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AUTHOR	Auster, Ethel; Lawton, Stephen B.
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ABSTRACT

This interim report of the EISO project concentrates on the early phases of the project responsible for the operation of an online bibliographic search service for educators in Ontario. Implementation of services involved providing access to data bases maintained by SDC and Lockheed through a terminal located in the Ontario Institute for Studies in Education (OISE) Library: making available copies of documents cited in computer generated bibliographies; and training consultants to help clarify and negotiate requests from users in the North Bay area of Ontario. This report reviews relevant literature on information centers, intermediaries, and changes in education, and describes the social effects of integrating EISO into OISE. The training program for Educational Information Consultants is evaluated. The business systems, designed to account for the financial aspects of the service, are outlined, and an actual user's experience negotiating a search request is provided. The theoretical models utilized in EISO's set-up are outlined in detail. Data collected for user studies are included together with preliminary findings. Appendices include sample time lines, job descriptions, data collection instruments, business forms, publicity items, and project training programs. (Author/MBR)

Educational Information System for Ontario

Interim Report
March 1975 – February 1976

Ethel Auster

Stephen Lawton

The Ontario Institute for
Studies in Education

THIS RESEARCH PROJECT WAS FUNDED UNDER CONTRACT
BY THE MINISTRY OF EDUCATION, ONTARIO

ABSTRACT

Early in 1975, the Ontario Ministry of Education contracted with The Ontario Institute for Studies in Education to undertake a research project to examine the viability of operating an on-line bibliographic search service for the educators of this province. The project was to study, among others, the nature and levels of demand in Ontario for such a service; to develop and refine methods of placing search orders, order delivery, and advertising; to determine manpower, technical requirements and fiscal viability; and to assess the effectiveness of an intermediary in interacting with users in a remote geographic setting in Northern Ontario.

The earliest phases of the project involved implementation of the search service. Access to the data bases maintained by System Development Corporation and Lockheed, both in California, was provided by a terminal located in the OISE Library. Copies of documents cited in computer-generated bibliographies were made available for requestors in microfiche or hard copy formats. Educational Information Consultants were trained to help clarify and negotiate requests from users in the North Bay area of Ontario.

A systems model is used to organize the multitude of factors that are relevant to this study. The search service is analyzed in terms of input, process, and output variables. At each stage, sociological, psychological, and economic characteristics of the users, analyst and service are examined. The entire framework is considered within an adoption of innovations model.

This interim report, written five months after EISO was fully operational, concentrates on the early phases of the project. The relevant literature on information centres, intermediaries, and change in education is reviewed; the social effects of integrating EISO into OISE are described; the training programme for the Educational Information Consultants is evaluated; the business systems designed to account for the financial aspects of the service are outlined and an actual user's experience negotiating a search request is provided. The latter chapters of the report outline in considerable detail the theoretical models used and provide the context for the collection and analysis of the data. Data collected are briefly described and preliminary findings presented. Extensive appendices give samples of the time-line, job description, data collection instruments, business forms, publicity items, and training programmes of the project.

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The first year of operation for the Educational Information System for Ontario has demanded a great deal from all members of the EISO staff. The Principal Investigators would like to acknowledge in particular S. Elizabeth Reicker, Search Analyst, who has served a multitude of clients from the Ontario education community and was primarily responsible for preparing Chapter IV of this report; Jutta Keylwerth, Research Officer, who collected and coded with meticulous care the data described in Chapter X; and Ann Yeung, Library Assistant, whose typing, maintenance of records, duplication of microfiche and able execution of countless other tasks ensured the smooth operation of EISO.

In addition to the contributions of the EISO staff, we gratefully acknowledge the cooperation and support given the project by units of The Ontario Institute for Studies in Education and personnel of the Ministry of Education for the Province of Ontario. We particularly appreciate the interest and commitment of the Educational Information Consultants who have enabled the EISO project to become a reality in the Northeastern Region of this province.

Finally, we would also like to thank Heather Dau for the cover design and Anne Kitchen and Susan Arbuckle who typed this report.

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CHAPTER I

Introduction

It is by now apparent to both educators and information scientists that we are in the midst of a rapidly changing environment with regard to information delivery requirements and techniques. Generous public and private spending on education in the recent past resulted in the production of massive amounts of information in the form of published and especially unpublished literature, such as reports, research studies, curriculum materials, proceedings, papers, and other documents. This store of knowledge, however, remained and continues to remain virtually inaccessible to the many practitioners in the field. Problems of dissemination and utilization have focussed around the lack of effective and efficient technology to transfer this information, and around the lack of individuals sufficiently knowledgeable to act as "knowledge linkers" between the research producers and the research users -- the local educators. Not without cause, public pressure has mounted to curb the rate of increase in educational spending and to justify the use of large sums allocated in the past.

It is in response to these and other circumstances and pressures, that the Ontario Ministry of Education contracted with The Ontario Institute for Studies in Education to undertake a study that would shed light on some of the issues and problems of information dissemination and utilization. Prior to the creation of the Educational Information System for Ontario (EISO), no computer-based, on-line bibliographic search service aimed primarily at educators

existed in this province. Nor did there at that time, nor does there yet, exist a data base consisting of entirely Canadian educational materials or documents. Obviously, then, if serious study was to be undertaken preliminary to the possible creation of any such provincial or national system, at least two areas would have to be explored and data collected and analyzed before any further progress could be made. One of these areas was the technical requirements and feasibility of creating an Ontario data base of educational information. To examine this highly complex aspect of information storage and retrieval, the Ontario Ministry of Education contracted with the Metropolitan School Board of Toronto to undertake a project entitled Ontario Educational Research Information System (ONTERIS). To look into the questions of dissemination and utilization of information, the Ministry funded EISO. Since there was neither a Canadian educational data base nor a search service to study, EISO set up a fully operational information service offering an interactive on-line bibliographic search service to the educators of this province by providing access to the existing ERIC data base. From the very first, then, EISO differed from the usual research contract in that it was not only to provide a rigorous research study firmly grounded in theoretical concepts, but it was also to have a large developmental component in the implementation of a search service available to educators on a cost-recovery basis. Thus not only would such normal aspects of contract research as research design, data collection and analysis have to be undertaken, but also some other more unusual activities would be demanded by the unique dimensions of the contract (see Appendix A): a business system would have to be established for the fee-based service, a publicity and advertising campaign would have to be launched to create awareness of the service among educators, a training programme would have to be established to train Educational Information Consultants who were to act as information intermediaries in geographically remote areas. Professional development activities, seminars, workshops, and Educational Information Stations added still other aspects to the study. The earlier phases of the project (see Time Line,

Appendix B), however, revolved around setting up the search service whose operation and use was to be studied. In addition to the Principal Investigators, an experienced staff was hired consisting of a search analyst who would negotiate information requests and operate the computer terminal, a research officer, and a library assistant. The search service was located in the OISE Library adjacent to the ERIC microfiche collection and its indexes.

The service provided by the Educational Information System for Ontario project assists educators in locating and duplicating materials contained in the collection of the Educational Resources Information Center (ERIC). Comprised of 16 subject-specialized clearinghouses, ERIC is an information gathering and disseminating network operating under the auspices of the U. S. National Institute of Education. The clearinghouses collect, index, and abstract research reports, conference papers, curriculum materials, including many from Canadian sources, and announce them monthly in Resources in Education (RIE). They also index more than 700 journals, including 26 from Canada, for Current Index to Journals in Education (CIJE). In all, the ERIC data base includes over 200,000 references, to which almost 2,500 new references are added each month. The EISO service provides interactive, on-line computer access to the ERIC data base via a terminal located in the OISE Library.

To use the search service, the educator submits his information request to the search analyst, a specially trained reference librarian, who rewords the content to conform to a list of subject headings designed for computer scanning of the ERIC data base. The search analyst queries the data stored in a computer operated by System Development Corporation in Santa Monica, California. When combinations of subject headings are entered, the number of relevant citations and sample citations are printed on-line. If the citations are appropriate, a bibliography containing the complete set of references and abstracts is printed off-line in Santa Monica and mailed directly to the requestor.

Should the requestor wish to obtain copies of the original documents cited in the bibliography he may order documents available on a microfiche and

paper copies of journal articles from EISO. Paper copies of fiche are available from ERIC Document Reproduction Service. Complete order information is sent to users after their search has been completed.

This service is seen as being especially helpful to those preparing reports, papers, speeches, proposals; to those seeking alternative solutions to problems; and to those working under pressure of deadlines.

CHAPTER II

Information Centres, Intermediaries, and Change in Education: A Review of the Literature

The numerous and diverse specifications of the Ontario Ministry of Education contract entitled "Educational Information System for Ontario" are grounded in several separate research traditions that fall within the social science disciplines of information science and education. The setting up of an automated bibliographical search service to provide on-line access to ERIC materials to the province's educators through a terminal housed in the OISE Library can be seen as a modern extension of the information services special libraries have provided for decades. The study of the use of the service and its effectiveness stem from the tradition of user studies and information system evaluation that have been the major concerns of information scientists in recent years. The role of the intermediary in interpreting and transmitting information has evolved from the concept of the agricultural extension agent prevalent in the U.S. at the turn of the century, while the introduction of this essentially new service and mode of obtaining information must be seen in the context of the research carried out on the planning of change and the adoption and diffusion of innovative practices in education. This brief introduction cannot hope to examine each of these traditions in detail. A number of extensive bibliographies, however, have been compiled and provide valuable guides to the literature. Among the most helpful is the 4000 item compilation, Knowledge Utilization

and Dissemination (Havelock, 1972), which views the flow of knowledge as a process involving a sender who communicates knowledge over a period of time to satisfy the needs of a receiver in a specific geographic location through a variety of mechanisms or strategies such as informal contacts, conferences, and publications. The effect of these efforts feeds back into the cycle to modify and improve it. It is important to grasp each of these components as separate variables each of which may be investigated in depth in its own right or in combination with the other variables and related to a variety of subject areas such as education, agriculture, law, technology, social welfare, etc. The Havelock bibliography covers not only these areas from 1967 to 1972, but also treats the support systems needed for knowledge flow: institutions that fund, train, recruit, control, protect, or plan dissemination and utilization of information. The more technical aspects of information retrieval systems are treated in the somewhat dated but still valuable bibliography Evaluation of Information Systems: A Selected Bibliography with Information Abstracts (Henderson, 1967). Although many changes have occurred in the field since this publication was issued, its entries represent the discussion of the growth problems of information systems that are now of concern to Canadian specialists. The latest trends in this field may be followed through the Annual Review of Information Science and Technology (Cuadra, annual), which from 1966 to the present has presented chapters devoted to state-of-the-art surveys of major issues. The topic of change in education has received much attention. A concise bibliographic essay that presents the major scholarly positions for school administrators is entitled Observations and Analysis of the Literature on Change (Maguire, 1970). A more comprehensive listing is available in An Annotated Bibliography on Administering for Change, (Maguire et al., 1971). This may be supplemented by Volume II of the Oregon Studies (Schalock, 1972) which presents a 642 page compendium of the scholarly literature that describes research, development, diffusion, and evaluation activities. The literature of the adoption and diffusion of innovations is comprehensively covered by Communication of Innovations

(Rogers and Shoemaker, 1971), which synthesizes and analyzes over 1500 relevant studies.

The annotated bibliography at the end of this report reflects the major theoretical and practical concerns of the Ontario Ministry of Education contract. Part A treats those works on change and innovation that will shed light on the aspects of an educational information system which derive mainly from the education literature. Emphasis has been placed on the major theoretical contributors to the field with a few examples of practical implementations. Part B describes the use of ERIC by schools in the U.S. Often this use has had to be inferred since no service run exclusively by or for school boards could be found. Indeed, identification of literature showing use of ERIC as a specific data base by schools is made difficult because "ERIC" as an identifying or descriptive term was not used consistently in Research in Education until 1972. However, examples of services provided by intermediate units, such as state and local education agencies, have been included to shed light on level of requests, pricing structures, staffing, and administration of similar services where possible. Part C draws upon the literature of librarianship and information science to illustrate those issues and concerns that should be considered in setting up an information service. The material is generally current, conflicting, and of limited applicability. This is not surprising in a field which is still new and seeking common standards and a shared philosophy.

The first part of this annotated bibliography deals with change and innovation in education, and it is to this topic that we now turn. It would seem reasonable to suppose that a general overview of the innovative process would be useful to those interested in deliberately encouraging the use of a new information system. Although studies on the introduction of innovations can be traced back a long way in other fields (Rogers, 1962; Chin and Benne, 1969; Rogers and Shoemaker, 1971), it was not until the 1930's that Paul R. Mort at Teachers College, Columbia University, became the first major scholar to study the adoption and diffusion of innovations in education. During the next 20 years,

he and his graduate students had a virtual monopoly on the field, producing over 200 studies. They used the school system as the unit of analysis and obtained their data usually through mailed questionnaires to school principals or superintendents. They found that the amount spent per pupil was the most accurate single indicator of a school's innovativeness (Mort and Cornell, 1938). They found, too, that the diffusion of educational innovations through the school was a very slow procedure: that 3-4% of school systems had accepted a new practice at the end of a 15 year period and that it may take as long as 50 years from the time a new practice, such as kindergartens, is introduced until it is widely used in the schools. This rate of adoption is represented by an S-shaped curve (Mort, 1953). The launching of Sputnik with its concommitant emphasis on the importance of scientific and technical education combined with the American respect for change as a positive value worked to speed up this slow rate of adoption so that by 1965 Carlson was reporting only a five year time lag for the adoption of modern math in the schools (Carlson, 1967). It is important for researchers to be aware of this slow pace if they are not to abandon their efforts at innovation diffusion prematurely before they have had a chance to catch hold.

The characteristics of adopters have also been analyzed. It is possible to categorize adopters on the basis of their degree of innovativeness. Those who are among the first 2.5% to adopt an innovation have been termed "innovators". They are followed by "early adopters" who represent the next 13.5%, "early majority", are the next 34%, "late majority", also 34%, and finally the last 16% or "laggards" (Rogers and Shoemaker, 1971). The personalities of innovators have been examined by a number of recent studies. The superintendents who adopted modern math earliest were seen to be more heavily involved in social networks and were higher in the status structure than late-adopting superintendents. They tended to be younger and more mobile and to have higher professional ratings (Carlson, 1967; Rogers, 1965). Early adopters read more, travel more, have higher incomes, are better

educated than late adopters of innovations (Katz, 1969). Further, the "innovator" tends to be venturesome, rash, daring, and a risk taker. He is a cosmopolite rather than a localite. The "early adopter", by comparison, is a better integrated member than the innovator of his social system: he is an opinion-leader looked to for advice by his colleagues (Rogers and Shoemaker, 1971). The personal characteristics of school administrators at various levels are important because they have been shown to play a significant role in the implementation of educational innovations (Leas, 1962; Hinman, 1966; Lawrence, 1967; Henderson, 1968). School systems, too, have characteristics that contribute toward an innovative disposition. The most innovative schools have been shown to have open climates, higher expenditure per student, and younger, more numerous, and less experienced staff (Halpin, 1966; Marcum, 1968; National Seminar on Diffusion, 1973).

The characteristics of the innovation itself have been found to effect the success of its adoption and diffusion. Further, it is the attributes of the innovation as they are perceived by the potential user and not the researcher that are important. The major studies in this area have been summarized to show that the attributes of an innovation that are positively related to its adoption are the degree to which it is better than the practice it replaces; its compatibility with existing values, experiences, and needs of the potential adopters; the degree to which results can be observed by others; the degree to which it can be tried on a limited scale (Rogers and Shoemaker, 1971). Complexity of an innovation is negatively related to its rate of adoption. Reliability was seen to be an attribute that superseded cost in importance in some cases (Fliegel and Kivlin, 1966).

But regardless of the attributes of the innovation, or of the potential adopter, or of the adopting system, the indispensable ingredient necessary to ensure successful adoption and diffusion of an educational innovation is the presence of an intermediary. Whether he or she is referred to as a change agent (Roger and Shoemaker, 1971) or a linkage agent (Havelock, 1973b) or

a knowledge linker (Farr, 1969) or a field agent (Sieber et al., 1972), or an educational information consultant (Educational Information Consultant, 1971), his role has been to put local practitioners in touch with the latest findings of researchers and to facilitate the implementation of theory into practice. As has been pointed out, the field agent in education is significantly different from his agricultural predecessor: he must deal with organizations and with members of organizations, not autonomous clients; he must usually deal with clients who are not economically motivated; and the results of his efforts are not as clearly visible or as easily assessed (Sieber et al., 1972).

His exact role in education is a varied and complex one. One expert suggests that he can bring about change in at least four different ways: by being a catalyst who pressures the client system to change, by offering solutions to felt problems, by showing the client how to bring about change as a "process helper", and by putting the client in touch with resources of various kinds to meet his needs (Havelock, 1973). None of these roles is mutually exclusive. All involve building a relationship of trust and confidence with the client. The role is the more difficult because it is vague (Sieber et al., 1972), and the expectations of clients are many and conflicting (Bos, 1966). But even so there is ample evidence to show that the efforts of change agents significantly affect the rate of adoption of an innovation. The agent is most likely to be successful if he works through opinion leaders in the client system, if he has a high degree of credibility and empathy, and if his programmes are compatible with his clients' needs (Rogers and Shoemaker, 1971).

The importance of the agent's role in the dissemination of educational information has achieved a renewed emphasis in the past five years as the need to relay the results of R & D efforts to the field was recognized. Agents who are in the unique position of being able to put those who need to know in touch with those who can inform them are seen as central to the flow of information (Farr, 1969). Recent case studies have helped to shape the position (Lindsay, 1973; Robinson, 1973; Havelock and Havelock, 1974) and have shown the

severely decreased usefulness of an information service which lacks such personnel (Cutter, 1974).

Some of the difficulties these intermediary agents are likely to face have already been alluded to: the requisite interpersonal relationships require the utmost delicacy. Human nature being what it is, people are not naturally given to change their ways unless strongly motivated. Schools, in particular, generally have little incentive to innovate. The reasons for resistance to change have been attributed to obstacles in the individual such as force of habit, self-distrust, insecurity (Watson, 1969), fear of being unpopular with peers (Pierce, 1963), and lack of knowledge about new practices (Carlson, 1965). The school system is conservative by nature, non-competitive, usually lacking change agents, usually offering no rewards for innovativeness. Its silent priorities tend to be conformity to norms, respect of vested interests, and rejection of "outsiders" (Pierce, 1963; Carlson, 1965; Watson, 1969).

The dissemination of educational information is dependent, of course, upon access to a knowledge base of educational research. And it is upon the efficient operation of an information service that the intermediary and his clients must rely for their information. But if the role of the intermediary is fraught with uncertainty, the role of the Educational Information Centre is equally confused. A recent report lists over 125 agencies engaged in computerized bibliographic searching of the ERIC data base (Embry, 1974). These agencies include Research and Development Centres, Regional Educational Laboratories, Instructional Materials Centres, Regional Offices of the U.S. Office of Education, private corporations, professional organizations, and university libraries. The services offered and the clients served are presumably even more diverse and certainly more numerous than the sponsoring agencies. For the purposes of this report, we have restricted examples to those state educational agencies that provide computerized search, retrieval, and dissemination of ERIC materials to educators. Even so, we find little uniformity in the services offered: some centres provide copies of fiche free, some provide previously

prepared information packages, some supply readers. The level of requests varies from 150 in Florida to over 1000 a month by the regional services of the Northern Colorado Educational Board of Cooperative Services (Cutter, 1974). Some centres rely on subscriptions for revenue, others charge per individual request. Funding of these centres usually is a combination of federal, state, and local participation supplemented to different degrees by revenue from users.

The existing literature on information dissemination reflects the newness of the field. Obviously, for a special library or a library within an academic institution to make available information retrieved from bibliographic data bases involves a number of key decisions and issues. Accurate information on these decisions and issues would be helpful. But when we turn to the literature, we are reinforced in the view that this field is still in its infancy. The costs of providing an automated search service are necessarily very closely linked to the type of organization, the mode of retrieval, the type and size of staff, and other local conditions. The models that have been developed may involve complex mathematical formulae (Cooper, 1972) or less esoteric means (Elman, 1975), but all require adaptation to local conditions. Most of the cost models to date have referred to the cost of developing the data base itself (Lancaster and Climenson, 1968) and not to the provision of information from commercially accessible tapes.

It is not surprising that costs have not been clearly calculated when the whole issue of the library's role in providing such information is itself still unresolved. Although it was thought in the early days that libraries would be required to acquire and manage magnetic tapes and that librarians would therefore need to know something of computer applications, it is becoming accepted now that subscribing to available search services provides an economic and practical alternative. As late as 1973, arguments were being made that the library should act as an information broker providing access to patrons of centrally maintained, commercially available data bases as part of a normal reference function (DeGennaro, 1973). The actual implementation of such a

service is still rare enough to warrant an article in a recent issue of College and Research Libraries (Hock, 1975). The textbook sponsored by the American Library Association for the purpose of training librarians in computer-based reference services (Mathies & Watson, 1973) is a clear indication of the course the profession is being urged to take in the future. In fact, because the formulation of search strategies requires delicate but persistent questioning of the patron, the new emphasis on question negotiation so vital to an automated system promises to sharpen those reference skills that have all too often become dormant!

Not only has the integration of data bases into the library -- especially reference services -- been problematic, but also it has brought with it another issue that goes to the philosophic core of traditional librarianship: charging for services. Because costs (no matter how calculated) are incurred in providing these new services, and because library budgets are not likely to increase, the user will have to be charged for access to computerized bibliographic information (Penner, 1970; DeGennaro, 1973; Lawton and Auster, 1974). This foray into the area of commerce has focussed attention on the lack among librarians of promotional and marketing skills that will be necessary to operate successfully self-supporting information services (Kuehl, 1972; Stern et al., 1973). Not only will a familiarity with consumer behaviour research, channels of distribution, and market segmentation analysis prove valuable, but also a more accurate means of predicting future demand for services should have implications for administrators regarding personnel, software, and hardware requirements (Ware, 1973; Lawton and Lawton, 1975).

In view of the unsettled state of the art, it comes as no surprise to learn that evaluation of information centres is also uncertain. The most detailed evaluation studies have tended to concentrate on the data base itself, rather than on the delivery and use of the information it contains. Numerous studies have refined the accuracy of precision recall ratios (Lancaster & Climenson, 1968; Cleverdon, 1974). The evaluation of the ERIC system

(Fry, 1972) and the earlier MEDLARS study (Lancaster, 1969) provide comprehensive examples which the practitioner may pare down to meet some of his needs. The recent ERIC report entitled "The Evaluation of Educational Information Centres" summarizes some of the problems inherent in attempting to evaluate an EIC and concludes with the following recommendations:

1. Efforts must be made to bring about some consistency to the terminology associated with educational information centres, their roles, and their evaluation needs. This task should be carried out in full cognizance of similar efforts emerging from the broader field of information science. The recent establishment of Information Services to Education Special Interest Group within the American Association of Information Science should assist this group.

2. The notion of educational information services versus the utilization of education information in the educational change process must be more fully researched.

3. More systematic efforts must be made to evaluate training resources in the light of specific operational aspects of the educational information centre. Most important are the skills related to query negotiation, search techniques, relevance judgements (recall and precision) and extension agent for other utilization support.

4. While more rigorous evaluation strategies are needed for impact evaluation of information centres, replication of existing studies are needed to ascertain their applicability to a wide variety of centres.

5. Existing centres must apply more rigorous programme budgeting and cost analysis techniques in order to provide a management data base from which cost-benefit characteristics can be determined (Brickley & Trohoski, 1974, p.13).

From this review of the literature one may draw then several conclusions. It is clear that the development and supply of an educational information system for Ontario is an interdisciplinary effort involving the research traditions of at least two major social science disciplines: education and information science. The literatures of these two fields remain distince and separate: one turns to the education literature for insights on

change and innovation and to the information science literature for background on information centres and user evaluations of services. This separation means that until very recently both disciplines were developing independently, each with its own experts, who rarely, if ever, collaborated. While the information scientists were involved in solving the problems of creating bibliographic data bases that were machine-readable, the educationists were concerned with the adoption and diffusion of new practices. Interestingly enough, the ERIC data base provides the best common source to both fields. It is only in the 1970's that there has developed a trend within diffusion research to concentrate on knowledge dissemination and utilization.

The newness of the field as well as its interdisciplinary nature means that there are few researchers or practitioners with experience or expertise in both fields. Havelock and Sieber are perhaps the most closely related to many of the concerns of this study. Even their usefulness is limited, however. They still see the intermediary in terms of a change agent -- the role of an information agent or consultant who does not become directly involved in the change process has yet to be spelled out.

The unique qualities of the Canadian education system further limit the direct applicability of some of the U.S. experiences. A shared funding scheme, for example, involving federal, provincial, and local authorities such as was used to finance the Pilot State Dissemination Project (Sieber, 1973) is not applicable to Ontario. Needless to say, there are no Canadian studies in the area.

The project could not draw upon a coherent theoretical framework. They have had to train personnel and create the educational information centre, define its services, and establish its costs so as to assess its fiscal viability. These developmental aspects merged with a research study investigating users and uses of educational information in target areas that are geographically remote from where the project centre is located. These problems indicated one thing with certainty: the project would continue to encounter new problems

as its work proceeded. But seen in the broad context of educational developments, this Ontario project is also in the forefront of necessary and significant research in education and information.

CHAPTER III

EISO and OISE: The Social Effects of Creating a New Setting

The implementation of a major change in an existing organization is fraught with numerous pitfalls. The literature of education abounds with well-intentioned innovations that failed (Gross et al., 1971; Smith & Keith, 1971; Wacaster, 1975). The reasons for failure are numerous and varied: they have been attributed among others to the innovator, the innovation itself, and the adopting organization. Oddly enough, however, little of this accumulated wisdom is apparent in the literature of librarianship or information science, the subject area of special relevance to the Educational Information System for Ontario. Rather, articles in library journals urging the adoption of computerized access to information, though valuable to the practitioner, limit their concern to which data bases to choose and reasons for the choice (Williams, 1975). Rarely are the human problems of implementing such a major change broached. It is the purpose of this chapter of our report to explore the social, psychological, and organizational implications of implementing a computer-based, fee-charging reference service into an existing library setting. In keeping with our view of EISO as an innovation, the appropriate research will be examined for insights that may be gleaned when introducing such a change into an existing setting.

Miles defines an innovation as a "deliberate, novel, specific cl which is thought to be more efficacious in accomplishing the goals of a (1964, p.14). Gross, Giacquinta, and Bernstein (1961, p.16) define a zational innovation as "any proposed idea, or set of ideas, about how t izational behaviour of the members should be changed in order to resc problems of the organization to improve its performances". Rogers a Shoemaker (1971, p.19) subscribe to the following:

> "An innovation is an idea, practice, or object perceived as new by an individual. It matters little, so far as human behaviour is concerned, whether or not an idea is 'objectively' new as measured by the lapse of time since its first use or discovery. It is the perceived or subjective newness of the idea for the individual that determines his reaction to it. If the idea seems new to the individual, it is an innovation.

The definition put forth by Zaltman et al. (1973, p.10) that dra and modifies this last usage considers an innovation "any idea, practic material artifact perceived to be new by the relevant unit of adoption". adopting unit may be an individual, an organization, or a sub-section v an organization. For purposes of this chapter the innovation will be th project in all its aspects, the adopting unit will be a subsection of the l specifically Reference and Information Services.

There can be little doubt that the service is a genuine innovatio matter which definition is used as authoritative. Everything about the service represented a radical departure from the Library's normal mo operation. Not only was the idea of such a service new, but also the m First, of course, was the introduction of computer-based technology fo supplying bibliographies that had previously been compiled manually. only could the computer search through vast quantities of material, but could do so more quickly, in greater depth, and more efficiently than a (it also never got bored or developed eye strain).

Next came the fact that the service was to be paid for by the cli The librarians had compiled bibliographies on specialized subjects for

province's educators since the inception of the Institute, but a charge had never been levied for this service. Now came the concept of "cost-recovery": an attempt to establish a bibliographic search service on a break-even basis.

Third, this was the first time the Library had participated in contract work. There was uncertainty as to what effect this would have on the rest of the staff and the organization itself.

Fourth, because the Library was inexperienced in contract work, and this particular government contract happened to be one of the largest in the Institute, Institute administrators decided that its personnel and budget should be handled by the Department of Educational Administration, which was accustomed to handling large projects. For the first time, an academic unit would be responsible for staff assigned to the Library, and new forms of communication and cooperation would be required.

The first of these new forms concerned the direct responsibility for the project itself, which was to be administered by an academic department, but headed jointly by an academic and a librarian. Never before had such a joint venture been undertaken.

Finally, the project necessitated that new equipment be purchased, new facilities built, new staff hired, and new business procedures established. Publicity efforts, normally regarded with suspicion by libraries, were an essential part of the project. And skills, such as research design and data analysis, normally not included in the librarian's repertoire, became of vital importance.

In short, such major philosophical, technical, organizational changes were instituted that the EISQ project was certain to precipitate major changes in the existing operation of the Library.

Rogers and Shoemaker (1971, p. 330-35) classify the consequences or changes that occur within a social system as a result of the adoption or rejection of an innovation in three main groups: functional or dysfunctional, direct or indirect, and manifest or latent consequences. The first type

indicates whether the effects of the innovation were desirable or not, the second type distinguishes between those changes in the social system that occur in response to the innovation and those that result from other or additional causes, and the last type makes clear which changes are recognized and intended by the innovators and which are not. Their main point, however, is not to produce an exhaustive listing; it is, rather, to emphasize that consequences are not one-dimensional, but can be expressed in numerous ways, and that innovators must be aware of the dynamic and complex impact of introducing an innovation into a social system.

The immediate result of the introduction of the EISO service on the staff of Reference and Information was a reduction in the workload. Compilation of bibliographies, a major function of the librarians prior to the introduction of EISO, was reduced by 60% in the first three months. This reduction in workload created a substantial amount of "found" time, which was used to re-examine the purpose and functions of the R & I service. As a result of this review new responsibilities were defined and assumed, new roles developed, and a functional reorganization of the unit was undertaken. Each librarian undertook major responsibility for a new function: one acted as liaison to field development staff, the second chose to develop orientation activities, and the third acquired the responsibility for the unit's book purchases. All of these functions had previously been part of the job of the head of the reference section: what had started out as a reduction in workload became a major change in role relationships.

One of the most significant though indirect effects of the introduction of the new service was what Zaltman et al. refer to as the "gateway capacity" of the new innovation (1973, p.45):

> In addition to the intrinsic value derived from the adoption of an innovation, an additional value can accrue to the extent that the adoption of an innovation can open avenues to the adoption of other innovations. It could well be that the increased opportunity for the adoption of other innovations is the intrinsic value of the initial facilitating innovation.

This certainly turned out to be so in the present case. For example, when it became clear that neither teachers nor graduate students balked at paying the $30 charge for the computer bibliography, the librarians began wondering whether they could develop other services to raise revenue, and within a few weeks, they had arranged to provide specialized bibliographic research for a professor on a fee-paying basis. The example provided by EISO regarding contracts undertaken by library staff led shortly afterwards to another contractual agreement whereby the Library would provide facilities and services for OTEC students. The philosophical, psychological, and administrative barriers that had prevented the Library from being paid for services rendered had effectively been broken. Although the innovators of the project had privately hoped for this result, it had not been openly discussed or encouraged by them. It could, in fact, be regarded as an indirect as well as latent effect.

In addition to stimulating an expansion of services and other major re-orientations of existing library activities, the new service produced some minor but interesting demands for change. Since the EISO service reproduced microfiche for sale to users of the search service, and since it was obvious that the duplicating equipment was available on the premises, the Field Centres and other regular users began to request that the Library expand its duplicating services to include microfiche (as yet no action on this request has been initiated). In addition, the EISO service increased the use of photocopying machines by clients as well as EISO staff, in the process increasing also the number of journals and microfiche that required reshelving.

Inevitably the changes brought about by the service results in several forms of resistance. Watson, in a frequently anthologized article (1973) is thorough in outlining reasons why individuals and social systems might be expected to resist change. He points to aspects of human personality that naturally prefer stability and familiarity (homeostasis and primacy, in his terms). Habit is a difficult thing to overcome and established ways of doing things (what Sarason, 1971, calls "regularities") tend to take on a sanctity.

If the individuals affected by the changes are themselves insecure and distrustful, they are more likely to feel threatened by innovative methods. The introduction of a new technology to perform a function previously done with pride and skill is likely to create immediate concerns about the security of one's job. The fear of being replaced by a machine, though less obvious among professional than clerical or assembly-line workers, is real and must be recognized and dealt with.

The attention and diversion of resources to the new service may also arouse envious feelings, while the hiring of new staff with different, "more modern" skills may create fears among regular staff members that their own expertise is becoming obsolete. Their purposes and functions come into question and a re-alignment of roles becomes mandatory. All these responses were to be seen in the reference library as the EISO service was introduced and began to operate.

If Schein (1974) is right about the socialization of professionals into their jobs, we might expect that individuals who have been in their positions longest, who have been away from the influence of their graduate training longest, will most likely offer the strongest resistance to innovative changes. Other theorists have also pointed out that innovators in education (and there is little reason to think that librarians are significantly different) tend to be younger, more involved in social networks, read more, travel more, have a higher income and social status, and be more "career-bound" than "place-bound" than their colleagues (Carlson, 1965; Katz, 1969; House, 1976). As these writers suggest, many of the reasons for resistance to change may be private and personal, arising from the distinctive natures of the people involved. Resistance may vary in type and intensity during different stages of the innovation's life cycle and among different staff members.

All this is not to suggest that overt and dramatic resistance is inevitable or that efforts to avoid it will prove useless. On the contrary, by anticipating opposition in a realistic way, the innovator can go a long way toward disarming

it. Watson (1973) suggests that resistance will be less if those participating in the change feel that it is their own; if the change reduces rather than increases their present burdens; if it is in keeping with their values; if it does not threaten their security; if it offers them opportunity for growth. He emphasizes the need for group consensus before adopting an innovation, for feedback mechanisms, acceptance, trust and confidence among group members. Equally important is the need for wholehearted administrative support.

In the case under consideration, serious opposition was kept at a minimum, though of necessity the process of gaining the government contract was not a participative one. The facilitating strategies recognized the importance of full and open communication and feedback mechanisms, the value of incentives to promote acceptance more readily, and the necessity of congruity both socially and professionally between new and existing staff members. To keep the information flow steady and accurate at the upper administrative levels, an advisory committee was established with representatives from the academic department, the library, and the project. This committee ensured that issues pertaining to all three areas could be dealt with in a consistent and cooperative manner. On a day-to-day basis, one staff librarian was asked to work with the project staff in the library to resolve problems of practical detail. In addition, demonstrations and seminars explaining the new service were held, and project reports of a non-confidential nature were circulated for information to all library staff members. The most effective means of keeping in touch, however, tended to be social: an ice cream party early in the process provided an opportunity for the two staffs to mingle with one another. It was followed by informal gatherings to celebrate Christmas and other festive events during the year. The addition of a coffee pot to an empty office did much to integrate the project and library staffs and to eliminate social as well as organizational barriers.

Realizing that there are usually few tangible incentives for staff members to engage in innovations (House, 1976), the project team devised a number of "rewards" that proved to be attractive and persuasive. The library staff was given the equivalent of $100 free time per month to access the computerized data bases for purposes related to their own work interests. There was also the prospect that the computer terminal, microfiche duplicating equipment, and microfiche reader as well as a fully equipped office built and furnished from Field Development funds would become Library property at the completion of the contracted research. Lastly, funds to enable the hiring of two temporary staff members were allowed to revert to the Library.

To minimize the gap between new and existing staff, the decision was taken to hire a fully qualified librarian rather than a research officer or computer expert to run the service aspect of EISO. This congruence between the qualifications of the new and existing professionals went a long way toward increasing her acceptance by regular staff.

Finally, the new service was made as nearly self-contained as possible in terms of workload. This was done not merely to control and study research variables accurately, but also to minimize the workload regular staff members would have to bear as a direct result of the project's existence. For example, the EISO assistant did all the photocopying generated by project clients, not relying on the library's photocopying services.

Obviously, facilitating strategies will be more effective if positive efforts are exerted not only by the innovation's proponents but also by the staff of the adopting unit. Again, the project was particularly fortunate to have the unswerving support of the unit's administrator. Through her intervention, reciprocal integrative efforts were undertaken. The project staff were urged to participate in library staff meetings and to give progress reports. They were invited to social functions both by the library administration and by individual staff members. The project office was included in the orientation sessions and tours given by the librarians. And a generally positive

feeling toward the service, the research, and the staff was encouraged by the unit administrator's affirmation of the professional ideals of her staff. Ironically, as a side effect of the determination to minimize any disruptive influence of the new service, it became common among the librarians to deny that it had any significant effects at all, making it a bit more difficult to deal with valid objections and to take steps to relieve unnecessary fears.

It should now be clear that the introduction of a computer-based reference service into an existing organizational setting is a complex undertaking. Some of the problems may be foreseen, others cannot. It is hoped that by drawing upon the existing literature of education and information science as well as actual experience, a contribution has been made toward documenting some of the social, psychological and organizational consequences that might be expected by those who embark upon a similar undertaking.

CHAPTER IV

Training Educational Information Consultants

When, early in 1975, the Ontario Ministry of Education contracted with The Ontario Institute for Studies in Education to investigate the demand, the technical requirements, the use, and the fiscal viability of offering an interactive on-line bibliographic search service to the educators of this province by providing access to the existing education data bases, one of the specifications of the contract was to "study the effectiveness of an intermediary (consultant) in interacting with users in a remote geographic setting in northern Ontario in clarification of search scope and in interpretation of output" and to "develop and refine strategies of utilizing such services through existing remote service facilities, such as a field office of OISE, a regional office of the Ministry of Education, and an office of a school board".

The concept of change agents is of course not a new one but derives from the use of agricultural extension agents in the U.S. at the beginning of this century. Nor is the use of change agents in education a recent development. However, the use of intermediaries with specific functions with regard to information purveyance is a direct result of the increasing rate of information production combined with the recent invention of computer technology to handle it.

It has by now become commonplace to refer to the "information explosion" in all fields of knowledge. We are told that knowledge is doubling

every ten years and is likely to continue to grow at an increasingly faster rate. Information specialists have been aware of the problem for some time and in the last two decades have attempted to find new ways of controlling and making available vast quantities of materials to specialists in various subject areas. Although sophisticated technological advances in information retrieval were first applied to the areas of medicine, chemistry, physics, and engineering, they are now also available for use in education and psychology. Ironically, however, the increase in the amount of information available and the creation of new methods for handling it have not made the life of the average educator easier but have, on the contrary, served to increase the "knowledge gap". While it may no longer take decades for a new educational practice to be widely adopted in the schools as it did when Mort made his famous studies, we have little evidence to show that the findings of educational research are having a significant impact in the classroom.

Those who have devoted serious study to the problem, Sieber (1972) at Columbia, Havelock (1973) at Michigan, and Hood at the Far West Laboratory, have all pointed to the lack of training the average educator, be he teacher or administrator, has in being able to identify sources of information in a systematic way: he does not know what bibliographic tools are available, which are most likely to be useful to him, where they are located, how to get them, or how to use them. Further, he is unable to translate what he does find and apply it to his own classroom or school. Often, he is even unable to articulate his problem in such a way as to be able to find help in solving it. To help bridge the gap between the research and the classroom, the scholars have suggested the use of linkage agents of various kinds. These people would ideally be people knowledgeable about available resources, familiar with the needs of local educators, and skilled in facilitating the introduction of new practices into the school setting. Although, as both Havelock and Sieber realized, persons with such skills are still rare; the Province of Ontario is particularly fortunate in that various mechanisms and organizations are already in existence

whose function it is to help local educators in various ways. Examples of such agencies are the Regional Offices of the Ministry of Education and the Field Centres of OISE. It followed naturally then that in selecting persons to act as EICs, the project team would turn for trainees to these established local sources.

As a result of discussions with Ministry officials, the North Bay area (Region 3) consisting of 17 Boards of Education was chosen as target region from which detailed research data would be collected on the effectiveness of using Educational Information Consultants to negotiate information requests with users. This region also received preferential treatment with regard to equipment, price structure for searches, and professional development activities.

In order to compare the use of fiche between schools with and without microfiche readers, portable readers were installed in several local elementary public and separate schools. Along with these were installed "Educational Information Stations" containing sample bibliographies, fiche, journal articles, search request and order forms, and instructions for using the EISO service.

To test the level of demand for searches in relation to price charged per search and to test the effect of offering free searches as a stimulus for further usage, a special price structure was implemented for the 17 Boards in Region 3, the local Community College and the Faculty of Education, and the Regional Office of the Ministry of Education. For the boards and colleges, free searches were allotted based on the number of students enroled. The Regional Office allocation was based on the number of education officers employed. For example, with one free search per thousand students, and with a minimum of five free searches per board, the Nipissing Board with a total student population of over 13,000 students is entitled to 13 free searches. When the allotments of free searches are exhausted, the fee per search will be $20, well below the $30 fee charged the rest of the province.

But the most important variable differentiating Region 3 from the rest of the province is the provision of Educational Information Consultants.

Separate meetings with government officials, educators, and OISE personnel were held in North Bay during which the concept of an EIC was introduced and elaborated. The information consultant was pictured as an individual employed by a local agency who would be trained by the project staff to assist local educators in forumlating their information problems, and supplying them with whatever further assistance was required.

The Role of Educational Information Consultant was outlined as follows:

1. Gain access to potential users;
    a. Let clients know you are there and why
    b. Describe service you can offer
2. In cooperation with clients, identify information needs;
3. Help formulate problems;
4. Relay request to OISE;
5. Deliver and interpret bibliographies;
6. Assist in ordering complete documents;
7. Follow-up and evaluation.

Each information consultant was to be responsible for a specific constituency. As a result of these preliminary meetings, it was decided that there would be three "official" EICs who would be trained by the EISO team. Two of these would have back-up people supporting them. The EICs from North Bay were the Chief Librarian of Canadore College who would be responsible for clients in his College and in Nipissing Faculty of Education that shared the same buildings; an Education Officer at the Regional Office of the Ministry of Education who would help his colleagues from the local office; the OISE faculty member attached to the Northeastern Field Centre who would have primary responsibility for the five southern boards of education in the region and secondary responsibility for the 12 northern boards. Both the government and Institute EICs had colleagues available to assist clients in their absence.

On the understanding that the EISO search service would begin full operation in the fall, four of the possible five EICs were trained during the late summer and early in September 1975. Training took place at OISE, lasted a full day, and was paid for by the project.

The general objectives of the training sessions were to familiarize the EICs with the EISO project and service and their part in them. Specifically, they were to meet the project staff; become familiar with the contents and use of ERIC products such as Resources in Education, Current Index to Journals in Education, Thesaurus of ERIC Descriptors, and the microfiche collection; gain an understanding of search processes, both manually and automated; learn to negotiate search requests, interpret bibliographies, and order original documents in various formats. (See Appendix K for Training Schedule.)

Adjustments were made to the depth with which each of these areas was treated in accordance with the experience and background of the individual EIC. However, all underwent demonstrations and simulations of the EIC's role vis-a-vis the client and received information packages.

Although the technical aspects such as procedures for submitting requests to the analyst, ordering documents, and methods of payment were outlined in considerable detail and forms were supplied to each EIC for these purposes, other areas were treated with much less specificity. For example, the project staff purposely did not insist that the EICs follow through on the information delivery by becoming actively involved in the subsequent program changes that might result from the newly acquired information. It was felt that the variation in skills of the EICs as well as their different position militated against such a prescription. Further, it was also felt that the diversity of clients that formed the constituency of each EIC would negate any single overall follow-through scheme.

The purpose of this chapter is a strictly circumscribed and limited one: to gain an appreciation of the effectiveness of the training program of

the EISO project in training EICs. The results will be used to alter any training given to subsequently-chosen EICs.

The goals of the training program and a brief description of the training session were outlined above. A questionnaire was designed to evaluate the degree to which these goals had been met. This was mailed to each of the three EICs in North Bay with an explanatory letter (see Appendix K). A week after receiving this questionnaire, each of the EICs was interviewed in North Bay. These interviews supplemented the written responses, and gave a richer, more individualized picture of the way each EIC carried out his role and how adequately he felt his training had prepared him. They also served to highlight unforseen problems.

The Questionnaire

Each EIC attended a training session in the late summer or early fall. It was felt that an assessment of the training should be undertaken in the late fall, after the EICs had had some experience in their new role, but before all other training sessions had been completed so that modifications could be made in the programme. Consequently, the questionnaire was sent to the EICs in mid-November and followed up by an interview a week later. The investigators were interested in gaining information in two broad areas that might be labelled factual and intuitive (or cognitive and behavioural). The first concern was that the EIC go away from his training session with a clear understanding of the technical aspects of the project. i.e., how to place a search, how to interpret a bibliography, how to order documents, etc. These concerns were addressed by Questions 2 and 5. The second concern was to determine whether the individual trained had internalized his role as EIC, how he had done this, and to what extent. Questions 3, 7, 8, 9 and 10 address these issues in part. Expansion of these topics was followed up in the subsequent personal interviews. The remaining questions, 1, 4, 6, and 11, treated the overall conduct of the session, i.e., the length of time spent, the effectiveness of presentation.

In general, the EICs rated the overall effectiveness of the training sessions between good and excellent. Two of the three EICs commented on the lack of time available to cover all the topics, even though the session lasted well into the afternoon. As a result of this perceived lack of time, better ways of organizing the training schedule will be explored so that EICs do not experience frustration in trying to master too much material in too short a time. Our initial plan had been to have a two day training session, but this was discarded because of practical problems, time away from North Bay for educators involved, increased expenses incurred. Also, we as investigators were uncertain whether prospective EICs might be discouraged by a lengthy treatment of such "dry" subject matter. We had clearly underestimated the commitment that the EICs were willing to make! As experienced by the first EICs, the training was judged to be "too short" by all three trainees. However, all agreed that the level of treatment of the sessions was "just right"; two felt that the amount of detail conveyed was "just right" and one that more detail would have been useful. In commenting on this aspect of his training, one EIC felt that he would have benefited from working out more searches, both alone and in conjunction with the analyst. Another EIC felt hazy about how to relate Thesaurus terms to each other. Again, the investigators had underestimated the interest the EICs would have in actually constructing search strategies as distinct from helping clients to formulate their information problems in narrative form. With regard to helping the prospective EIC learn his new role, the training session ranked second in two out of three instances, after the trainee's previous experience working in the field. Next in importance in helping him to shape his role as EIC came trial and error in dealing with his clients. The problems that the EICs encountered were not directly related to the training session. These included the lack of customers, and the desire of local educators for curriculum materials of Ontario origin.

Of all the specific informational aspects the training session attempted to convey, only the purposes and services of the EISO project were perceived

as having been explained clearly. The other information components, use of ERIC indexes, formulation of search strategies, interpretation of bibliographies and ordering procedures for documents were all seen as having been explained fairly well, but below the optimum level possible. Lack of clarity and specificity were identified as limitations of the training sessions. Perhaps allowing more time as well as adding more detailed explanations would improve understanding.

Although there is a fair degree of agreement among the three EICs about the effectiveness of the training session with regard to the factual information conveyed, the types of behaviour changes that resulted in each case were different. While each prospective EIC was given the same list of objectives that he was expected to fulfill in his role as EIC, each was left to operationalize these objectives in a manner most suitable to his particular situation. Each brought his own experience, training, and personality to bear and created his own distinct orientation.

In answer to the question, "What do you see as your role as an EIC as a result of your EISO training?", the Ministry EIC responded: "Assisting the clients to select the exact descriptors which would provide the information which they wish"; the Field Centre EIC answered: "The value of an EIC would lie mainly in the conceptualization of a problem area prior [his emphasis] to a search"; the Community College/Faculty of Education EIC replied: "To give maximum assistance to the user I must be accepted as a 'confidante' and temporarily at least a participant in whatever project the user is undertaking. As in all reference work, the problem is to get the full story on what the client really wants and is trying to do. From that point my responsibility is to translate the problem or question to the access language of the system".

What becomes apparent here is the influence or effect the EIC's normal role has on his functioning as an EIC. The Ministry EIC, used to a traditional organizational environment, has chosen to emphasize the formalized, structured, classifactory aspects of information definition. He does not see himself initiating search requests, or following through by facilitating change. His approach is simply to select descriptors or subject headings for his clients.

The academic orientation of the Field Centre EIC is obvious immediately. He is not interested in the mechanics of strategy formulation, but in the accurate conceptualization of the problem. His emphasis is on the significance of the problem itself and creating or selecting appropriate theoretical frameworks. Interestingly enough, this EIC undertook a variety of activities, few of which were suggested by the training session, and most of which were discovered by interviewing his secretary and a student of his.

The emphasis of the third EIC reflects the concerns of public service librarians everywhere: the importance of good interpersonal relations with clients. So much of his effectiveness is a product of his acceptance as a colleague by his co-workers within the organization, that a prime focus of any role he fills will be to establish and strengthen such contacts. He recognizes that his new role derives from the reference techniques he is familiar with and he is able to adapt and modify this expertise to what may be regarded as a new variation on an old theme: computer-based reference services. Instead of using a card catalogue, he now uses a Thesaurus and in place of Library of Congress subject headings, he uses ERIC descriptors. Only the Boolean logic is entirely new.

As a check to the question above, another query asking EICs to describe their activities as an EIC was posed. As might be expected, these activities related closely to how the individuals saw their roles. The Ministry's education officer assisted clients to select descriptors. The Field Centre representative consulted with school board personnel about searches, advised and/or directed searches of good students, and advertised the existence of the EISO service. The Community College librarian promoted the project, interacted with clients, ordered material for clients, and explained the system and materials to clients.

In further attempting to determine whether the EICs had internalized their new role, we asked where the EICs turned for their educational information needs, whether they used the EISO service in the course of their normal duties, and whether their EISO training had influenced the way they approached

their normal duties. Only the Ministry EIC did not list ERIC as an educational information resource. While the other two EICs sometimes used the EISO service in their primary roles, the Ministry EIC never did. None of the three thought that the EISO training had influenced the way he approached his normal responsibilities. As we will see from data collected from the subsequent interview, this last view was not entirely corroborated, especially with regard to the Field Centre EIC.

Lastly, we come to recommendations EICs might have for changing and/or improving their training. All stressed that more time was required. The Ministry EIC wished that more attention were given to selecting accurate descriptors while the Community College librarian wanted more detailed information on the technical aspects of interacting on-line with the data base.

The Interviews

About a week and a half after the questionnaire was distributed to the EICs, the principal investigators paid a visit to North Bay. Among the purposes of the visit was the desire to see how the EICs were responding to their roles after their initial training, how they were operationalizing their roles in their own settings, what follow-up, clarification or procedural help they might need. Each EIC was interviewed at his office for close to two hours. What emerged most strongly from these conversations were the different ways the three EICs had taken the concept of Educational Information Consultant and adapted it to fit their specific needs and positions.

The first EIC interviewed was the one located within the Regional Office of the Ministry of Education in North Bay. His EISO responsibilities were limited to his 28 colleagues within the Regional Office. He was asked how things were going, what he did as an EIC, whether he had encountered any difficulties, and what suggestions or other comments he would like to make.

He described his function as mainly a passive, responsive one. That is, he felt that following a general announcement made by his Regional Director to all staff about the availability of the new service, his role was to help clients who sought him out of their own volition. When clients came to him, he usually requested that they write out in 100 words or less what their problem was. He would then choose appropriate descriptors, fill out the EISO Search Request Form, give it to his secretary for typing and forward it to the project's search analyst at OISE. Of the five free searches that had been allotted his office, all had been used by January 1976, six months after they had been allotted. Users included one special education specialist who wished to keep his information up to date, one individual working on his doctorate, and one education officer sitting on a committee charged with the task of developing a curriculum guideline. The EIC had not solicited any of these requests, but had relied on individual motivation. When he was asked how he viewed his role as EIC, whether it was burdensome to him, his reply was: "It's part of my job. Something that has to be done."

He did venture the opinion that once the remaining free searches were used up, the $20 fee would pose a considerable barrier to using the service. He described the stringent economies prevalent in the Office and doubted whether the Office administration would authorize funds to be used for searches. The main value of the service, he felt, was for high priority committees. He did not think it was valuable for individual use. His suggestions for improving the training of EICs centred around providing them with more experience doing searches and using descriptors. He felt that formulating two searches with the analyst and then two alone that would then be evaluated by the analyst would put the EIC in a better position once he returned to the field.

On the whole, then, the interview confirmed the general information obtained from the questionnaire. The specific information that had been the focus of the training session had been learned: the EIC know the technical aspects of formulating a search and could relay received requests to the

analyst. No significant changes in behaviour, however, were immediately discernible: the EIC did not solicit clients, he had held no information sessions for his colleagues, nor had he set up any of the display materials provided. When he himself needed educational information, his first inclination was to turn to the Ministry's Resource Centre in Sudbury, not to the service for which he was a local representative. One might conclude then that there had been only a limited internalization of his new role.

The interview with the OISE Field Centre EIC revealed a significantly different approach. As a result of the joint meeting referred to earlier between Ministry, Field Centre, and project staff, the Northeastern Field Centre had been designated responsible for searches generated in the five southern boards of education in Region 3. From our conversation with the Centre EIC, we learned that several activities had been initiated in the local boards: the Curriculum Project Co-ordinator of the East Parry Sound Board had been recruited and trained as an EIC for his school system and two requests for searches had been submitted by his Board. An Educational Information Station had been set up at the central office of this Board as well as in the central offices of the Muskoka Board. The Nipissing Board had been encouraged to participate and had borrowed a microfiche reader from the Centre. Within the Field Centre itself, different types of displays had been set up to advertise the service: on the wall at the entrance to the offices, an eye-catching assembly of posters and pictures had been erected and inside, an Information Station had been set up.

The Centre EIC viewed his major responsibility as "helping people sort out ideas". Once they had been helped to do that, he then added new conceptual information for them to react to and incorporate into their own mental framework. He differentiated his EIC activities according to his major functions within the Field Centre. In his role as Instructor of a graduate course in curriculum, he felt that his responsibilities vis-a-vis the EISO project were to help students clarify their problems, to assist them in identifying the

type of material they wanted, and to have them compare their searches. His course had been structured so that only those having specific responsibilities for implementing curricula were encouraged to attend. The general topic of the course was problem solving within curriculum and each student had been assigned a search in a specific area such as reading, geography, or math, so that collectively, all the searches would represent an integrated approach to problem solving in curriculum.

In his capacity as Curriculum Facilitator, this EIC had been working with local boards helping them to arrive at goal priorities for their system. In this capacity, he would help boards conceptualize what they wanted and assist them in identifying the components of a programme. He would then urge them to submit a search for each component. His clients had not yet reached this last stage.

His third major function as Information Disseminator fitted equally well with his role as EIC. In this capacity, he was free to advertise the service as he wished, encourage the training of local EICs, use the service for his own projects.

It became clear to us from the interview that though the basic training provided by the project had been effective, these individual adaptations could not have been prescribed by project staff even if they had been foreseen. Neither could we have hoped, within the limited amount of time allotted to training of EICs, to inculcate the variety of skills that had already made this individual a successful change agent. His previously established relations with local educators, the trust and esteem in which he was held, as well as his academic training and position all combined to ensure that he would become an imaginative, resourceful, and effective EIC. Our experience with him suggests not so much how we should alter the training of EICs as those combinations of skills and training to seek when recruiting future EICs to serve similar functions.

This is not to say, however, that only Field Centre personnel make effective EICs. The Community College/Faculty of Education EIC integrated his duties equally well though quite differently. Whereas the Field Centre EIC viewed information as a powerful tool that must be used responsibly, and took what may be termed as an ethical stance on information utilization giving guidance on when and for what purposes it was to be sought and how it was to be used, the Librarian saw himself as an impartial or neutral information purveyor. His behaviour conformed most closely to the actual training given EICs. He helped clients clarify their problem, chose appropriate descriptors, checked his choices in his library's indexes, submitted the request to the search analyst, and interpreted the bibliographies to his clients.

The Community College and Faculty of Education share one physical facility, though each institution is administered separately. The Library and its librarian, our EIC, serve the students and faculty of both organizations. During the years he had been employed at the Community College before the move to shared facilities, he had built up a loyal clientele who naturally sought him out to help solve their information problems. When he became an EIC, he called a meeting of department chairmen within his college, explained the ERIC system, the new search service, and the availability of free searches. He was able to use as an example a sample search done for a faculty member and so stimulate immediate interest. He also demonstrated how each instructor could receive the results of a colleague's $70,000 research program for 35¢. Since his library had paper copies of the ERIC indexes, microfiche readers, as well as a reader/printer, he was able to demonstrate how the new service could augment the facilities already available.

The different orientation, aspiration, and interests of the staff at the adjacent Faculty of Education necessitated that another approach be taken there by this EIC. In this organization, he chose to work through the Dean rather than make direct approaches to clients. The Dean met with his staff and the faculty decided to give the free searches to the students. The project

brochures were posted on the bulletin boards but as yet no requests had been generated.

It becomes apparent that the EIC's regular position affects to a very significant degree how the EIC will approach his task and how effectively he will carry it out. Of equal importance are his training, experience, interpersonal skills, as well as the relationships he has previously established with his colleagues. Nor are personal characteristics like intelligence, tact, persistence, enthusiasm, and imagination to be undervalued. For to carve out a new role successfully, the EIC is undoubtedly required to use each of these in good measure.

It is clear that once a person decides to become an EIC for the project, he wants to learn as much as possible about the project and his role in it. It has been a mistake to underestimate the commitment of the EIC and to try to condense the training sessions into as short a space of time as possible. It has been equally wrong to try to oversimplify the complexities of automated information retrieval and the role of the EIC. It would seem that as a result of the expressed needs of the EICs, the following changes should be made in future training sessions.

1. Future EICs should be offered the option of a longer, more detailed, two day training session.
2. If the two day package is inconvenient for the EIC, his one day training should occupy a full working day.
3. Additional opportunities should be made available for the EICs to work out search strategies on their own and to have these analyzed by the search analyst.
4. Greater emphasis should be placed on the technical aspects of information retrieval -- the relevant aspects of thesaurus construction, Boolean logic, etc.
5. Care must be taken to explain with greater clarity and in more detail use of ERIC indexes, formulation of search strategies, interpretation of bibliographies and ordering procedures for documents.

6. The emergent roles of the incumbent EICs could be used as examples to guide trainees in options available to them.
7. In selecting future EICs, careful consideration should be given the individual's current position, his training and experience.

As a result of the data collected from the questionnaire, interview and personal observation, certain other courses of action not specifically related to the training session suggest themselves. For example, facilitating an exchange of experiences between EICs might provide not only suggestions as to how to cope with specific problems, but also create a greater sense of participation and integration with the project as a whole. A workshop might be held to which all EICs would be invited. They would not only interact with each other but learn about the latest developments of the service, be kept abreast of the research aspects of the project, and have a chance to compare their operation with others in the region.

It is also incumbent upon the project staff to supply more feed-back to the geographically remote EICs. A monthly newsletter might serve this purpose.

The EICs also need more "public relations" types of materials, samples of service products, training manuals that they can use with their clients. The Education Information Stations should help in this regard.

All in all then, this investigation into the effectiveness of the training programme for EICs has been a worthwhile undertaking yielding a considerable amount of valuable information which will be used to improve numerous aspects of the Educational Information System for Ontario.

CHAPTER V

Business System's Design and Operation

In addition to creating a new unit housed in the OISE Library and training Educational Information Consultants, the Educational Information System for Ontario was faced with developing an adequate business system. Adequate records were needed to ensure that obligations related to the processing of requests for searches and for materials (microfiche and paper copies) were met, that financial transactions were documented, and that satisfactory reports could be prepared. Particularly difficult was development of a workable cost-recovery programme for users within The Ontario Institute for Studies in Education.

Creation of each of the records systems mentioned above was approached in the same way. First, EISO staff members discussed the topic among themselves and with key people at OISE, most often the Academic Services Officer in the Director's Office and personnel from the Institute's finance unit. Next, steps composing the process under consideration were outlined, the points at which documents were needed identified, data required on these forms noted, and individuals to receive copies of forms chosen. Draft forms were then prepared, reviewed by the staff and key people in the Institute, and multiple Xeroxed copies prepared for trial use. After several months of trial use, forms were altered in light of suggestions that had arisen during the trial period, paste-ups were prepared by the OISE Editorial Division, and final

versions were printed, using NCR (no carbon required) paper in different colours wherever multiple copies were necessary (Appendix N). In several cases final layouts for forms have not yet been designed; in others, future changes have been planned even though "final" printing has occurred.

Processing Search Requests

Six stages occur in processing search requests: submission of the request by a client, negotiation of the topic between the client and search analyst, entry of search into the terminal by the analyst, off-line printing of the bibliographic references, mailing of bibliography, and mailing to the client of a confirmation that the search has taken place. Two of these, the first and last, require specific documents. Appendix items N (i), (ii) and (iii) are three versions of the EISO search request form. The first is completed by the search analyst for users making their requests in person or by phone. The search number, at the top right of the form, is of particular importance since all files are kept in order of search number; as well, all research data are grouped using the search as the basic unit of analysis. One copy of this form is retained by EISO, and one is received by the client.

The second version of the EISO search request form is designed for completion by Educational Information Consultants. EISO, the EIC and the client receive copies. The third version of this form is that used on the EISO brochure and in publicity articles. It is meant for the direct use of the client. Use of the form is optional; the one copy is retained by EISO though the requestors may well make duplicates for their own records.

All searches received and executed are logged by the library assistant on form N(iv), and form N(v) is sent to the client so that he is aware the search is on the way. If possible, the date they actually received the bibliography is learned by the EISO staff and added to the search log. Bibliographies from the Lockheed system, however, are all sent to the EISO office since that system

does not have the capability of accepting different addresses. These are then relayed to the client by EISO, omitting the form letter N(v).

Accompanying either the form letter or, in the case of Lockheed, the bibliography itself, is a brief primer, "Understanding the Printout", (Form N(vi)).

Processing Requests for Materials

In addition to sending the user an explanation of the terminology used in the bibliography, EISO forwards order forms for microfiche and paper copies of materials (forms (N(vii), and N(viii)). The first of these is for ordering microfiche copies of ERIC documents or paper copies of journal articles from EISO. The OISE Library, in which the EISO office is located, maintains virtually a complete collection of all ERIC microfiche and journals indexed in the Current Index to Journals in Education. Users are not required to use this form, and many orders have been received on various organizations' standard order forms. These orders have been satisfactorily processed without delay. Regardless of the form used, all orders are logged on form N(viii).

Microfiche copies and paper copies are prepared by the library assistant (Appendix M), and sent to the requestor. If some materials are not available, form letter N(ix) is sent, listing the missing materials, providing the reasons, and suggesting where items might be located. As well, it informs the user of the exact cost, since the latter will be less than that originally calculated by the requestor due to the missing materials. Materials are prepared in the meantime so that they can be sent immediately on receipt of the cheque. Occasionally, orders for more than $10 have been received; invoices are normally submitted in these cases.

In addition to EISO order forms, a form is also included for ordering paper copies of ERIC documents from the ERIC Document Reproduction Service (EDRS) in the United States (form N(x)) since only microfiche copies are

available from EISO. EDRS maintains a large, automated system for producing paper copies from fiche originals at a price well below that possible for EISO. Users are requested to send copies of these forms to EISO, where the data will be used for research purposes.

Financial System

If EISO were a free service to users, as has been the case with traditional information systems, there would be no need for financial records. If one wishes to charge (and charging for computer searching of bibliographic data bases is becoming a standard practice in libraries and information centres), then a complete financial system is necessary. Fortunately, The Ontario Institute for Studies in Education's Finance Division agreed to provide invoicing and records services; indeed, this arrangement was virtually mandated by Institute policy.

Funds are paid for EISO services and goods in three ways: cash, invoice, or cost-recovery. For the first, payments are collected by EISO staff and paid to Finance accompanied by form N(xi), a copy of which is maintained by EISO. If a user selects to be invoiced, form N(xii) is completed by the EISO library assistant, who forwards four copies to the OISE Finance Division. The latter assigns an invoice number, credits the funds due to the EISO revenue account, sends the white and blue forms to the customer, retains the green form, and returns the pink form to EISO. For his part, the user becomes a creditor of OISE (not EISO), and returns the blue copy to Finance with his payment.

EISO users who are students, researchers, or faculty at OISE may pay cash, or use the cost-recovery system set up by EISO and Finance. If they choose the latter, the budget officer in their OISE unit (e.g., academic department) must approve form N(xiii), retaining the blue copy, giving the pink copies to the user, and sending the white and green copies to EISO. The latter has the responsibility of forwarding the white copy to Finance at month's

end, along with a Summary of Account Distribution N(xiv), a copy of is retained. In addition, EISO prepares a monthly Statement of Cha each budget unit; a copy of this is also retained by EISO.

No formal evaluation of the EISO records system has been un as yet. When specific problems arise, solutions are sought. Extra resulting from the special handling required for customer orders wh tain requests for copies of materials not available for copying is a c point. The present procedures, described earlier, were developed three months of discussion. While this problem is far less bothers previously, it is recognized that the ultimate solution is acquisition missing materials by the OISE Library and a reduction in the length journals are unavailable while being bound or awaiting reshelving.

Reports

The system and subsystems described above also provide raw for monthly reports. To date, these have been rather cryptic -- nun searches (paid and unpaid, Northeastern Region and Elsewhere) and revenue. After detailed analysis of research data, daily, weekly, m and annual reports will be designed which will summarize what are fe key data for managing EISO effectively. Also, so much effort has be placed on developing a system that works that there has not been time centrate on matters more related to its long term operation. One po for the latter would be to use the EISO computer terminal itself for d data entry to the OISE DEC/10 computer. In this way, reports could generated on demand by the search analyst or principal investigators ever, development of such a system would be expensive and time-con Certainly its creation could not have been considered during EISO's fi year because a computerized system is ill suited for a system underg constant, rapid change. As it becomes more stable during its second though, automation of EISO's business system becomes a topic for se consideration.

Office Lay-out

Efficient operation requires not only a sound business records system but also an appropriate work area as well. The office lay-out for EISO (Appendix O) has been particularly successful. It is located in a room created within the OISE Library for this specific purpose. The office is adjacent to the Library's journal collection, ERIC microfiche collection, microfiche readers/printers, dissertation collection, and reference area. Hence, clients and staff have most original materials close at hand. Indeed, a better physical arrangement is difficult to imagine. Within the office, storage for blank forms and file cabinets for records are close at hand for both the library assistant and search analyst. The latter two are located near one another, ensuring good communication. The only problem arising from this arrangement is the occasional disturbance of typewriter noise from the library assistant at work while a search is being negotiated by the analyst.

The search analyst has a large work area; the only inconvenience noted is the difficulty the client experiences in following the work of the search analyst on the computer terminal. The high desk and seating arrangement requires that the user stand, looking over the analyst's shoulder. A smaller round table, separate from the desk, might be a more appropriate location for the EISO computer terminal.

There are two telephones in the office, one hooked into the OISE switchboard and one a direct outside line. The latter is needed to ensure a direct linkage with the TYMSHARE computer node in Toronto. Internal lines are too susceptible to noise and interruption to be dependable links for interactive computing.

Fiche duplicating equipment are located away from the EISO office, one floor above, with the copying equipment used by the OISE Library. While this arrangement requires a few extra steps, it is logical in terms of availability of space and placement of other equipment. There was, in short, no real alternative.

Summary

Development of an adequate records and information system for the management of EISO's service, production, and financial activities has been a difficult and time consuming task. Now, as EISO enters its second year, these systems are functioning smoothly. Previous studies (e.g., Sieber, 1972) have suggested information systems have encountered extreme difficulties in this field. The project staff took these to heart, and concentrated much effort upon them. Others entering this area should do likewise.

Similarly, physical arrangements made by EISO have proven successful. This was not accidental. Again, the staff sought to avoid problems encountered by others. The OISE Library formed an ideal setting for the creation of a successful service; such a resource is not readily available elsewhere.

For the future, design of reports for regular accounting of operations is necessary. A more automated system is also a possibility. Finally, some improvement in the office working conditions, especially with regard to problems of noise and involvement of the client, may be warranted.

CHAPTER VI

One EISO User's Experience

The educator in need of information has many sources to turn to; one is EISO. If the latter is chosen, the first step is to contact the search analyst, currently Ms. S. Elizabeth Reicker. The process that follows, however, is not quite so obvious.

After the initial contact comes the most critical part of the entire search service, the "negotiation process". In this, the user and search analyst discuss the client's problem or topic in order for the search analyst to develop an understanding of the nature of the information required and classify it according to subject headings or "descriptors" which are "understood" by the computer.

The complexity of the negotiation process is such as to warrant extensive psychological and sociological study and investigation. How does the user come to perceive a problem? How is the problem formulated in the user's mind? How is it conveyed to the search analyst? How can the search analyst, by using a variety of probing and clarifying techniques, seek to understand it better? How does the search analyst proceed to reformulate her understanding of the problem in terms which the computer can understand? Although any exhaustive attempt to answer these fundamental questions must await a more opportune time, the following example of an actual search request, interview, and strategy formulation is presented to assist an initial comprehension of of the process.

Description of a Search -- S. E. Reicker and Jane Smith

Jane Smith telephoned on January 20, 1976, to request an interview to design a search strategy. During this short conversation, the search analyst learned that the subject of the search was "repayment of student loans through service to the state". The date for the interview was set for January 22. Before the appointment, the search analyst scanned the literature on student loan programmes and identified problems in the search. The entire face-to-face interview was tape recorded for research purposes; examples of conversation in this chapter are taken from the transcript of the tape.

Because on-line bibliographic searching is a new service, it is necessary to reassure first time users and to explain to them what the computer does. It is found that an informal approach is most successful -- answering questions rather than lecturing. As a consequence, many activities occur simultaneously -- definition of the topic, explanations about ERIC descriptors, the size of the ERIC data base, Boolean logic, computer searching, etc. Some time is also spent with the client in explaining the function of EISO and giving directions for ordering copies of microfiche and of journal articles.

In the case discussed in this chapter, the client has already started looking for information on the topic:

Search Analyst: Have you done any research on your own or ...

Smith: Well, I started off on the ERIC stuff that the _____ Library has and then I was speaking to a librarian there, and she said you had this, so then I thought well -- you know, why bother when I can do this.

Search Analyst: Did you find anything when you were going through on your own?

Smith: Just a couple of things, but you know I hadn't really ... These are the descriptors that I've been looking under so that's -- now these are a couple that I did find: Non-traditional college routes to careers.

Although Ms. Smith began the interview by asking some general questions about EISO -- how long it had been in operation, how many users had

tried the service -- the search analyst almost immediately assumed the role of negotiator by summarizing her perception of the problem and what she had discovered. A dialogue about the topic started then and lasted for approximately 30 minutes. The search analyst was trying to understand the information needs of the client to design the best search strategy.

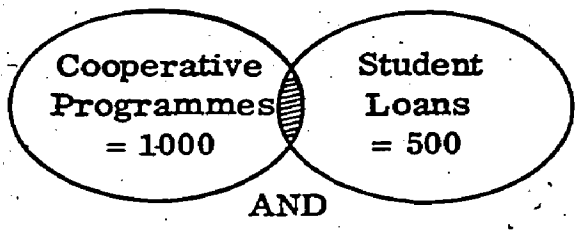
> Smith: ... well, not necessarily social, but service to the state of some kind.
>
> Search Analyst: Undergraduate students?
>
> Smith: All levels, any level at all. Most student loans are given at universities, that's what I mean; not especially high school students and summer jobs. You see, one of the things that could be involved is that in many countries study aid is given after the age of school leaving ... Student aid doesn't necessarily mean student. It really should be termed study aid so that you are studying any time in your life. ... so long as you are prepared to give some service to the state in return for it ...
>
> Search Analyst: Is it the same as management development in a job?
>
> Smith: If they would take people from graduate school and put them into an internship program in some of the state agencies ...

Concurrently with this negotiation process, the search analyst was giving the user information about the ERIC system, in particular the descriptors in the Thesaurus -- and the Broader, Narrower and Related Terms. The search topic was discussed in the descriptor language to try out the access points approved by ERIC.

> Search Analyst: Work study programmes are programmes providing part-time employment to students who need financial aid in order to commence or continue their education. That sounds pretty good.
>
> Smith: Do you have something in the Thesaurus like day release?
>
> Search Analyst: That sounds like prisoners. ... Day release -- "time used for day release" -- it's related to off-the-job training, employer-employee relationship, school-industry relationship, time block ...
>
> Smith: I'd like time blocks too ...

It is evident that although the user is the expert in her field and is most aware of the terminology, the search analyst plays a major role in choosing the access points for the search. In this example both were able to see "the plot thickening" in the search for elusive information. Because Ms. Smith had started to search ERIC manually and was familiar with literature searching tools, the search analyst assumed that she wanted to take an active role in choice of access points.

Two advantages of computer searching are stressed -- the speed of the search and the ability to access many parts of the bibliographic record (authors, institutions sponsoring research, programme names are only some examples). The combining of the different access points chosen by Boolean logic is often illustrated in terms of the search request:



Conjunction: 50 references indexed by both descriptors (shaded area)

The possible results of the search are discussed and alternative procedures are planned in the event of too much or not enough information.

Smith: I have a dreadful feeling that it is not going to be very much.

Search Analyst: I tend to agree, but we can see if the references retrieved by the conjunction of student loans and cooperative education prove to be relevant.

By the end of the negotiation process the terms to be searched are listed and retrieved by both the user and the search analyst. Additional words and phrases which might help in the search but which are not listed as descriptors are considered.

Search Analyst: Has it been tried anywhere else?

Smith: Saskatchewan has something apparently and I'm just getting some information on that, ... a system in Australia apparently called Cadetships which are offered by the State, and then the state would pay you to go to school. .. That was tried mostly with teachers. ...Well, listen, there's one thing I want to know more about: the Canadian Forces system.

The final choice of terms was as follows:

Set 1. Cooperative programmes, internship programmes, work experience programmes, work study programmes, released time, school industry relationship, employer-employee relationship.

Set. 2. Adult education, external degree programmes, part-time students, evening students, evening college, independent study, university extension, continuous learning.

Set 3. Student loan programmes, scholarship loans, Saskatchewan, financial needs, financial support, student costs.

Set 4. Cadetships, ROUTP, ROTC.

Due to other commitments, the client unfortunately had to leave at the end of the negotiation period, which meant that the actual search had to be done in her absence. Because of the lengthy interview with the search analyst, Ms. Smith was nevertheless confident about the search stragegy chosen and not hesitant about leaving the problem in the search analyst's hands.

Smith: Well that's splendid, let's hope something comes up. ... smashing system isn't it?

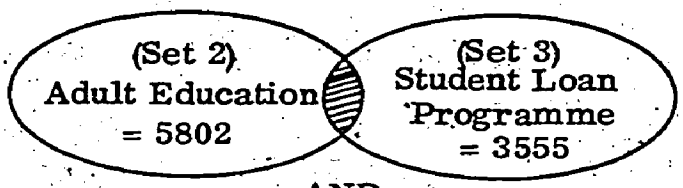
The search was conducted the next morning (Friday) against the ERIC data base using the SDC computer system's ORBIT software. The fears of the user and the search analyst were confirmed. When the three main sets or groups of items on cooperative programmes (1), adult education (2), and student loan (3) were combined together only ten references were retrieved.

In some cases, that number would have been adequate for the user. However, Ms. Smith was starting on a year's project and had been assigned

the task of developing a programme; therefore, more information would be necessary. The search analyst decided to broaden the search.

Group 1 (cooperative programmes) was linked with Group 3 (student loan programmes) to produce a set containing 95 references. Although this figure was a manageable number, a scanning of a few of the titles did not show them to be particularly relevant, for example, "Guide to Operating an Off-Campus College Work-Study Programme" and "A Model Internship: The Intern -- An Economical Assistant".

At this point the search analyst used her knowledge of the client's problem to determine the types of references which would be useful in her search. A look at the conjunction or "anding together" of other sets showed that it would not be easy to eliminate citations of documents and articles which were of marginal relevance.



189 References
(shaded area)

AND

When the references retrieved from this set were added to the match of student loan programmes in adult education (95 references), a total of 272 references was retrieved. These were limited by a group of descriptors to indicate a level (e.g., higher education) or a non-descriptive paper (e.g., literature reviews, research). This additional combination narrowed the retrieval to 80 references.

A search for references on ROTC and Cadetships yielded seven items. These were added to the 10 initially retrieved and the 80 of potential use. The final set chosen for off-line printing contained 95 references.

The full citations, including the abstracts and descriptors for these 95 references were ordered quickly and efficiently from the SDC computer centre in Santa Monica, California. In this case the printout was sent directly to the client's office. The entire computer search lasted only 14 minutes.

When the search was completed, the search analyst filled out the form letter (Appendix N) and sent that as a confirmation to Jane Smith. The form letter was accompanied by a written explanation of the printout, order forms for the documents, and a copy of the search request form (Appendix N). Each user is encouraged to seek the help of the search analyst in the event of questions or problems.

On Tuesday morning, only three days later, Ms. Smith telephoned the search analyst to report that the printout had arrived. They discussed the procedure from that point and decided that she would become familiar with the bibliography and focus her research design before ordering microfiche copies. Many of the journal articles are available in her own library and would be read or photocopied there.

Three days later the client telephoned to request a second search. Though dealing with a new topic, the interview was conducted over a telephone in five minutes. The search analyst spent another 10 minutes designing the search strategy and then processed the request in the same manner.

Ms. Smith was sent an evaluation questionnaire in early February. Although the client has not yet returned the completed form, the fact that she completed the search cycle twice, clearly represents adoption of this innovation, namely the EISO information service.

CHAPTER VII

Information Systems Model for the Assessment of EISO

The viability of the Educational Information System for Ontario (EISO) depends on the people it is designed to serve. To assess the viability of the service we must know a great deal about its users. Who are they? What are their information needs? How can they be satisfied? Are the needs great enough to create and sustain demand for information services at a price that will pay for the full cost of these services? If these questions can be answered, we can assess the viability of the information service operating in a given context, and describe how it can operate in an efficient and effective manner.

A systems approach is used to organize the multitude of factors which must be considered if the questions raised above are to be answered. That is, input, process, and output variables must be treated separately, with it being assumed that the first two types of variables serve, at least in part, to explain the third. Data collection for this purpose was limited to a pre-coded questionnaire completed by each user for each search (Appendix C), and a more cryptic data sheet (Appendix D) completed by the search analyst and research officer.

This chapter focusses on the explication of the information systems model used to organize the data that were collected. This systematic treatment of the information search cycle is then set within a framework developed from the literature on the adoption of innovations. The view is taken that the Educational Information System for Ontario constitutes an educational innovation in

the province, and that its use by an educator represents that individual's adoption of an innovation -- namely, EISO. The following chapters describe in detail the data collected, the findings based on the first five months of EISO's operation, and the implications of these findings.

Information Systems Model

The Educational Information System for Ontario is a service seeking to satisfy the information needs of its users. One cannot study the service without considering the users. It is their interaction which results in the goal being reached -- the users learning what they sought to know.

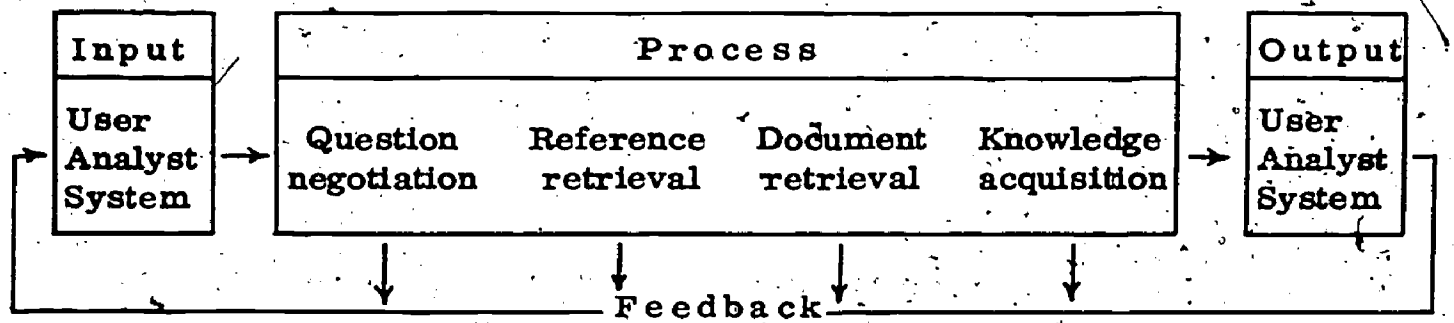
In a sense, then, a broad view of an educational information system encompasses both the user and the service, the user being characterized by unfulfilled needs and the system by its ability to satisfy these needs. In practice, a user's needs would be represented by a verbal or written request for information on some topic, while the information system would be personified by the search analyst, trained to refine the requests so that existing information on a topic can be retrieved for the user. After a request is submitted, the search topic is "negotiated" by the requester and analyst. Then, appropriate references are retrieved and later the documents themselves. From the information scientist's viewpoint, the entire information search cycle may be said to end here since information has been supplied to the client. However, stopping the process at this point begs the question as to the system's success in actually satisfying the information need. Has the client's need for information been satisfied? Therefore, we must consider that supplying documents constitutes a stimulus which helps users to acquire knowledge and thereby satisfy their information needs. To be sure, the process can be carried still one step further, to the application in practice of the knowledge gained from the documents. However, this step carries us one too far -- beyond the users to their social environment. We choose to omit this step from study, not because it lacks importance (it does not), but because it would expand the scope of the investigation far beyond

that required to assess the viability of an information system and would change its character into one having the educational system, rather than the user, as its focus. It seems far better to consider that satisfying the user's information needs -- however subtle a transformation of the user's state this may be -- is the best point to conclude the information search cycle.

At each stage of the search cycle -- composed of a search request, question negotiation, search, reference retrieval, document retrieval, and knowledge acquisition -- feedback occurs. During question negotiation the search analyst makes inquiries of and suggestions to the user related to the search request, and the user responds. After a few references have been retrieved and reviewed by the user for relevance, negotiations may be reopened and an altered search begun. The cycle of stimulus-response-feedback recurs constantly until the final set of references is retrieved. Even at the end of the entire cycle, when a satisfied or dissatisfied user has ended the search process or turned elsewhere, feedback to the information system continues. The former users, acting as disseminating agents, recount their experiences to others, thereby creating expectations that are brought to the system when new users make search requests. Dissatisfied users, by their negative comments, may affect the system by reducing the expectations and even numbers of users. More directly, through formal evaluation forms, all users have the opportunity to provide feedback designed to alter the form or operations of the system.

The cycle of activities, together with the user, search analyst, (computerized) retrieval system and their special characteristics, form a system which is portrayed graphically in Figure 1.

FIGURE 1. Information System Model



Models of Behaviour

Systems models are particularly helpful in organizing the questions that can be asked about a particular situation. Questions concerning the user's characteristics come first, along with those concerning the search analyst and the particular technology being used to actually retrieve information. Next come those related to the process in which the user is transformed from an individual lacking in knowledge to one who is informed; finally, one can consider the end result -- the level of satisfaction, the types of documents retrieved, etc. At each stage one can investigate the nature of feedback occurring. Throughout, questions may be on a micro scale -- focussing on the individual user and his or her interaction with the service -- or on a macro scale, with data being aggregated to develop an overall picture.

Because the purpose of this study is to answer questions related to the viability of the Educational Information System for Ontario, aggregate data are important. How many users are there? How many potential users? How satisfied are users on the average? How much revenue can be generated -- enough to cover expenses? Aggregate answers, of course, are based on individual responses; ideally, the investigator assembling aggregate data knows as much about each individual as does the micro researcher, but this is never the case. In the place of collecting extensive information about each subject, one can decide (or assume) all subjects act in accord with some set of laws --

sociological, psychological, economic, or whatever -- and then only collect data for those variables related to the theoretical model being used. It is this latter approach that is used in this study.

Sociological

A sociological approach to man would view the user as an individual occupying some role (or set of roles) and status position(s) in society. In most cases, a user will hold a professional position in an educational organization, and his expectations for his own behaviour based on his interpretation of organizational norms will likely account for his decision on whether or not to make an EISO information search. If he believes that searching for information is a highly valued activity in the organization, he will likely conduct a search. If, on the other hand, he believes it is considered unproductive, he will not.

As well, an individual's role may even determine if he hears about EISO. Graduate students and administrators have been sent brochures advertising EISO; teachers and undergraduate students in education have not and must depend on their superiors to relay the information.

An individual's social status is another variable of importance. Those in higher positions, with more power accruing to them than those in lower positions, are probably more likely to seek information because they can put it to use; their decisions count. The same cannot be said for those in relatively low positions within the status hierarchy of the educational profession.

Finally, the environment of the organization in which a user works will condition his approach to seeking information, as well as the type of information sought. Those located in urban areas are likely to have information centres readily available -- and a surplus of critical problems in need of solution.

Psychological

A number of important characteristics of users are essentially psychological in nature -- one's knowledge about a topic, motivation to learn,

attitudes toward innovations in general, and opinions about EISO in particular.

Presumably, an individual must have some knowledge about a topic before a question concerning it can be formulated. If a search is undertaken and additional information is located, then learning can occur, and the individual's need for information is reduced. Thus, learning models provided by psychologists are of considerable relevance to EISO's performance.

The user's motivation to learn is clearly a major force affecting the decision to search for information. One motivating factor may be the individual's "need for achievement". Information may be sought in order to assist the person's social advancement. Knowledge can be power.

At the same time, the person's attitude toward innovation and change may be of critical importance. Those favouring old ways are not nearly so likely to try a new service such as that provided by EISO as those who have a predilection toward new ideas, products and services.

Finally, a user's opinion about EISO -- his satisfaction with the quality of the service and information provided -- is essentially a psychological characteristic. In assessing the results of the information system, these opinions are of major importance.

Economic

The long-term fiscal viability of EISO is primarily an economic question. If one assumes the system must be totally self supporting, then there are three economic models that can be applied to determine the probable answer. The findings would also be of value in developing a policy which would incorporate partial subsidization of the service.

The price-demand model views the user as an individual with limited funds who makes purchases according to a set of priorities, with the amount purchased of a given product (of a given quality) being related to its price. Applying this model to an information user directs the investigator to collect

data related to price and quality of the information search service, and the quantity purchased by users. Other types of economic models, e.g., cost-effectiveness, cost-benefit, etc., would require collecting other types of data.

Cost-effectiveness analysis requires data on system processes (especially cost) and results, to establish the relationship between the cost of a given approach with the quality of the product resulting from various processes. One might compare the cost effectiveness of supplying paper copies of documents with microfiche copies, first collecting data on the costs of each and then on the extent to which each satisfies the information needs of the user population. One might find that, though microfiche were only half as effective as paper copies in satisfying information needs of an individual, they were five times as cost effective because their costs were one-tenth those of paper. That is, in sending out the same dollars' worth of microfiche and paper copies (say 10,000 fiche and 1000 paper copies) and assuming paper copies were always effective, the first option would produce 5000 satisfied users which the second would yield only 1000.

Cost-benefit analysis is similar to cost-effectiveness, but more inclusive in its measurement of results. In the present study, a cost-benefit analysis would require an estimate of all benefits or "goods" arising from a single search. One would have to estimate, say, how many children with a particular learning disability would be identified and given proper treatment -- thereby enhancing their entire life and earning ability -- as a result of information searches. Less ambitiously, one might try only to estimate the number of "second readers" a given EISO bibliography might have, and to place a dollar value on this occurrence. Regardless of the scope of estimates of benefits, the cost-benefit approach remains highly speculative, more so than either cost-effectiveness (and effectiveness is rarely measured with very much precision) or price-demand models.

Three general perspectives or approachs, sociological, psychological, and economic, can guide the selection of variables and collection of data throughout the information cycle, from the initial search request to the concluding

acquisition of knowledge by the user. Data can be collected on the three "parties" involved -- the user, the intermediary, and the retrieval system itself -- and can be aggregated to describe the characteristics of the user population, e.g., its average level of information need, and the overall information system, e.g., its cost. Before developing detailed rationales for the selection of specific variables for measurement, as well as their definition and operationalization, a wider view of the Educational Information System for Ontario must be taken.

Adoption of Innovations

To this point, our discussion has implied that the Educational Information System for Ontario, EISO, is an existing service with a regular clientele. This situation is not, of course, the case; instead, EISO is a new, experimental service which may be viewed as an educational innovation making its first appearance in Ontario. This particular context means that the system has no "users", just potential users. This situation is rather like that when a new variety of influenza appears -- no one has been stricken, but there are many susceptibles (Lawton & Lawton, 1975; Rogers, 1962).

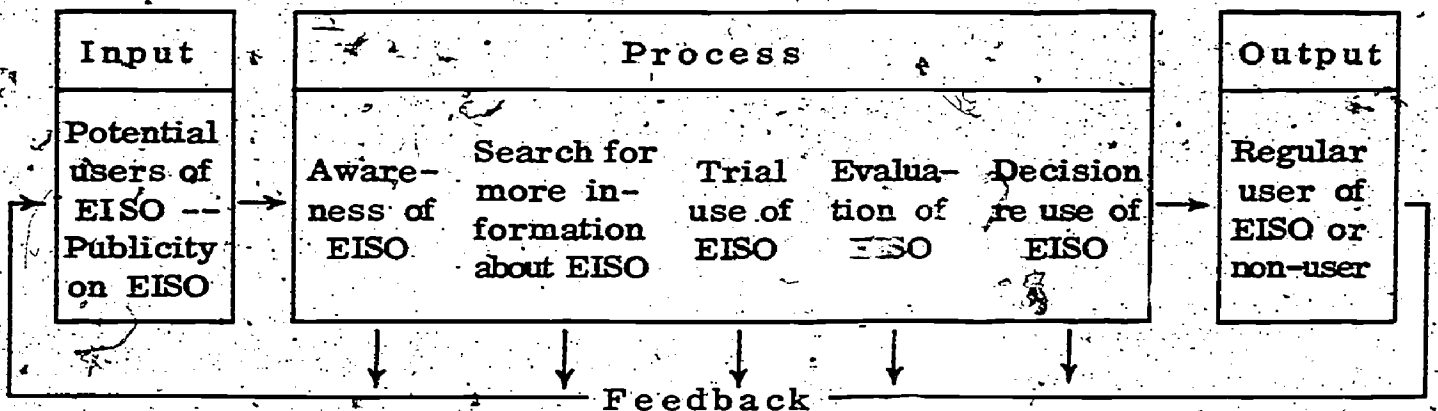
Treating EISO as an innovation whose adoption has just started requires incorporating the information system model (Figure 1) into a more general model which incorporates the stage of adoption experienced by an individual coming into contact with a new idea (Rogers, 1962): 1) no knowledge, 2) awareness, 3) seeking of additional information, 4) trial adoption, 5) evaluation, and 6) permanent adoption or rejection.

At the start of the EISO project (March 1, 1975), none of the potential users knew of the service since it did not exist; all were at stage 1. To become a first time user (stage 4), stages 2 and 3 must first occur. In the case of EISO, where the search analyst is the major source of additional information, stage 4 often follows immediately after or in conjunction with stage 3, seeking additional information. After trial adoption (stage 4), evaluation (stage 5) occurs.

Evaluation by the user is inevitable; people form opinions and attitudes after any new experience. Clearly, this assessment by the first time user is all important to the viability of an information system, since it is this evaluation which sets the value (in economic and professional terms) of the search service in the user's mind. If his information need is satisfied, it is likely the service will be viewed positively, though if the information contradicts his own beliefs or opinions, he may blame the messenger and form a negative opinion of the service. Or, if the search negotiation has revealed the user's naivete and ignorance, he may feel humiliated and avoid further searches. Regardless, a final decision (step 6) necessarily occurs: permanent rejection, or readiness to use the service again whenever the appropriate circumstances arise.

The innovation adoption model adds a degree of complexity to the overall design of this study. Clearly, the first time user who completes an information search cycle has made a "trial adoption" of the EISO service; the second time through the cycle represents permanent adoption of the service. Hence, first time and repeat users of the system must be treated separately. In addition, the population of users must be broadened to include all potential users -- i.e., those susceptible to the innovation -- and the systems model that is used to guide the collection of data must be extended to incorporate an awareness phase. The model then becomes, more explicitly, an open-system model (Katz & Kahn, 1966), with "awareness" representing a characteristic (present or not present) of the potential users of the system. Upon completing the search process and utilizing the documents, users themselves spread knowledge about the service to other potential users until all are aware and, ultimately, become at least trial users (Figure 2).

FIGURE 2. Systems Model for Adoption of EISO as an Educational Innovation



Since the rate of diffusion for recent educational innovation tends to be high (Lawton & Lawton, 1975), it can be expected that within five to seven years, all potential users will have tried the information service, and the overall system will approach a steady state of operation.

Parenthetically, the adoption model for innovations suggests one reason for expecting potential users to place a relatively high value on the service: namely, collection of information is a key step in the process of adopting any new practice. Thus, it can be expected that users (particularly users in the first two years) will be the types of individuals who are given to trying out innovations (Rogers, 1962; Carlson, 1965). They will probably be involved in selecting other innovations, and will likely turn to EISO as a convenient source of additional information. Furthermore, the fact that collection of information is a stage in the process of making all types of decisions (Musella, 1973) suggests that most educators are potential users of the information service.

Summary

The viability of the Educational Information System for Ontario depends on the willingness of the educational community to make use of the system, paying sufficient fees to sustain its continued operation. To learn if this support

is likely, this study has focussed on EISO users, treatment of them as social, psychological, and economic individuals; in particular, their role in adopting EISO as an educational innovation is considered. These various viewpoints are organized into a systems model of the educational information search cycle set within an innovation adoption model.

The next chapter turns to the collection of data related to the topics noted above. Variables describing the users' social role, phychological characteristics, economic behaviour and satisfaction with EISO are treated in detail.

CHAPTER VIII

The EISO User: Questions, Definitions, Variables, and Satisfaction

Who uses EISO? What are their information needs? Are they satisfied with EISO? These are three of the fundamental questions which this study seeks to answer. Each one is multifaceted and can be approached from several different perspectives. In this chapter, definitions of the dimensions of primary relevance in answering these questions are provided, followed by the particular item(s) used to assess the user's place on these dimensions. As noted earlier, two data collection instruments were used: the EISO User Evaluation Questionnaire (Appendix C) and the EISO Service Evaluation Data Sheet (Appendix D). Throughout this chapter, items from the two forms are identified by the item numbers that appear on the forms themselves; though they do not appear in the same order. Items from the questionnaire are identified by number (e.g., item 17) while those from the data sheet are identified with the prefix DS (e.g., item DS17).

The three perspectives used in this chapter to view the users are those described previously; namely, sociological, psychological, and economic. Among the psychological variables is one of considerable importance: the user's satisfaction with EISO.

Sociological Perspective

The first question, "Who uses EISO?", is most readily approached from a sociological viewpoint. In what type of organization is the user employed? What are the person's role and social status? What

is the organization's environment? These questions address the four types of social variables that must be considered.

Type of Organization

Probably the most important social systems for EISO users are the formal organizations within which they work -- school boards, faculties of education, or whatever. These organizations, most of which will be non-profit in the case of EISO users, have specific goals (e.g., to educate children), and maintain well-defined roles for their members. These roles are defined in terms of the behaviour expected of the individuals, including those acts that are mandated (e.g., a teacher must teach), permitted (e.g., a teacher may suggest new policies) and forbidden (e.g., a teacher may not hire staff). For virtually all roles in educational organizations, acquiring information is probably permitted, and for some (e.g., researchers, graduate students) it is required -- i.e., it is expected behaviour on their part by both themselves and other members of the organization. A person's role, in all probability, will to a large extent account for whether or not he will try EISO. An OISE graduate student, studying and searching for information in the same building in which EISO is located, is extremely likely to use it. A distant elementary school teacher involved primarily in classroom teaching will probably not use the service, unless another role she occupies, such as that of math curriculum committee member, includes the expectation that information will be sought for the committee's use. This latter possibility suggests one of the difficulties in using a person's role to explain his or her behaviour: people have multiple roles, and it is difficult to know which role they are playing when undertaking a given action. Indeed, in the example above, the teacher might request information concerning math curriculum to satisfy both a classroom need and a committee need.

In practical terms, types of organizations with which users are primarily associated are determined by their response to items 1 and 2 on the EISO User Evaluation Questionnaire (Appendix A). Categories include the following types of organizations: preschool, public board, separate board, private school or

board, college of applied arts and technology (CAAT), faculty of education or teacher's college, university, Ministry of Education, professional organization, government, and business or industry.

For school board personnel, and in particular those serving in schools, it was felt that the size of the organization might be an important factor related to the amount of information needed, the assumption being that large organizations are more complex, making the need for information greater. Therefore, both the board enrolment (item 11) and school enrolment (item 12) were requested.

Professional Role

The user's three major professional roles were determined by their response to item 6. A limit of three roles was imposed somewhat arbitrarily for the sake of economy, with the primary, secondary and tertiary roles each being identified. Included in the choices were administration or supervision, teaching, pupil personnel services, research, field development, Ministry of Education regional office, library services, private consultant, student, and other. The student category was broken down by level; undergraduate, M.Ed., Ed.D., M.A., and Ph.D.

For school board personnel, the professional role was also modified by level: elementary grades only, secondary grades only, elementary and secondary, central board office, and other.

As suggested in a previous example, the type of information individuals seek and the frequency with which they seek it are likely to be related to their professional responsibilities. Indeed, information seeking is an exceedingly important professional activity which is part of the expectations for many roles. In addition, it is a characteristic of utmost importance for the user of EISO. Therefore, item 19 asked how often (never, sometimes, often, or very often) they sought information for each of the following purposes: to keep abreast of their field; to complete assignments, term papers and theses; to prepare or update bibliographies; to develop curriculum; to improve programmes; to prepare speeches, reports or articles; to complete research and development

projects; to browse; to recruit or evaluate personnel; to develop policy and to meet other needs.

The sources of information used to meet these various needs were identified in item 18, which asked for an indication of the amount of time per week spent using a given source. As well, the value (low, medium, or high) of the information acquired from each source was requested. The list of sources included the following: colleagues, professional journals and books, outside consultants, inside consultants, office files and records, supervisors, professional organizations, libraries, conferences, professional development days, academic or professional courses, curriculum guides or texts, ERIC materials, educational abstracts and indexes, and other.

The purpose in requesting a particular EISO search is also rooted in the individual's role. Recorded on the search request form, this information was coded onto the EISO Service Evaluation Data Sheet (Appendix D) as item DS4 using the same classification scheme used for noting their usual reasons for seeking information. Related to the purpose of the search request is the amount of information needed, a matter tapped by items DS6 and DS7: first year for which materials are required (a recent year implies that little material is required) and the number of references desired.

Organizational roles are not defined solely from the institutional perspective, of course. There are unique aspects of an individual's behaviour and expectations regarding a role that are not shared by all other individuals in the organization -- even those in positions that carry the same name. Certainly, not all teachers, not even all grade 3 teachers, teach the same way. Similarly, not all are likely to have the same information needs. The knowledge and expectations derived from professional training (e.g., completing an M.Ed. programme), experience in the position, professional activities and reading habits might all affect an individual's performance in his or her primary professional role. Complementing the institutional dimension of organizational roles is the personal dimension characterized by the following items:

person's highest degree -- high school, teacher's college, bachelor's, masters, doctorate (item 55); years in current position (item 7); experience as an officer of a professional organization (item 13); extent of publications and conference presentations (item 15); membership in voluntary professional organizations (item 14); and participation in research projects (item 16).

Social Status

A person's social status will also be an important background variable related to his performance on the job. On any normal scale of social status, of course, virtually all of EISO's users would probably be classed very highly since most would be university graduates working in professional positions. Nevertheless, the status of individuals of different ages and sex does vary, with mature males (up to retirement age) usually of highest status, with the most power and prestige, and young females at the bottom, with little influence or prestige. Therefore questions regarding both the user's age (item 52) and sex (item 53) were included.

That social ranking by age and sex exists (and is apparent in school systems wherein virtually all administrative positions are held by men between the ages of 35 and 65) does not imply that the situation is fair or unchangeable. It simply represents a current social fact.

Organizational Environment

After taking personal differences into account, individuals occupying similar roles in different organizations might be expected to have similar kinds of information needs. In fact, though, environmental factors might also cause their information needs to differ. For example, one administrator may work in a homogeneous rural board while another is employed in a heterogeneous urban setting. The two might require different types of information in order to solve problems arising from their boards' different social environments. A similar situation applies for other types of roles and organizations. One particular factor of importance is whether or not the organization is located in the Ministry of Education's Northeastern Region centred in North Bay.

This region is the test area for experimentation with specially trained Educational Information Consultants, thereby making it special when compared to other regions in the province. Four items tap the environmental context, one of which (concerning language) only applies to boards and schools. Item 3 inquired as to the municipality in which the user's organization was located: a district or district municipality, a county or regional municipality, Metropolitan Toronto, Ottawa, London, Hamilton, Windsor, Sudbury, Canada (outside Ontario), and outside Canada.

Whether or not it was located in the Northeastern Region (Region 3) was learned from item 4; the urban or rural nature of the setting was sought in item 5; and the mother tongue of the majority of students (in the case of schools) in item 10.

Psychological Perspective

Describing users in sociological terms has led us to consider them first as members of organizations, second as incumbents in particular roles, having both institutional and personal dimensions, and third as individuals occupying some position in the social hierarchy. Finally, the important social context of the organization itself was noted. Next we shall answer the question of who EISO users are in psychological terms, first viewing the user as a learner, and second as a subjective being with particular motivations, attitudes and opinions.

The User as Learner

How does a person learn? What conditions are necessary for learning to take place? There are many theories concerning each of these questions, some are consistent with one another, and others are contradictory. It is probably fair to say that there is at least some agreement on the following statements.

1) A learner must be motivated to learn. This motivation is grounded in the social situation of the learner. It may be that learning is required by

an authority (a method used effectively in armed forces), or is encouraged by the individual's curiosity concerning an unusual occurrence, about which he asks, "Why?". In other cases, as we shall note later, an individual's role in an organization -- teacher, administrator, student -- often creates situations where new knowledge is necessary in order to cope effectively, or where the individual's own need for achievement is met by gaining new knowledge (McClelland, 1961). Such socio-psychological circumstances form the impetus behind the motivation to learn (Gagné, 1964).

2) The learner must possess certain prior knowledge in order to learn a new concept or to discover a new understanding. If a child cannot speak, he cannot write. If a potential user does not know about EISO, he cannot decide to seek further information about its potential usefulness. This prior knowledge would relate not only to that about EISO itself, but about a given problem, situation, practice or other topic about which information is needed. How much does the user know in advance? If he is almost totally lacking in knowledge about a topic, he may not be able to formulate a good statement of the problem for the search analyst. The search negotiation may prove arduous, and the results may prove less than satisfactory -- at least on the first try.

3) Regardless of whether only a simple fact is learned, or a complex concept involving generalizations and inductive leaps, the learner is changed in the learning process. Something is learned which was not known before. Expectations concerning the learning experience are fulfilled entirely, in part, or not at all. Opinions concerning the process are formed, and may, in turn, affect the motivation to undertake further learning.

Knowledge, in the sense used here, can be thought of as a set of facts, concepts, and theories related to some topic or activity as accepted by those individuals who are most centrally involved. In general, the extent of an individual's knowledge concerning an area is measured against that held by recognized experts in the area. For example, knowledge concerning programme development is defined by experts in the field of programme development. In

theory, if an individual could, on demand, relate all of the facts, concepts theories about programme development to these experts, he would be said have full knowledge about the topic. In practice, it is never necessary to l so exhaustive. Instead, only a sample of the facts, concepts and theories used, as in any scholastic examination, to assess an individual's knowledg In this study, however, specific knowledge is not assessed. To do so woul require testing users on a multitude of different subjects (i.e., on each of topics they submit). Only two items entered on the EISO Service Evaluatic Data Sheet (Appendix B), are used to measure prior knowledge: number o references expected, and relevant citations already known (items DS8 and D As we shall point out later, it is not really necessary to measure knowledg about the various subjects directly in any case.

One particular topic concerning which users must necessarily have knowledge is the Educational Information System for Ontario itself. Since awareness of an innovation like EISO is an important stage in the process o adopting an innovation, the knowledge about EISO that users possess is an important characteristic. Of course, all users necessarily are familiar wi EISO, so awareness will be studied as an outcome of the publicity program which will be treated later.

Motivations, Attitudes, and Opinions

Motivation to learn is a psychological variable of utmost importance By motivation we mean a psychological state characterized by the readiness an individual to engage in some activity. In particular, motivation to learn implies that a commitment exists to engage in learning activities. It may b rooted in other psychological factors, such as personality, or in the social economic context of a given situation. Personality itself is a complex of ha habits, preferences, beliefs and needs which produce in a person a disposit to engage in some activities and not in others.

One personality trait that has been suggested as a motivating factor seeking information is the need for achievement, a personality force which

drives an individual to seek mastery in some sphere of activity or knowledge. An ambitious person is likely to search out information in order to out-distance the competition, both by knowing more and being seen to know more, and to gain mastery of a situation. Two items that tap this characteristic relate to an individual's professional plans: the first ascertains the user's ambition or wish to advance to a higher position within his organization (item 8), while the second asks whether he wishes to undertake study toward a higher degree in the next five years (item 17).

Correlated with individuals' personalities are their attitudes which are expressed as opinions, which reveal a predisposition to act in a specific way toward some object (the so-called "attitude" object). A scale adapted from Sieber (1972) measures opinions and attitudes toward innovations (items 20 to 24), while item 48 asks the user about his initial attitude toward EISO, a typical educational innovation.

Motivation may also have a sociological impetus, as when it is derived from one's social role within a society, profession or organization. Then, it is embodied in the expectations for one's behaviour held by various segments of society, including the individual himself. The roles of research director and graduate student, for example, carry in them the obligation to seek information if the incumbents are to fulfill their social roles.

Economic Perspective

If EISO were providing only a free service, as has traditionally been the case with libraries, then it would not be necessary to view the user as an economic creature. However, EISO is charging $20 in the Northeastern Region and $30 elsewhere; thus an economic perspective is necessary.

Economic situations in fact serve to motivate individuals. This occurs whenever it is recognized by a person that he can achieve some objective or fulfill an obligation at less cost in time or money by following one course of action rather than another. Such is the case when an administrator chooses to

request an automated bibliographic search to satisfy an information need, thereby avoiding the alternative of hiring a part-time researcher to fulfill the need.

In terms of describing the user, one important characteristic is his source of funds. Is the user paying himself, or is the cost being charged to his organization? This question is answered by item DS11, which determines who pays for the search; item DS23 elicits the same type of information for materials ordered as a result of a search. Items DS13 and DS25 refer to the source of payment for OISE users who avail themselves of internal charge-back arrangements. On the whole, it would be expected that a person who is paying out of his own pocket would be more reluctant to conduct an EISO search -- that is, he would have to be more highly motivated than one whose organization is covering the cost.

The User as Innovator

When an educator first tries an innovation like EISO, he is engaging in the trial adoption of the service. This trial use represents the fourth stage in the adoption process, described earlier. He evaluates the service (stage five) and, if he finds it to his liking, may decide to include the service on his list of sources to be checked when information is needed. The second time he tries the system, it may be said that he has adopted the innovation (stage six). To be sure, some users may require several trials before making a final decision regarding its value; but, with a fee of $30 it is apparent that requesting an EISO search is not a minor decision. There are few extrinsic rewards for undertaking a search -- it is not a visible symbol that enhances or reflects one's status. Its real value is in the information provided. If the information is not satisfactory, then there would be no reason to choose EISO as a future source of knowledge.

First time or trial users of an innovation are of tremendous importance for two reasons. First, they form the major portion of the clientele in the

first year of operation. Perhaps more importantly, they assist in the dissemination of information about the system. One user talks to a colleague, and converts that individual from a potential user into a trial user. An interaction effect (Rogers, 1962) occurs, and use snowballs. More and more clients are recruited. But after all potential first-time users have been served, the repeat user -- the adopter -- enters the limelight. He is the one who will determine, in the long run, if the service survives. Loyal customers are the mainstay of any business.

It is extremely important, then, to know who the early adopters of an innovation are, so that likely candidates can be contacted and encouraged to use EISO. To learn about the differences between trial and repeat users, both groups will be described in terms of the sociological, psychological, and economic perspectives that have been discussed in this chapter. Item 54 in the evaluation questionnaire yields the data needed to distinguish between novice and veteran users of EISO by asking the number of previous EISO searches the user has requested.

Satisfaction with EISO

A major factor in a first time user's decision on whether or not to use EISO again is his satisfaction with the EISO. Has his need for information on a given topic been met? Was service satisfactory? How helpful was the material provided?

All of these questions are aimed at learning users' opinions and might be considered psychological in character. At the same time, they relate to the individual's role, the assistance provided by the EISO staff, and the adequacy of the technology. Hence, both psychological and sociological perspectives are used below.

Sociological Perspective

Just as we first considered users and their needs in sociological terms, with the latter growing out of their roles in educational organizations, so might we consider the success of the EISO. What role was it expected to play? Did it play that role well?

Item 19 classified the purposes for which users regularly sought information; DS4 asked for the purpose of a particular EISO search -- using the same categories. Paralleling these questions is item 32 which enquired as to the helpfulness of the information provided as a result of the EISO search for each of the following purposes: keeping abreast of the field; completing assignments, theses, etc; preparing or updating a bibliography; curriculum development; improving programmes; preparing a speech, article, or report; undertaking or completing a research or development project; browsing; recruiting and/or evaluating personnel; developing policy; and other. In interpreting the data it will, of course, be necessary to consider the individual's purpose in conducting a search. It is hardly fair to consider how helpful the information has been for evaluating personnel when it was sought for completing an assignment.

It is worthwhile at this point to note a distinction between the value of the search service and the value of the information acquired as a result of a search. A potential user, in deciding to pay $30 for a search, clearly has estimated that the worth of the service and information to be retrieved exceeds $30. This estimated value applies to both the value of the time saved by conducting an automated search and the expected value of the information. In situations where an individual occupies a role that requires information be sought, there is no real alternative to EISO except manual searching of indexes, and the savings in time alone -- regardless of the results -- will probably be sufficient to justify the cost. In most cases, of course, the information retrieved will have some value. Two items request the user to indicate what this value was for both the annotated bibliography itself and the materials located in using

the bibliography. Users were asked if their satisfaction with the value of these was low, medium or high (items 45 and 46, respectively).

Psychological Perspective

In psychological terms, the results of a search cycle can be assessed in part by the knowledge concerning the topic gained by the user. In theory, at least, this question is separate from that of the value of what is learned. For example, one might search for ways to reduce the heating cost for a school and learn that all effective solutions had already been adopted, with additional savings of energy unlikely. What has been learned in this case is of no economic value.

Knowledge gain, the user's usual objective in utilizing EISO, might be measured by the use of appropriate pre- and posttests. To do so would require testing users on a multitude of subjects (i.e., on each of the topics submitted). This approach is not feasible. Instead, a substitute or proxy will be used in this study: the individual's own perception of how much knowledge he has gained from using EISO to meet information needs. In item 29, the user is asked how much he learned about the topic as a result of the search -- nothing or very little, some, or a great deal.

This question is supplemented by two additional items from the search request form: the number of bibliographic references expected, and the number of relevant citations already known to the user (items DS8 and DS9). Both of these items suggest the level of knowledge of a user about the topic being searched before the search is conducted.

Though an individual may learn a great deal in using material retrieved through EISO, he may feel that there is more information available and that it is worth seeking. This desire for additional information is a measure of the extent to which a person's information need has been fulfilled (item 31).

An additional area of knowledge gain is not concerned with the user's primary interest, but with knowledge concerning EISO. The question of how much the user has learned about EISO is asked in item 30. One would

expect that a person who has used the system would feel relatively well informed about it.

Satisfaction, too, is a psychological variable. What are the users' attitudes about EISO now that they have experienced it first hand? Thirteen items measure their satisfaction with four aspects of EISO: published materials, quality of service, timeliness of service, and quality of the technology employed.

Published materials. Accuracy, comprehensiveness, adequacy of directions for submitting search requests, and adequacy of directions for submitting orders for materials were considered of most importance in assessing published materials. Items 37, 38, 39 and 40 concerned these aspects, which were rated in terms of high, medium and low satisfaction. Comments were also invited.

Quality of service. Convenience of arrangements for requesting EISO searches (item 33), the helpfulness of the search analyst or EIC (item 34), and the length of time devoted to the search interview (item 41) were the three indexes of service quality.

Timeliness of service. Timeliness of service refers to the time taken to deliver an EISO bibliography, EISO microfiche or paper copies, or materials ordered from ERIC Document Reproduction Service in the United States. Items 42, 43, and 44 measured the level of satisfaction with each of these aspects.

Quality of technology. Quality of technology relates to several characteristics of the materials and machines utilized in EISO. Included were the length of the bibliography, readability of microfiche, and availability of microfiche readers. Satisfaction with each of these was tapped by items 35, 36, and 47, respectively.

Finally, three summative or global questions concerning satisfaction were asked. All refer to social action; if they were to be classified according to the scheme used here, the could be classified in both the sociological and psychological spheres.

Would you use EISO again? This question, posed in item 49, is of utmost importance. Responses to it provide an estimate of the proportion of first time users who are likely to become repeat users.

Would you recommend use of EISO to a colleague? As noted earlier, colleagial recommendation -- the sociological "interaction effect" -- can serve to multiply the numbers of potential users. Hence, this question, asked in item 50, is also of considerable importance, both practically and theoretically.

Do you think EISO search services should be offered on a permanent basis? A positive response to this question (item 51) indicates that users of the experimental service accept the idea of a fee-for-service information system which is responsive to their needs. A negative response suggests a rejection of the idea.

Summary

The framework used in the assessment of EISO is rather complex, incorporating as it does sociological, psychological and economic models in a systems framework (a framework which itself is set within a systems model for adoption of innovations). Tables I and II help to simplify this overall structure by listing the sociological and psychological variables for the user in terms of input, process and output. Identifying item numbers from the questionnaire and data sheet are keyed to each factor. Age, for example, is a sociological input variable elicited by item 52 on the EISO User Evaluation Questionnaire. Satisfaction, on the other hand, is a psychological factor tapped by a number of items, and is on the output side of the system's equation.

The next chapter concentrates on the characteristics and processes of the Educational Information System for Ontario. Of particular importance are its economic traits -- cost, price and viability.

TABLE I. Variables for Sociological Models[a]

Input	Output
ORGANIZATIONAL	ORGANIZATIONAL
Kind of organization	Helpfulness of search for given purpose: 32
Purpose of organization: 1, 2[b]	
Size of organization: 11, 12	
Role of user in organization	
Institutional:	
Aspects re information search: 18	
Purpose for search: 19, DS4, DS7	
Topic/content	
Name of position: 6, 9	
Personal	
Training: 55	
Experience in job: 7	
Professional activities: 13, 14, 15, 16	
Trial/repeat use of EISO: 54	
Cost of first search: 31	
ENVIRONMENTAL	
Rural-urban: 5	
Geographical location: 3, 4	
Language: 10	
SOCIAL STATUS OF USER	
Age: 52	
Sex: 53	

a. No sociological variables are classified as process variables.
b. Numbers refer to item numbers on EISO User Evaluation Questionnaire (Appendix C). Numbers preceded by a "DS" refer to items on the EISO Service Evaluation Data Sheet (Appendix D).

TABLE II. Variables for Psychological Models[a]

Input	Output
LEARNING	**LEARNING**
Knowledge (actual) Topic: DS6, DS8, DS9[b] EISO	Knowledge (actual) Topic EISO
Knowledge (desired) Topic EISO	Knowledge (desired) Topic: 31 EISO
Motivation Achievement need: 8, 17	Knowledge gain Topic: 29 EISO: 30
ATTITUDES	**ATTITUDES**
Innovations: 20, 21, 22, 23, 24 EISO: 48	EISO: 49, 50, 51 Satisfaction: 33 to 47

a. No psychological variables are classified as process variables.

b. Numbers refer to item numbers on EISO user Evaluation Questionnaire (Appendix C). Numbers preceded with a "DS" refer to items on the EISO Service Evaluation Data Sheet (Appendix D).

CHAPTER IX

Economics of Operation: Questions, Definitions and Variables

To the user, EISO is most likely personified by either the search analyst or a local Educational Information Consultant. The computer technology supporting the system is relatively invisible to him, except for the bibliographies which are its printed output. Another visible characteristic of EISO is the price charged for the services and materials provided, prices which are to some extent based on the costs of their production, i.e., the costs of providing the search analyst and computer system. Ensuring that the public image of EISO is accurate -- neither too simplistic nor too technical -- is the role of publicity materials and dissemination activities.

This chapter focusses on the components of EISO described above and reports on the type of data collected from both users and the system regarding a series of process variables. What kind of intermediary did the user employ? How long was the search negotiation interview? How much computer connect-time was used? How extensive were the results? These questions are not evaluative; they are descriptive of what actually occurred. Yet they are of fundamental importance, since they measure the resources allocated for a given search -- the amount of time spent by EISO personnel, the amount of computer time, etc. -- and these translate into dollar cost figures. Price of services, in turn, are based on costs. Though this fact often does not

hold in the case of public services, it does for EISO which offers a service for which there is a "free" alternative. Users have the choice of manually searching indexes for information related to their topic. It is for them to judge if the saving in time EISO provides is of greater value than charges for the service. Pricing policy, whose derivation is explicated in this chapter, is related to the dissemination programme which is being conducted to inform educators about EISO and its services. One practice in this dissemination programme was the provision of free searches to select groups of potential users, with a view toward stimulating demand. Other modes of dissemination were also tested, and users were asked where they first heard about EISO in order to discern the more effective methods of publicizing the system.

Human Resources

Two types of intermediaries are available to help users adapt their questions to the requirements of the computerized information system used by EISO: the search analyst and the Educational Information Consultants.

Educational Information Consultants (EICs) are local educators selected from boards, Ministry Offices, faculties of education, colleges, or OISE Field Centres, who have been specially trained to assist users in developing accurate descriptions of information needs, and to assist them in interpreting information retrieved. At present, EICs have been trained only in the Northeastern Region of the Province, stretching from Muskoka to James Bay. An evaluation of the training programme itself is presented in Chapter IV. What is of principle concern in terms of the effectiveness of EISO and the contributions of Educational Information Consultants to the system is the extent to which EICs are involved in assisting users. Hence, in item 26 each user was asked whether or not an EIC in a particular agency assisted in developing the search request.

If no EIC was involved in the submission of a search, then the user of necessity went directly to the search analyst, a specially trained reference librarian (Appendix R), with the search request. The nature of this contact was recorded by the search analyst in item DS5.

Much of the actual work in processing requests was handled by a library assistant (Appendix Q). Analysis of this role is warranted, but is not included within this report.

Technological Resources

The final component of the information system is the particular technology that is being used in EISO. By technology we mean only those non-human elements of the system, such as machines, involved in creating the final products. The total list of machines involved in EISO is quite extensive (Appendix E), but the list of technological items must also include printed materials such as the EISO manual which was created as a reference for EICs, and the numerous publications related to the Educational Resources Information Center (ERIC), including the Thesaurus of ERIC Descriptors (Appendix F).

A retrieval system for bibliographic information is nothing more than a mode of gaining access to particular documents or references in a specific form. Information searches may be conducted in several ways: manually using indexes or by computer using either a batch or interactive system. With manual searches, transcription of references may be required, as is true with computerized systems using screens to display results (i.e., cathode ray tube or CRT display units). The particular system used for the Educational Information System for Ontario is an interactive computer system with an on-line typewriter-type terminal which gives a printed record of search activities and the option of off-line printouts. The latter are far less expensive than on-line printouts because they are run at the site of the computer, thereby avoiding long distance communication costs and allowing for very rapid printing using high speed machines.

Although EISO uses only one computer terminal, it subscribes to two remote search services, those offered by System Development Corporation (SDC) and Lockheed. Both systems provide access to ERICTAPES which include all bibliographic information reported in Resources in Education and the

Current Index to Journals in Education. Both are on-line, interactive services, but they do differ in the times at which they are available and in ancillary services provided. SDC appears to be somewhat faster than Lockheed, both in terms of on-line communication and providing off-line printouts, allows the mailing of off-line printouts directly to the client, and has excellent back-up services. Lockheed appears to be somewhat less expensive than SDC, and allows textual search of abstracts. Both systems are constantly changing and adding new data bases. In addition to ERIC, EISO has on request searched Social Science Citation Index (SSCI), Psychological Abstracts, and Dissertation Abstracts. Two items on the Search Service Evaluation Data Sheet record, for a given search, the two technological characteristics alluded to above: the name of the system used (item DS15), and the data base searched (item DS16).

It should be noted that costs differ both by the system used and the data base searched. Cost per hour of connect time for a given service is noted in item DS22, and cost per citation in item DS19. These data are directly related to the cost of the service and, hence, its economic viability.

Another technological trait of EISO, at least from the user's viewpoint, is the availability of microfiche readers on which to view microfiche copies of documents from Resources in Education (RIE) that might be ordered after reviewing a given EISO bibliography. Clearly, a user who does not have a microfiche reader will be forced to order paper copies of documents from ERIC Document Reproduction Service (EDRS) in the United States, or do without. To ensure that at least some users had microfiche readers available, a small number of Educational Information Stations (Appendix G) were placed in various locations in the Northeastern Region. A survey conducted by the Ontario Secondary School Teachers' Federation (OSSTF) indicated many secondary schools in the province have readers available, as do virtually all university and college libraries. To learn if a user had access to a microfiche reader, and could therefore make use of the EISO fiche duplicating service, three items were used. Item 28, completed by the user, asked if a fiche reader was

available and, if so, whether or not it was a portable type that could be used at home. The latter distinction was considered of potential importance since convenience is a major factor in determining whether or not microfiche copies will be ordered and read. For many reasons, it would be far more convenient to use a portable fiche reader in the comfort of one's home than to visit a library to use its stationary fiche readers. Items DS30 and DS31 dealt with the question of whether the fiche reader available was provided by EISO.

Cost of EISO Services

The costs of providing an automated search service are necessarily very closely linked to the type of organization, the mode of retrieval, the type and size of staff, and other local conditions. For example, a recent report lists over 125 agencies engaged in computerized bibliographic searching of the ERIC data base (Embry, 1974). There is little uniformity in the services offered, however. Some centres provide copies of fiche free, some provide previously prepared information packages, and some supply readers.

The costs incurred by such diverse agencies and services will obviously be vastly different. The ways in which they are measured will be equally diverse. There has been some attempt to develop models that can be applied to a variety of situations, but most of the cost models to date have referred to the cost of developing the data base itself and are not relevant to libraries that wish to purchase commercial services such as SDC as opposed to developing computer systems to search their own magnetic data tapes.

Others have attempted to measure the economic efficiency of a retrieval system by user-oriented and management-oriented criteria. Lancaster and Climenson (1968) feel that the characteristics that signify the operating efficiency of a system to the user are its coverage, usability, recall, precision, response, presentation, and user effort required. These factors are weighed against the need of management for economic efficiency. The break-even points, trade-off factors, and diminishing returns are considered

in relation to the various component parts of the whole retrieval system: acquisition, indexing language, searching, and equipment.

Cooper (1972) has developed a mathematical model to provide a method of comparing costs between different information retrieval systems. The model divides the total costs of the retrieval operation into those incurred by the user and those incurred by the system. For each of these components, pre-search, search, and post-search activities, costs are analyzed. The method allows separate cost allocations to the user and to the system and suggests that there is a "trade off between the degree of generality or specificity required in the search and the cost and benefit of conducting it".

For the librarian interested in the costs incurred by subscribing to a commercial service, Elman (1975) provides a more easily applicable equation. He devised the formula $C_{total} = (T \times C_{sum}) + P$ to represent the total cost of completing an on-line literature search. The total cost is arrived at by multiplying the on-line time in minutes, T, times the sum of all costs per minute of operation (including computer-connect time, labor, telephone hook-up charges, and terminal leasing) and adding the cost, P, of off-line printed citations. The average cost of 66 computer-aided literature searches via Lockheed's Dialog on-line information retrieval system was $47. The average manual search cost $250. Time required for the automated search averaged 45 minutes; for the manual search 22 hours was required. A recent study by Benefeld et al. (1975) showed that a typical appointment for using services other than Medline lasted 57 minutes, of which 65%, or 37 minutes, was spent on-line. Only 43% of the searches requested off-line printouts, and those contained an average of 173 citations. The actual average cost to the user was $45.96 for computer-connect costs plus unstated administrative costs, $7.84 for the time of the search analyst, and $20.75 for off-line printouts.

These figures provide preliminary though scant data against which to measure the probable costs of providing automated reference service. They

also service to highlight an important aspect of the state-of-the-art of charging users for library services: little is known about the actual costs of providing information, no common standards are used to assess costs, and rarely are the means by which costs are derived made public. Penner (1970) goes even further to state that librarians either do not know or do not want to know the costs of their systems. He attributes this partly to the fact that charging users for information services has not yet become a common practice among libraries. Because costs (no matter how calculated) are incurred in providing these new services, and because library budgets are not likely to increase in the near future, the user will have to be charged for access to computerized bibliographic information (Penner, 1970; De Gennaro, 1973; Jackson, 1975). Brickley and Trohoski (1974) have strongly recommended that "existing centres must apply more rigorous programme budgeting and cost analysis techniques in order to provide a management data base from which cost-benefit characteristics can be determined". It is with the hope of alleviating the scarcity of accurate, detailed cost information that the following is presented.

Recognizing that provision of computer-based reference services will probably not be highly subsidized, data were collected to try to assess how much the user would have to be charged per search in order for such a service to break even, or as the economists say, reach equilibrium. To gauge as accurately as possible costs involved, the service began by providing access to only one data base, ERIC, via the System Development Corporation in Santa Monica, California. Later, other commercial services and data bases were added. An initial estimate of costs was made using as a model on-line search of ERIC using SDC's search service via the TYMSHARE communication network. Using this arrangement, the local terminal is connected with the computer located in California. Costs were also estimated for providing the user with original materials cited on the printed bibliography.

To begin with, then, an office with desks for the search analyst and her secretary, a typewriter, and two telephone lines as well as standard office

supplies was built in the section of the Library adjacent to the journals, indexes, and ERIC fiche (Appendix O). Actual costs were incurred for the building of the room, electrical modifications and equipment directly related to the new service: a computer terminal to be used by the search analyst, a microfiche duplicator for reproducing ERIC fiche, and a microfiche reader to be used by the service to check quality of duplicated fiche. These represent start-up or one-time costs and are listed in Table III below.

TABLE III. Budget for Capital Costs

Item	Price
Computer Terminal Teleterm Printer, Model 1030, APL/ASCII, Computer Devices, Inc.	$3700
Microfiche Printer/Processor Bell and Howel, diazo,	4740
Extra ammonia unit	102
Provincial sales tax	598
Office Installation Partitions, telephone and electrical outlets, etc.	902
Total	$10,042

It should be noted that the new service was able to make full use of the host Library's journals, indexes, microfiche collections as well as the duplicating facilities for making paper copies of journal articles. Also, users were able to use the fiche readers, and/or reader/printers already available in the Library. Thus the costs for providing a computer-based reference service described herein assume that such a service will be incorporated into an existing, modern, well-equipped library.

Estimated costs per search are reported in Table IV, which incorporates a number of important assumptions. First, mentioned above, is that the new service is created within an existing library setting and has full access to journals, indexes, readers, photocopying machines, etc. Second is that staff will be hired on an annual basis and devote all of their time to the new service. This decision is particularly important for the search analyst since it is virtually impossible to retain such professional expertise without some guarantee of employment. Third, it is assumed that a skilled search analyst can process a maximum of approximately 130 searches per month. Further, the assumption is made that the average search will require one-quarter hour on-line at the terminal. These estimates were arrived at after a five week trial of the service that had been offered previously, and have a wide margin of error. Fifth, since Toronto has a node in the TYMSHARE communications system, no long-distance charges are included. Last, it is assumed that the new service should attempt to be self-supporting, but that the price per search, in order to be competitive, must fall within the $30 to $45 per search range. This cost per search, then, covers the negotiation of the search request between the search analyst and the user, the formulation of the search strategy by the analyst, and the retrieval of a computer-generated bibliography which is then mailed to the user. The user submits his request by mail, in person, or by telephone (for which he is responsible if long distance charges are incurred) and may order duplicates of original documents cited on his bibliography at an extra cost of 10¢ per page for photocopied journal articles and/or 35¢ per fiche for duplicate ERIC documents.

Turning to Table IV, then, we see the costs incurred when varying numbers of searches are performed per month. Even when no searches are transacted, there are still costs of $1857 per month because the staff, hired on an annual basis, must be paid regardless of whether or not their services are used. Similarly, the telephone must be paid for, ringing or not. At a rate of 25 searches per month, the total costs per month are $2408 and the revenue

TABLE IV. Costs and Revenue for Searches per Month

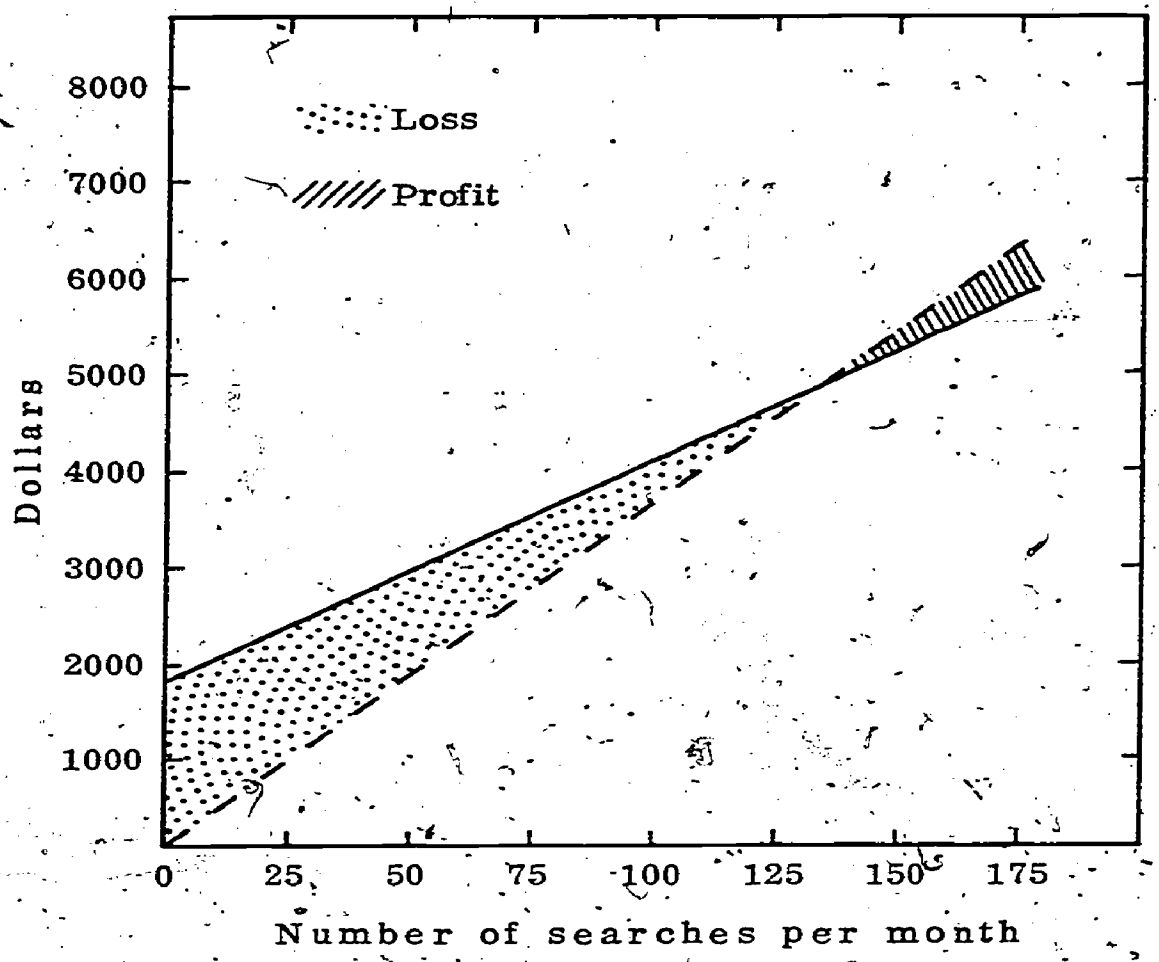
Budget item	Number of searches						
	0[a]	25	50	75	100	125	150
Telephone & Telegraph							
SDC/ERIC ($42/hr computer connect time at 1/4 hr search)	0	$ 262.50	$ 525.00	$ 787.50	$ 1,050.00	$ 1,312.50	$ 1,575.00
TYMSHARE ($11/hr Toronto-SDC data base)	0	68.75	137.50	206.25	275.00	343.75	412.50
Mailing	0	37.50	75.00	112.50	150.50	187.50	225.00
Monthly telephone	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Supplies & Printing							
Terminal paper ($7.50/roll)	0	7.50	15.00	22.50	30.00	37.50	45.00
Printed forms	0	12.50	25.00	37.50	50.00	63.50	75.00
Off-line printing (50 citations at $0.13 each)	0	162.50	325.00	487.50	650.00	812.50	975.00
Professional							
Librarian II ($14,000)	1,166.00	1,166.00	1,166.00	1,166.00	1,166.00	1,166.00	1,166.00
General Support							
Secretary II ($8,000)	666.00	666.00	666.00	666.00	666.00	666.00	666.00
Total cost per month	1,857.00	2,408.25	2,959.50	3,510.75	4,062.00	4,613.25	5,164.50
Total revenue per month at $36/search	0	900.00	1,800.00	2,700.00	3,600.00	4,500.00	5,400.00
Total cost per year	22,284.00	28,899.00	35,514.00	42,129.00	48,744.00	55,359.00	61,974.00
Est. cost per search to break even (cost per mo./no. of searches)		96.33	59.19	46.81	40.62	36.905	34.444

[a] This column represents fixed costs which are incurred even if no searches are conducted.

received from filling the search requests at $36 per search is $9000. We can see that at this level of requests submitted, each user would have to be charged $96.33 per search for the service to break even -- a fee that clearly does not fall within the competitive range of $30 to $45 per search.

If we take this $30 to $45 range as the most desirable, and we combine this with the additional constraint that one search analyst can provide between 125 and 150 searches per month, how many searches would have to be performed for the service to be self-supporting? The answer to this question is easily visualized in Figure 3. The graph shows that if $36 per search is charged, the cost curve and the revenue curve meet at approximately 135 searches. If any fewer searches are performed, the cost exceeds the revenue.

FIGURE 3. Cost, Revenue, and Profit per Month
(—— total cost/mo., --- revenue/mo. at $36/search)



If more than 135 searches per month are performed, a profit is gained. However, it should be remembered that the capacity of one search analyst cannot be stretched without limit. Beyond a level of 130 to 150 searches per month, another search analyst would have to be added to the staff, thereby raising the costs to a new level. Another solution is to raise the price per search above $36, to say $40 per search to allow for a greater area within which profits can be made or, if we assume that cost recovery and not profits are the objective, so that the analyst would be able to perform fewer searches. However, before setting this higher price, other factors such as the price of competitors, and the elasticity of demand would have to be weighed carefully. Unfortunately, the Ontario market for such a service is virtually unknown.

In addition to the costs already mentioned are those that are more indirect and difficult to assess accurately, but are, nonetheless, just as real. They, too, must be considered before an organization, in this case a library, institutes a major new service. These are what economists call "opportunity costs". Whenever we are faced with choosing between alternatives, we must give up one thing to get another. What we give up is the opportunity cost of what we get. "The opportunity cost of a good is the alternative that must be given up to obtain that good" (Lumsden, Attiyeh & Bach, 1974). If, for example, the cost of publishing bibliographies and providing a computer-based reference service were similar or the same, and the library could support only one of these services, but not both, and if it chose to support automated reference, then the inability to publish bibliographies would be the opportunity cost of the chosen service.

Social costs must also be considered. If, for example, several hundred educators a year avail themselves of the vast quantities of educational information available through computerized techniques, return to their classrooms with new curricula and teaching approaches which then benefit their students, the benefits of the new service may be far-reaching. If, in addition, the new service adds to the reputation of the sponsoring organization as a leader in

educational development, provides new jobs, eliminates duplication of research efforts, and contributes to a better understanding of knowledge dissemination and utilization in education, these benefits may serve to outweigh other cost considerations.

It becomes clear at this point that even an accurate calculation of the direct monetary costs incurred in implementing any new service cannot be used as the sole determining factor in decision making. Since the benefits and costs of the service under consideration go beyond the single individual using the service, the service might be considered analogous to a public good. In that case, the use of investment criteria are not enough. Value judgements must be made: personal, professional, organizational, and user preferences must be considered. It will be easier to make rational choices if the decision is made within a consistent organizational philosophy. If the goal is to provide the best available educational information to as many educators as possible within the lowest possible price, adopting the new service may be justified.

Against this broader view remains the necessity of accurate measurement of actual costs incurred in providing services. Cost is defined as the total cost in dollars of producing a given service, item, or both. For costing an EISO search, Elman's (1975) formula -- Total cost = Minutes for search x Cost per minute of service + Cost of all printed citations -- serves as a guide. The search cycle, including question negotiation, reference retrieval and document retrieval, will be costed using a variation of this formula.

Question negotiation is comprised of a series of actions and responses engaged in by the client and search analyst during which they both acquire a thorough understanding of the search topic which the search analyst translates into a format usable for a computer search of an appropriate data base. The search follows, with the strategy being modified if necessary in order to ensure relevant references are retrieved. While the entire search cycle has innumerable characteristics, only two are considered in this report: length of time of the negotiation phase, and length of time of the search phase during which the

computer terminal is connected on-line to SDC or Lockheed. Both periods are recorded in minutes by the search analyst on the Data Sheet in items DS14 and DS17, respectively, and are of particular importance because of their direct relationship to the actual cost of the service. During the total elapsed time, the search analyst's salary must be counted; during the period the terminal is connected, charges for the search service must be added as well. Separating the two time periods departs somewhat from Elman's approach which assumes that each minute of negotiation costs the same as every other. We view the negotiation process instead as a two stage process: negotiation alone first, followed by negotiation plus computer searching. An estimate of the total cost of a search can be made using the following set of formulas.

If t_1 indicates the length of time in minutes of the first phase of the negotiation interview and t_2 the length of the second phase, then costs incurred for the search (excluding administrative overhead and cost of citations) are given by

$$\text{Search costs} = c_1(t_1+t_2) + c_2t_2 = c_1t_1 + (c_1+c_2)t_2$$

where c_1 = salary per minute of the search analyst, and c_2 = cost per minute of the search system.

The difference between this model and Elman's is important. This approach can account for the fact that $c_1 + c_2$ is much greater than c_1 alone. That is, time spent in negotiation during which the computerized search system is operating is far more expensive than time spent with the search analyst alone. For example, a search analyst might be paid \$7.80 per hour (\$0.13 per minute) and the connect time charges for an interactive system might equal \$120 per hour (\$2.00 per minute). That is, c_1 = \$0.13 and $c_1 + c_2$ = \$2.13. If price is substituted for cost in the above equation, and t_1+t_2 set equal to a constant (the total elapsed time for negotiating a search request and retrieving references), then two linear equations are formed whose solution for t_1 and t_2 is quite straightforward, and yields the break-even point at which the price covers costs.

For example, if $30 is charged for a search and the search is conducted in 20 minutes, the equations are

$$30 = 0.13t_1 + 2.13t_2$$

$$20 = 1t_1 + 1t_2$$

Solving these simultaneous equations yields $t_1 = 6.3$ and $t_2 = 13.7$. Therefore, if the analyst were on-line for more than 13.7 minutes, direct costs for the search would exceed $30. For example, if $t_1 = 5$ and $t_2 = 15$, then the cost would total $32.60. On the other hand, if $t_1 = 10$ and $t_2 = 10$, the total cost would be only $22.60. Clearly, it is more economical to negotiate a question with care before going on-line; also, a good typist on the terminal would prove more economical by far than a poor one.

In addition to negotiation costs, charges are made for each citation printed off-line; following Elman, these costs may be represented by P with $P = np$ where p is the cost per citation (item DS19) and n equal to the number of citations (item DS18). Added to the cost of negotiation, we have

$$\text{Total cost} = c_1 t_1 + (c_1 + c_2)t_2 + P$$

If materials are ordered by the user, their numbers are noted as follows: number of microfiche copies ordered from EISO (DS26); number of copies of journal articles (DS27); the number of copies of ERIC documents ordered from EDRS (DS28); and the number of microfiche ordered from EDRS (DS29).

Other time variables besides those related to search negotiation are also recorded. They are related more to the efficiency and turn around time rather than the character and cost of the service. Relevant dates are included for receipt of search request (DS1), interview with user (DS2), search executed (DS3), and bibliography received by the user (DS21). Each of these steps may not occur in each search cycle, or course. For example, no interview may be necessary if a search request is well stated by an Educational Information Consultant. Also, the EISO staff may not always be aware of the date a

bibliography is received by the client since many are forwarded directly. Nevertheless, the intervals between these occurrences would provide insight into the length of time needed to process search requests, so that delays would be spotted.

Pricing Policy

First year prices for EISO search services and materials were determined on the basis of the preliminary analyses reported in this chapter. They suggested that $30 would be a lower limit to the range of prices that might provide sufficient revenue to support an information system on a break-even basis. With the low volume of search requests expected during the first year of operation, it is apparent that $30 is a highly subsidized price at the present time.

While $30 was the standard price, in certain cases no fee was charged for an EISO search (e.g., introductory searches for school boards in the Northeastern Region) and in others a fee of $15 was levied (e.g., 1975 OISE Summer Session graduate students). A fee of $20 was set for users from the Northeastern Region, taking effect once free searches were exhausted. These lower prices were offered in the hope that a "seed" of satisfied customers might be created that would stimulate or catalyse demand (Lawton & Lawton, 1975).

Fees for microfiche copies, set at 35¢ each, and for paper copies of journal articles, set at 10¢ each, were meant only to cover costs of supplies. The first is below the price charged for an equivalent service from the ERIC Document Reproduction Service, but exceeds their charges for large orders since EDRS uses a pricing formula that decreases price as more fiche are ordered (Appendix N(x)). The 10¢ fee for paper copies is equal to that charged by the OISE Library on its self-service machines, but above that charged for its internal duplication service.

Since EISO fees for microfiche and paper copies were set, there was no need to record them on data sheets. Price for a given search, in contrast,

was recorded (item DS10), as was the price of the user's first search (DS 32). The latter variable was, of course, collected only for repeat users.

Publicity

Free or discounted EISO searches have been mentioned as one method of stimulating demand for the service. This effort was limited, however, compared to that expended experimenting with other modes of dissemination, such as brochures, articles, and professional development days.

Direct mailing of brochures or flyers describing EISO (Appendix H) went to all school boards, faculties of education, Ministry of Education offices, and educational organizations in Ontario. Sufficient copies were provided for boards to distribute two flyers to each school. Within The Ontario Institute for Studies in Education, copies were sent to all 150 faculty and 2000 students. As well, OISE Field Centres and the OISE Library were provided multiple copies for distribution. The flyer, it will be noted, is suitable for posting, and incorporates a search request form on the reverse side.

Articles, based on the content of the flyer, appeared in major Ontario educational journals: The Forum, The Educational Courier, Orbit, and Ontario Education. A similar article has been submitted to Dimensions (Ontario Ministry of Education) and is planned for OCLEA (Ontario Council for Leadership in Educational Administration). The articles in The Forum and the Courier both incorporated search request forms, run as full page advertisements (Appendix I).

Professional development days (Appendix J) have been conducted at numerous locations in the Northeastern Region and several within Metro, including OISE. Each session usually lasts two hours, and includes an on-line demonstration of a search on a topic suggested by those present. In almost all cases, atleast one of the principal investigators for the EISO project has participated.

Classroom instruction about EISO has taken place at OISE on several occasions, usually on invitation of the instructor. Sessions are similar to those

offered on professional development days, though may be related, as appropriate, to the content of the course. The on-line demonstration, however, is given in the EISO office in the OISE Library, rather than in the classroom. In several cases, classroom instruction was combined with the offer of free searches.

Colleagues, the literature indicates, are a major source of new ideas for all types of professionals, including educators (Stern et al., 1976). The use of colleagial networks is not totally beyond the control of the professional disseminator. Attempts have been made to capitalize on these networks by aiming professional development days at individuals who, in the investigators' views, were likely to be influential. However, no systematic data were collected to assess the accuracy of these choices.

Educational Information Consultants in the Northeastern Region were considered possible disseminators of information concerning EISO. Not only had they been trained in the use of EISO, they had been presented with a role description (Appendix K) that included the responsibility for disseminating information about EISO. However, no specific training in this regard was given (Chapter IV).

Library tours are regular offerings of the reference staff of the OISE Library, who also provide special seminars on the use of various retrieval techniques. Productive efforts were made to integrate familiarization with EISO into the schedule of these services.

Other sources of information concerning EISO were expected, so an open-ended question allowing the user to respond was included in item 25, which requested the source of their first information about EISO.

Summary

To recapitulate, one may ask not only who used the information system provided by EISO, and how satisfied they were with the service, but also, "What is EISO?" Who are the professionals that form its staff? What is its technology? How much does the service cost to use and to run? How effective are different modes of publicity.

Table V summarizes the variables used in the economic input-process-output model of the information system which has been used to structure the questions asked. Most questions are related to the technology and service aspects of EISO. Only a few items measure costs; additional study of costs beyond that suggested in this chapter will be required at a later date.

We now turn to a preliminary analysis of the data reported by users of EISO who became its clients between July 1, 1975, when a trial run during the OISE Graduate Summer Session commenced, and January 15, 1976, when data collection for this initial report ceased. The framework presented in this and the preceding chapter will be used to characterize the users in sociological, psychological and economic terms. The search process will be described in terms of its costs and time requirements. At a later date, relationships among background, process, and output variables will be analyzed. Included at that time will be a comparison of novice and veteran users.

TABLE V. Variables for Economic Models

Input	Process	Output
TECHNOLOGY	TECHNOLOGY	TECHNOLOGY
Retrieval system: DS15, DS16	Length of interview: DS14	No. of bibliographic citations: DS18
Fiche reader availability: 28, DS30 [a]	Length of search: DS17	No. of articles ordered: DS27
EIC: 26, DS5, DS20	Time to deliver bibliography: DS21	No. of documents ordered: DS26
Fiche/paper copies	Time to deliver materials	No. EDRS paper copies: DS28
Mode of dissemination re EISO: 25, DS31	Time to process search request: DS1, DS2, DS3	No. EDRS fiche copies: DS 29
PRICE-DEMAND		PRICE-DEMAND
Price: DS10, DS11, DS12, DS13, DS23, DS24, DS32		Level of usage
Level of usage		
COST-EFFECTIVENESS		COST-EFFECTIVENESS
Cost: DS19, DS22, DS18, DS17		See psychological and sociological outputs
Level of usage		
COST-BENEFIT		COST-BENEFIT
Cost: DS19, DS22, DS18, DS17		See psychological and sociological outputs

a. Numbers refer to items on the EISO User Evaluation Questionnaire (Appendix C). Numbers preceded by a "DS" refer to items on the EISO Service Evaluation Data Sheet (Appendix D).

CHAPTER X

Description of Preliminary Findings

A description of the types of individuals who have used EISO is the first topic of this chapter, and a preliminary answer is given to the question of their identity. This is followed by a tentative outline of some of the actual costs of conducting EISO searches.

User Survey

Every user of the EISO search service was given or sent an EISO User Evaluation Questionnaire to complete. This chapter describes the responses made by those individuals who received questionnaires before January 15, 1976, and returned them by the end of that month. In all, 300 questionnaires were distributed; of those, 122 (40.7%) had been returned by the cut-off date of January 30, which had been established early enough to allow sufficient time to prepare the data and to complete a preliminary analysis. As some of the users requested more than one search during the evaluation period, the actual number of distinct individuals who completed the questionnaire, only 102, was somewhat less than the number of questionnaires collected. Five users indicated that they had used the search service more than once, but returned only one questionnaire each.

In the analysis that follows, the data are treated as if each search were conducted by a distinct user; that is, the data are treated as if there were 122

users. In this way, proper weight is given to the role repeat users play in the operation of EISO.

Rate of return for questionnaires was somewhat disappointing. Forty-five percent of the questionnaires mailed to EISO clients who used the service during the six-week trial period, July 3 to August 13, 1975, were returned; the comparative figure for "regular" clients (those requesting a search after August 13) is 38%. Since mailing of all evaluation questionnaires commenced in late September, overall rate of return may have been depressed by the prolonged postal strike last autumn. As well, the length of the questionnaire, which had, in fact, been planned only as a draft to be replaced in the winter by a new version, may have discouraged a better response. The revised version of the questionnaire, now being prepared for spring, should alleviate this problem.

The User

Sociological Perspectives

Organization. Table VI provides information about the first type of social characteristic of the user, namely the organization or institution with which the individual is primarily associated. It shows that OISE faculty and students comprised the greatest number of EISO users coming from a single institution: 45, or 37%. Here the most heavily represented departments were Applied Psychology, Curriculum and Field Development, with eight users each, or a combined total of 53% of all OISE users. Special Education followed with six users or 13%; the OISE Library had five users; Educational Administration, four, Adult Education, three, and History and Philosophy, one.

Users from Ontario public (37) and separate (16) boards -- including elementary and secondary schools, as well as central board offices -- comprised 30% and 13%, respectively, for a total of 43%. The distribution for the remaining organizations is as follows: Ministry of Education, seven (5.7%);

TABLE VI. Organizations Users Primarily Associated With

Organization	Number	Percent
Public board	37	30.3
Separate board	16	13.1
CAAT	2	1.6
Faculty of Education	5	4.1
OISE	45	36.9
University	3	2.5
Ministry of Education	7	5.7
Professional organizations	1	0.8
Government	2	1.6
Business	2	1.6
Other	2	1.6
Total	122	100.0

Faculty of Education or Teachers' College, five; University, three; each of CAAT, government, business or industry and other, two.

For the 51 users associated with school boards, either in an administrative or teaching capacity, the average board enrolment figure (mean score) was 30,895, with a minimum of 3081 and a maximum of 99,894. The average enrolment of schools, based on 23 valid observations, was 624, the minimum being 114, and the maximum 1620.

Role. The second type of social variables under consideration are the institutional and personal dimensions of the users' organizational roles. With regard to the institutional aspect, a maximum of three major professional roles was ascertained from each respondent, as is shown in Table VII. The primary function of the highest number of users (33, or 27%) was administration

TABLE VII. Users' Major Professional Roles

Role	Number		Percent	
ADMINISTRATION OR SUPERVISION				
No other role	24		19.7	
Second role:				
Teaching	1		0.8	
Pupil-Personnel Service	1		0.8	
M.Ed. Student	5		4.1	
Ed. D. Student	1	7	0.8	5.7
M.A. Student	1		0.8	
Total	33		27.0	
TEACHING				
No other role	4		3.3	
Second role: Administration	2	3	1.6	2.4
Third role: M.Ed. Student	1		0.8	
Second role: Research	3		2.5	
Third role: Administration	1	5	0.8	4.1
M.A. Student	1		0.8	
Second role: Field Development	1		0.8	
Second role: M.Ed. Student	2		1.6	
M.A. Student	1		0.8	
Other	1		0.8	
Total	17		13.8	
PUPIL PERSONNEL SERVICES				
Second role: M.Ed. Student	1		0.8	
Total	1		0.8	
RESEARCH				
No other role	6		4.9	
Second role: Administration		9		7.3
Third role: Teaching	2		1.6	
Library Service	1		0.8	
Second role: Teaching	1		0.8	
Library service	1		0.8	

Table VII (continued)

Role	Number	Percent
Second role: Other		
Third role: Teaching	1	0.8
Total	12	9.7
FIELD DEVELOPMENT		
No other role	5	4.1
Second role: Research	3	2.5
Third role: Teaching	1	0.8
Total	9	7.4
MINISTRY REGIONAL OFFICE		
No other role	6	4.9
Second role: Field Development		
Third role: Teaching	1	0.8
Total	7	5.7
LIBRARY SERVICE		
No other role	9	7.4
Second role: Administration	1	0.8
Total	10	8.2
PRIVATE CONSULTANT		
Second role: Research	1	0.8
Total	1	0.8
UNDERGRADUATE STUDENT	0	0
M.Ed. STUDENT		
Second role: Teaching	3	2.5
Total	3	2.5
Ed.D. STUDENT		
No other role	4	3.3
Second role: Teaching		
Third role: Administration	1	0.8
Total	5	4.1

Table VII (continued)

Role	Number		Percent	
M.A. STUDENT				
No other role	5		4.1	
Total	5		4.1	
Ph.D. STUDENT				
No other role	10		8.2	
Second role: Teaching	1	2	0.8	1.6
Third role: Other	1		0.8	
Second role: Research				
Third role: Private Consultant	1		0.8	
Second role: Other	1		0.8	
Total	14		11.4	
Total Students	27		22.1	

or supervision; 24 of these listed no other roles and thus represented the largest single group. Other categories (excluding those comprising less than 5%) given by users as their most important professional role included teaching; 17 (14%); Ph.D. student, 14 (11%); research, 12 (9.8%); library services, 10 (8.2%); Field Development, 9 (7.4%), and Ministry of Education Regional Offices, 7 (5.7%). The "Other" category includes one employee at the Regional Office of the Ministry of Correctional Services -- Juvenile Division (Training Schools); one business consultant to Bell Canada; one school counsellor; one psychologist; and one "community organizer".

In the first three major professional functions for users, namely administration, teaching and research, the following secondary (II) and tertiary (III) roles (which no doubt also affect to a large extent an individual's decision to try the service) occur most frequently:

Administration: (II) Five M.Ed. students, one Ed.D. student and one M.A. student (5.7%).

Teaching: (II) Five in research (4.1%) with administration and M.A. student listed as (III) in one case each; (II) three in administration (2.4%), one user indicating M.Ed. student as (III); (II) three graduate students, two M.Ed., and one M.A., accounting for 2.4%.

Research: (II) Three in administration (2.4%), two of whom stated that their third most important function was teaching, and one giving library services as (III). Furthermore, two researchers indicated teaching, one as a secondary role, and the other as a tertiary role.

Regarding the professional role of school board personnel, Table VIII shows the breakdown. Sixteen users (31%) were employed at the elementary level only; four (7.7%) in the secondary level only; and four at both elementary and secondary levels.

The highest proportion of school board users (20, or 39%) were from central board offices, while eight (15%) occupied "other" levels (e.g., board librarian).

TABLE VIII. School Board Personnel Level of Primary Position

Level	Number	Percent
Elementary	16	30.8
Secondary	4	7.7
Elementary and secondary	4	7.7
Central board offices	20	38.5
Other	8	15.4
Total	52	100.0

The frequency with which EISO users sought information for their varied professional activities appears in Table IX. In order to facilitate comparison in the descriptive analysis, it is convenient to combine the responses "never" and "sometimes" to form the "low" categories, and the responses "often" and "very often" to constitute the "high" category.

The purposes for which users sought information most frequently were, keeping abreast of the field (78% in the "high" frequency category), programme improvement (64%), and curriculum development (53%). In descending order, other purposes included research and development projects (48%); preparation of speeches, reports, and articles (47%); assignments, term papers and theses (41%); browsing (37%); preparing or updating bibliographies (21%); policy development (18%) and personnel recruitment or evaluation (10%). Clearly, this is an overall picture for users; those in particular roles might well search for information with far greater or lesser frequency than does the "average" user.

In terms of the approximate time per week spent by the individual user in obtaining information from various sources, and the value of the information gained, professional journal and books, followed by colleagues, emerged as the two most frequently consulted and valuable sources (Table X).

TABLE IX. Frequency Information Sought for Professional Purposes

Purpose	Percent				No. valid cases
	Never	Sometimes	Often	Very often	
To keep abreast of the field	1.7%	20.8%	50.8%	26.7%	120
Assignments, term papers, and theses	28.4	30.2	15.5	25.9	116
Preparing or updating bibliographies	26.8	51.8	11.6	9.8	112
Curriculum development	16.1	31.3	33.0	19.6	112
Programme improvement	14.8	21.7	42.6	20.9	115
Preparation of speeches, reports, articles	12.1	41.4	33.6	12.9	116
Research and development projects	17.1	34.5	28.3	19.5	113
Browsing	4.2	58.5	28.8	8.5	118
Personnel recruitment or evaluation	49.5	40.4	8.3	1.8	109
Policy development	32.4	49.5	9.0	9.0	111
Other	33.3	--	33.3	33.3	9

TABLE X. Time Spent by Users in Obtaining Information and Value of the Information Gained

Source	Approximate time spent (Hours per week)							Value			
	0	1/2	1	2	3-6	7+	No. valid cases	Low	Medium	High	No. valid cases
Colleagues	0 %	11.5%	15.9%	30.1%	29.2%	13.3%	113	8.8%	31.9%	59.3%	113
Professional journals, books	1.8	9.6	14.9	16.7	28.9	28.1	114	2.7	36.6	60.7	112
Outside consultants	44.6	32.7	8.9	9.9	4.0	--	101	31.3	50.7	17.9	67
Inside consultants	26.5	30.4	20.6	9.8	3.9	8.8	102	19.0	45.6	35.4	79
Office files, reports	7.8	21.5	29.9	14.0	9.3	7.5	107	30.8	38.5	30.8	91
Supervisors	30.2	26.4	23.6	11.3	7.5	0.9	106	27.6	33.3	39.1	87
Professional organizations	41.0	41.0	10.5	5.7	1.9	--	105	43.8	26.2	7.4	73
Libraries	8.0	12.5	25.0	21.4	17.0	16.1	112	11.7	37.9	50.5	103
Conferences	34.0	40.6	20.8	2.8	1.9	--	106	34.9	50.6	14.5	83
Professional development days	61.2	18.4	10.7	3.9	3.9	1.9	103	48.3	38.3	13.3	60
Academic, professional courses	50.0	3.8	6.6	5.7	17.9	16.0	106	15.7	37.1	47.1	70
Curriculum guides, texts	26.2	31.8	18.7	10.3	9.3	3.7	107	20.5	61.4	18.1	83
ERIC materials	23.1	35.6	16.3	13.5	9.6	1.9	104	13.8	39.1	47.1	87
Education abstracts, indexes	35.9	25.2	23.3	1.9	10.7	2.9	103	16.5	41.8	41.8	79
Other	37.5	--	12.5	12.5	25.0	12.5	16	--	30.0	70.0	10

Eighty-four out of 114 users indicated that they spent two hours or more in obtaining information from books and professional journals; 32, or 28% spent more than seven hours, 33 (29%) three to six hours, and 19 (17%) two hours. One hundred and nine (97%) users considered the information from this source of medium or high value. Eighty-two of 113 respondents said that they spent from two or more than seven hours per week in exchanging information with colleagues. The information thus gained was felt to be of medium or high value by 103 (91%) of the users. Professional Development Days, professional organizations, outside consultants, conferences and educational abstracts or indexes, among others, appeared as sources from which information was sought with least frequency and by the smallest number of users.

To use an example, according to 87 (86%) of 101 respondents, one hour or less (45, or 45% indicated zero hours) was spent with outside consultants; consequently 31% of 67 clients felt the information obtained to be of low value. The comparative figure for professional organizations is 97 of 105, or 93%, with 43 users checking zero hours; here the value accorded to the information acquired was low in 32 out of 73 cases (44%). One must bear in mind, however, that these sources, including academic sources, were in many instances seen by the user as non-applicable in his or her particular position. For example, 63 (61%) of 103 users stated that Professional Development Days did not apply to them, and 50% of 106 respondents indicated that they were not involved in academic course work; zero hours was checked in each case.

It is interesting to note that in several cases where sources such as outside consultants, supervisors, ERIC materials, and educational abstracts were consulted for two hours or more per week by only a small number of respondents, a disproportionately high value of the information provided was indicated. Sixty-nine percent of the 67 respondents using outside consultants, found them of medium or high value though only 14 of 101 (14%) consulted them for more than two hours per week. For ERIC, 86% of the 87 respondents found the materials of high value, even though only 16 of 103 (16%) used them for more

than two hours per week. Similar comments apply for information sought from supervisors and educational abstracts. This finding can be interpreted in a positive light: even though the majority of users spent one hour or less seeking information from these sources, they must have found the information they located extremely useful and satisfactory, a fact which is of some importance, particularly since ERIC materials are retrieved through EISO.

As mentioned previously, the respondents' role largely determines his or her purpose in requesting a search. Table XI shows that users indicated assignments (term papers, theses, dissertations) as the major purpose for an EISO search (36%), followed by research/development reports (24%), and programme improvement (12%). These figures contrast somewhat with the reported purposes of their regular information gathering activities reported in Table IX (e.g., no searches were conducted for keeping abreast of the field), suggesting that EISO is seen as being well suited for particular kinds of information gathering and not others.

TABLE XI. Purpose of Search

Purpose of search	Number	Percent
Keep abreast of field	0	0
Term paper	44	36.1
Bibliography	5	4.1
Curriculum development	9	7.4
Programme improvement	15	12.3
Preparation of speech, article, report	6	4.9
Research/development project	29	23.8
Browsing	1	0.8
Personnel recruitment, evaluation supervision	2	1.6
Policy development	9	7.4
Other	2	1.6
Total	122	100.0

Concerning the personal dimension of the users' organizational functions, the highest degree earned by the respondents ranged from bachelor's (37, or 33%) to doctorate (19, or 17%). The largest segment of users reported the master's degree as their highest academic degree (58, or 51%).

Most of the users (31, or 26%) had been in their current positions for from four to six years, whereas the next highest group of users (24, or 20%) had held their positions for less than one year. Overall, however, 63 (52%) had occupied their positions for from four to ten or more years (Table XII).

TABLE XII. Number of Years in Current Position

Years	Number	Percent
Less than one year	24	19.8
1 year	10	8.3
2 years	12	9.9
3 years	12	9.9
4 to 6 years	31	25.6
7 to 9 years	21	17.4
10 or more	11	9.1
Total	121	100.0

To the question, "Have you ever been an officer of a professional organization?", 79 (66%) responded that they had, while 40 (34%) answered in the negative. Ninety-three (78%) of EISO's clients were members of a professional organization other than those required by provincial legislation.

Sixty-three (52%) of the users indicated that they had written professional papers for publication or for presentation at conferences in the last five years; 92, or 76% of the users stated that they had participated in an educational research project during the same period.

The age group of EISO users ranged from 25 or under to the 56 to 65 age group. The largest number of users (53, or 45%) were in the 26 to 35 age group. Ninety-nine users (83%) were in the 26 to 45 age group. The majority of the users were male (85, or 75%), with 29 (25%) being female.

Environment. The third type of social characteristic of importance deals with the environmental factors which influence the kinds of information requirements that individuals in organizations might have. Fifty-nine users (48%) listed Metro Toronto as the location of their organization; 23 (19%) said that their organization was located in a county or regional municipality, and 17 (14%), in a district or district municipality. The organizations of 11 (9%) of the users were located in London; of seven (6%) in Windsor; of three (2.5%) in Sudbury, and of one (0.8%) in Hamilton.

One hundred and three, or 85%, or the respondents reported that their organization was located outside the Northeastern Region (Region 3) of Ontario; 16, or 13.2% indicated that their organization was located in Region 3, and two were not sure.

Asked whether the community served by the user's organization was mostly rural, equally rural and urban, or mostly urban, 57 users (47%) replied "both rural and urban", 56 (56%) indicated "mostly urban", and only nine (7%) "mostly rural".

The next item applies only to school boards (central board office, as well as schools). Out of 51 valid cases, 48 respondents stated that the mother tongue of the majority of students served by the board was English; two (3.9%) that it was French, and one, that it was 50% English, 50% French.

Psychological Perspective

Motivation to learn. The first important psychological variable to be examined is the individual's motivation to learn. Since the need for achievement is seen as a motivating factor in seeking information, EISO clients were queried concerning their professional plans. The majority of users (56, or 52%)

indicated a desire to obtain a more senior position within their organization during the next five years; 33 (31%) stated that they were not interested in advancing to a higher position, with 19 (18%) saying that they had not yet come to a decision. When asked whether they planned to undertake additional study toward a higher degree, 42, or 34% replied that they were not sure; 40, or 34% replied that they were not seeking a higher degree, and 37 (31%) answered in the affirmative.

The respondents' opinions and attitudes about innovations were obtained, and appear in Table XIII.

TABLE XIII. Users' Opinions about Innovations

Opinions	Agree	Agree some-what	Don't know	Dis-agree some-what	Dis-agree	No. valid cases
Most innovations in education today, such as initial teaching alphabet (i.t.a.), electronic calculators in classrooms and the credit system, are really worthwhile and help children to learn better.	14.4%	57.6%	6.8%	12.7%	8.5%	118
Colleagues often ask me for advice about their professional problems.	38.5	52.1	1.7	3.4	4.3	117
I am one of the few people in my organization who is continually trying out new ideas in his work.	10.4	26.1	5.2	13.9	44.3	115
Most educational innovations today cost more money than they are worth.	9.5	31.0	5.2	21.6	32.8	116
Only local school people know what their educational problems and needs are, not outside experts.	2.5	15.3	0.8	33.1	48.3	118

A significant number of respondents (85, or 72%) agreed, or agreed somewhat, with the statement that most innovations in education today are really worthwhile; 106 (91%) of the respondents also agreed either fully or somewhat, that their colleagues often ask them for professional advice. The typical EISO user did not see himself as being one of the few people in his organization who continually experimented with innovative ideas. Sixty-seven (58%) disagreed either fully or to some extent. Only 12 (10%) were in complete agreement that they were unusually innovative, while 30, or 26%, agreed somewhat. Six users did not wish to commit themselves and, therefore, checked the "Don't know" category. Most of the respondents (63, or 54%) disagreed or disagreed somewhat with the statement that most educational innovations today cost more money than they are worth; the corresponding figure for those who agreed either completely or partially was 38 (33%). Six were undecided on this point and said that they did not know. All but five of the respondents clearly stated their opinion on the assertion that only local school people know their educational problems and needs: the majority of clients (57, or 48%) disagreed; 39 (33%) disagreed somewhat; 18 (15%) agreed slightly and only three, fully.

The users' initial attitude toward EISO, a specific educational innovation, was requested. The largest number of respondents (62, or 52%) said that they expected it to be somewhat helpful before actually trying the service and 53 (44%) reported that they expected it to be very helpful; only five, or 4%, did not expect it to be very helpful prior to requesting a search.

The last characteristic of users being considered in this context is whether an individual is a first time or a repeat user of EISO. Ninety-two (76%) of the questionnaires were completed by clients who had not requested any searches previously. (This figure includes, of course, the trial use of the service by repeat users.) Twenty, or 17%, had used EISO once before; six, or 5%, reported two previous searches, and four (3%), three to five previous searches. The total number of previous searches amounted to 30, or 25% of the total number of searches for which questionnaires were returned. These data suggest that one of every three searches is by an experienced user.

Economic Perspective

Sources of funds are considered here as user characteristics, since they are determined by user roles and are seen as a user's response to the system. Clients paid for searches and materials either in cash or they were invoiced. Of 95 customers who were charged for searches, 74 (78%) of the respondents received invoices, 14 preferred to pay in cash, and 7 were charged, using the OISE internal charging system. EISO paid for 27 (22%) of the searches; these were conducted as samples for demonstration and publicity purposes, or were allotted to boards and other agencies in the Northeastern Region of the province. Forty searches were paid for by the requestors themselves; 36 by an organization, 19 by OISE. The type of payment for materials ordered was reported as follows: cash, 17; invoice, six. Concerning materials ordered, requestors paid in seven cases, organizations in 13; OISE was listed three times.

Level of Satisfaction

The primary end result of a search, as far as this assessment is concerned, is the users' opinions about EISO and its products. These opinions are needed to define the success of the service. Users were requested to rate the service on a number of scales. Responses are grouped according to the various perspectives previously discussed.

Sociological

The purpose for which a search was conducted was seen as an outgrowth of the individual's role in an organization. Table XIV reports how helpful a given search was for meeting the various purposes for which information was sought. As with all tables presented in this chapter, the results summarize the "average" user. More detailed analyses are needed to compare the helpfulness of information against the purpose for which the information was sought. It is not surprising, for example, if information collected for one

purpose is not useful for another. As a result, many users marked a particular purpose is "not applicable". This is the logical response to make if one had conducted the search for some other purpose. However, it is clear that not all respondents were logical; for example, only two reported searching for information to assist in recruiting or evaluating personnel, yet 41 rated the information received in terms of its helpfulness for this purpose.

TABLE XIV. Helpfulness of Information Provided as a Result of EISO Search

Purpose of search	Not at all	Some-what	Very	Valid cases
Keeping abreast of the field	7.0%	58.6%	34.3%	99
Completing assignments, theses, etc.	20.8	28.6	50.6	77
Preparing or updating a bibliography	24.0	37.3	38.7	75
Curriculum development	37.5	46.9	15.6	64
Improving programmes	28.8	57.5	13.7	73
Preparing a speech, article or report	29.3	45.3	25.3	75
Undertaking or completing a research or development project	19.8	44.4	35.8	81
Browsing	36.1	42.6	21.3	61
Recruiting and/or evaluating personnel	78.1	9.8	12.2	41
Developing policy	38.5	44.2	17.3	52

Information provided by EISO for each of the following four categories was considered to be most helpful: keeping abreast of the field (93% rating it somewhat or very helpful); undertaking or completing a research or development project (80%); completing assignments, term papers, theses, etc. (79%); and preparing or updating a bibliography (76%). In descending order, information provided by searches were also helpful for improving programmes (71%), preparing speeches or articles (71%), browsing (64%), curriculum development

(63%) and policy development (62%). Information was of least value for recruiting and/or evaluating personnel (22%). Again it should be emphasized that a significant number of activities were termed n/a (not-applicable); for example, only 51 of 122 respondents (42%) used the information they retrieved for policy development. Overall, the majority of users were of the opinion that the information provided as a result of their EISO search was helpful.

Users were also asked to indicate the value of the bibliography itself and of the materials located through the bibliography. Eighty-nine users (82% of those responding) found the bibliography to be of medium or high value, the corresponding figure for the value of materials located being 73 (85%). Conversely, 18% and 15%, respectively, expressed a low level of satisfaction with the value of the bibliography and materials (Table XV). Recall that 44% had expected EISO to be very helpful, and only 4% not helpful at all. It appears EISO fell somewhat short of expectations, perhaps because of the lack of materials on certain topics.

TABLE XV. Satisfaction with Value of Bibliography and Materials

	Satisfaction			No. valid cases
	Low	Medium	High	
Bibliography	17.6%	46.3%	36.1%	118
Materials	15.1	46.5	38.4	86

Psychological

The individual's own perception of how much knowledge he or she gained on the search topic from using the EISO search service was measured. The majority of users (62, or 54%) indicated that they had acquired some knowledge about the topic that was searched; 35 (30%) had learned a great deal, and 18 (16%) nothing or very little.

To this item must be added two other items from the Data Sheet: the average number of references expected by the 42 individuals responding was 355.8 (minimum 1, and maximum 2000), and the mean score for the number of relevant citations already known to the 26 users responding to this item was 13.6 (minimum 1, and maximum 99). Clearly, in most cases the user did not know what to expect, and was unfamiliar with existing references.

In order to determine whether the users' information needs have been met, EISO clients were asked to indicate whether they desired additional information on their particular search topic. Again, the largest number of users (53, or 47%) stated that they still desired some additional information, 37 (33%) expressed the desire to seek a great deal more information, and 24 (21%) indicated that their information need had been satisfied, by replying nothing or very little.

In another area which deals with knowledge gained about EISO itself as a result of the search, 69 (59%) noted that they had learned a small amount ("some"); 28 (24%) that they had learned a great deal, and 20 (17%) nothing or very little. It appears that either EISO is so easy to use that it can be used without the individual learning much about the system, or that the publicity was very effective in explaining the system.

Satisfaction

Thirteen items directly relate to the users' satisfaction with four aspects of EISO: publicity materials, quality of service, timeliness of service, and quality of technology, as shown in Table XVI. Respondents were asked to check n/a if the question was not applicable.

The level of satisfaction with publicity materials and directions was found to be high (from 61% to 76%). EISO users were most satisfied with the adequacy of directions for submitting search requests to EISO: 88 (97%), all but four of those to whom the question was applicable, expressed medium or high satisfaction. Low satisfaction was expressed by more than 10% only with regards to the directions for ordering materials; these directions have now been improved.

TABLE XVI. User Satisfaction

Aspects of EISO	Satisfaction			No. valid cases
	Low	Medium	High	
PUBLICITY MATERIALS & DIRECTIONS				
Accuracy of publicity materials, EISO presentations, etc.	4.1%	26.0%	69.9%	76
Comprehensiveness of publicity materials, EISO presentations, etc.	7.5	31.3	61.2	67
Adequacy of directions for submitting search requests to EISO	4.4	19.6	76.1	92
Adequacy of directions for ordering copies of materials	13.0	26.1	60.9	92
QUALITY OF SERVICE				
Convenience of arrangements to obtain EISO searches	2.6	13.8	83.6	116
Helpfulness of search analyst or Educational Information Consultant	1.7	7.8	90.4	115
Time devoted to search interview with search analyst or Educational Information Consultant	5.0	15.8	79.2	109
TIMELINESS OF SERVICE				
Time taken to deliver the EISO bibliography	8.3	21.3	70.4	108
Time taken to deliver microfiche or paper copies ordered from EDRS in the U.S., if applicable	36.8	21.1	42.1	19
Time taken to deliver microfiche or paper copies ordered from EISO	15.2	27.3	57.6	33
QUALITY OF TECHNOLOGY				
Length of bibliography	9.9	35.4	54.9	111
Readability of microfiche copies, if applicable	18.4	44.7	36.8	38
Availability of microfiche readers	9.0	21.8	69.2	78

Quality of service was rated highest among the four aspects of EISO considered. The helpfulness of the search analyst (or EIC) was rated as extremely satisfactory by 90% of the respondents, followed closely by the convenience of arrangements to obtain EISO searches (84%). Satisfaction with time devoted to search interview was high in 79% of the cases.

In spite of the prolonged postal strike last autumn which caused lengthy delays, users felt that the turnaround time of the EISO search was more than adequate for their needs; they were particularly satisfied with the time taken to deliver the EISO bibliography (70% indicated a high level of satisfaction, 21% medium, and 8% low). The remaining two items dealing with time taken to deliver documents from either EISO or EDRS did not apply to 71% and 83% of the respondents, respectively. Where applicable, the users indicated that they were satisfied with the length of time from request to receipt of microfiche or paper copies from EISO: 85% checked medium or high. However, they were slightly less satisfied with the time taken to deliver EDRS materials from the United States, 63% checking medium or high. The remaining 37% indicated low satisfaction, a proportion that might be considered too high to be acceptable. Clearly, delivery of copies of original materials is one of the most difficult procedures in operating an information system.

The last aspect, quality of technology, also shows quite a high level of satisfaction, with the possible exception of readability of microfiche copies (if applicable). Here 14 (37%) of the users said that they were highly satisfied, 17 (45%) indicated medium, and seven (18%) low. They found the length of the bibliography very reasonable: 92% indicated their level of satisfaction to be either medium or high. In addition, users were very satisfied with the availability of microfiche readers; the medium or high category comprised 64% of the respondents.

Thus, apart from very few minor reservations, the vast majority of users were highly satisfied with the service aspects of EISO, which seems to indicate that they considered use of EISO to be a worthwhile and rewarding endeavour.

Finally, users were asked to respond to three summative questions about EISO which fall within both the sociological and psychological frameworks. Of the 103 respondents, 85% noted that they would use EISO again; 18 said perhaps. An even higher figure, 114 (95%) of the EISO clients stated that they would recommend the service to a colleague; five said that they would perhaps do so, and only one, that he would not. Furthermore, 106 (88%) of the clients recommended that the EISO search service be offered on a permanent basis. These last three very positive responses bring this user description to a fitting and hopeful conclusion.

Economics of Operation

Considerable human, financial, and material resources are required for EISO's operation. Previous chapters have related the nature of the first of these, particularly the training of Educational Information Consultants and the staffing of EISO. As well, attention has been given to the records system with its large number of forms, to the creation of a suitable work area, and to the purchase of equipment. This section is concerned with the actual deployment of these various resources expressed in dollar terms. This topic is the first phase in conducting a financial analysis of the Educational Information System for Ontario.

Human Resources

Training and maintaining a network of Educational Information Consultants is a considerable undertaking, and the effort is warranted only if their assistance is regularly sought by EISO clients. To learn the extent of this usage, clients were asked whether or not an EIC had assisted in developing their search request. By far the largest component of users (94 or 78%) responded that they had not consulted an EIC, but had contacted the search analyst directly. Seventeen respondents (14%) replied that EICs had, in fact, assisted them in formulating their search request; of these, 11 (9%) were assisted by Field Centre EICs, one by a Faculty of Education EIC, and five

by a Ministry of Education EIC. Five respondents were not certain, while four listed "other". Given that EICs are available in an area containing a small percentage of Ontario's population, these figures look encouraging.

The nature of establishing initial contact with the search analyst was recorded by the search analyst on the Data Sheet. In 74 instances (61%) the client came in person, in 34 (28%) the users telephoned, and in 18 (15%) search requests were sent by mail.

Since mode of delivering bibliographies included delivery by the EIC or search analyst, this variable reflects the human side of the search service as well. Sixty-three (54%) of the bibliographies were mailed to the search analyst, who then contacted the client so that the bibliography could be picked up. Forty-eight (41%) were mailed directly to the requestor; two were sent to an EIC for delivery, and three were sent to "other".

Technological Resources

The particular computerized search system used and data base searched for processing a given request are two major technological items of interest. Of the 122 searches reported in the questionnaire data, 104, or 85%, were executed on the search service provided by the System Development Corporation; the remaining 18 searches used Lockheed. In 115 cases, 95% of the total, the ERIC data base was searched. Psychological Abstracts was searched five times and Social Science Citation Index only once.

Users were also asked to indicate the availability of microfiche readers; without fiche readers, it is unlikely clients would order microfiche copies of ERIC documents from EISO. The greatest number of respondents (81 or 68%) noted that non-portable readers were available, as for example at the OISE Library. Sixteen (13%) reported having access to a portable reader in their organization. Eighteen users (15%) had no fiche reader available, and four were unsure.

Two individuals stated that a fiche reader supplied by EISO was available to them. These individuals were from the Northeastern Region of Ontario where a small number of microfiche readers were distributed to ensure microfiche readers were available to some users in that area.

Cost of EISO Services

Cost of EISO services refers to the actual costs incurred by the search service to conduct business -- as distinct from the prices it charged users. A formula indicating a few of these costs -- staff, computer time, and printed bibliographies -- was presented in the previous chapter; namely,

$$\text{Search costs} = c_1 t_1 + (c_1 + c_2) t_2 + pn$$

where c_1 and c_2 are the costs of search analyst salary and computer time, respectively, t_1 the time spent for the first discussion-only phase of the search negotiation interview, t_2 the length of the second phase of the interview during which the search analyst is on-line with the computer, p is the cost of printing one citation, and n is the number of citations printed. Note that all overhead costs are excluded.

Data from the 122 cases analysed for this report yielded the following average values: c_1 = \$0.12 per minute for the search analyst's salary; c_2 = \$0.85 per minute for the search service (\$51.06 per hour); t_1 = 27.1 minutes for the first phase of the negotiation interview; t_2 = 12.2 minutes for the second, on-line phase of the interview; p = \$0.12 per citation printed; and n = 67, the average number of citations.

Hence, the total cost of the average search -- excluding overhead -- was \$23.12, with the costs of phase one equal to \$3.25, phase two to \$11.83, and the bibliography, \$8.04.

Substituting the maximum observed values for each of the variables in the formula above gives an upper limit for the direct costs associated with doing a single search. These values were: c_1 = \$0.12; c_2 = \$1.33, t_1 = 70 minutes, t_2 = 53 minutes, p = \$0.13 and n = 197 citations. The total direct cost amounted to \$110.85.

A similar figure for the minimum direct cost for a search equalled only $2.10. Clearly, direct costs for searches can vary widely.

It must be emphasized that all costs above exclude overhead, record keeping, space, staff time when a search is not underway, and depreciation of equipment. Additional research is necessary before an accurate estimate of the full cost of a typical search is possible.

Quantitative data relative to the number of documents ordered from EISO and EDRS were also collected. The average number of microfiche copies ordered from EISO, for those 21 who actually placed orders, was nine; the average number of copies of journal articles for the 20 using this service was 3.5; eight individuals ordered an average of 2.8 copies of ERIC paper documents from EDRS; and two ordered an average of 13 microfiche copies from EDRS.

No data were collected on which to base an estimate of the full cost of providing microfiche and paper copies. This topic will be the focus of a future investigation.

Prices Charged for EISO Services

The pricing structure used by EISO, it will be recalled, set $30 as the fee for a search in most parts of Ontario, and $20 as the fee for users from the Northeastern Region. Exceptions included a $15 fee for students at OISE during Summer Session 1975, and free introductory searches for educators in the Northeastern Region.

The average price actually paid by users responding to the questionnaire was $20.57; the average price for their first search was $20.08 -- a slightly lower figure than the overall average price since free searches were often available for trial use of EISO. The relatively small difference between the two figures reflects the fact that most searches reported by survey respondents were in fact first searches. Note that the average price per search was below that of the average direct cost. Hence, even excluding overhead, the typical EISO search was conducted at a loss.

Prices for microfiche and paper copies were set at 35¢ and 10¢, respectively. No data were collected on the actual charges since no users received copies at reduced rates.

EISO Publicity

A final technological variable, shown in Table XVII, deals with the effectiveness of EISO publicity materials in informing potential clients about the availability of the search service. Thirty-five respondents (29%) learned about EISO through the brochure (or flyer), and 34 from a colleague.

TABLE XVII. How Did Respondents Learn about EISO

Method	Number	Percent
Brochure	35	28.9
Article	1	0.8
Professional Development Day	1	0.8
Classroom instruction	9	7.4
Colleagues	34	28.1
EIC	5	4.1
Library tour	6	5.0
Cannot recall	6	5.0
Other	24	19.8
Total	121	100.0

Among the "other" effective methods of communication given were: librarian, seven; OISE faculty, five; principal investigators of EISO, four; announcements at OISE Field Development Standing Committee meeting, three; and presentation to staff at the Regional Office of the Ministry of Education, or at Principal Teachers' Meeting in Northeastern Ontario (Region 3), three. Two sources were not identified.

Summary

Assessment of the Educational Information System for Ontario during its first five months of operation provides an initial picture of the type of client it is attracting, the effectiveness of its services, and some of the costs of doing business. Far more data are needed on these and other topics before sound conclusions can be reached; however, the emerging images are encouraging.

The next and final chapter of this report provides an overview of the findings to date, and suggests their implications for the immediate future.

CHAPTER XI

Summary and Implications

Who uses EISO? This is the fundamental question addressed in this report. It can be answered by sketching a profile of the typical individual who submitted a search request, as represented by the data reported in the preceding chapter. Is EISO a viable operation? Certainly it works, that much is clear from the data. However, only a guess can be made concerning its long-term fiscal viability. Elaboration of the findings concerning these two issues form the body of this chapter, which concludes with a brief statement as to the implications of the results.

Profile of a User

The person who consults the EISO search analyst -- most users visit in person -- is most likely a man in his mid-thirties. Chances are he is with a school board in the Metropolitan Toronto area, or a doctoral student at OISE, having already completed an M. Ed. He has been involved in research, has written papers or presented talks, and wants to get ahead. He has a positive attitude toward educational innovations, but is modest concerning his role as an expert in his own organization. He spends a great deal of time gathering information from colleagues, and at least two hours a week reading to keep abreast of the field or for dissertation research. If he is from a school board, he is interested in programme improvement and curriculum development.

When he sits down with the search analyst, the client is probably interested in a specific topic for a specific purpose. While he may browse or read to keep up with changes in the field, he comes to EISO for information to be used in research and development, programme improvement or academic assignments. Chances are, this is the first time he has tried this new, innovative approach to retrieving information. He first read about the service in a brochure or heard about it from a colleague. He will be a satisfied customer and will willingly pay $30 for a search and bibliography of approximately 70 references (or, more precisely, his organization will be invoiced). He will be particularly impressed with the skills and assistance of the search analyst.

If he orders materials from EISO, which only one in six clients do, he will select the three or four best articles for paper copies and nine of the best documents in microfiche form. Of course, he may prefer to use the OISE Library or his board's professional library instead of placing an order. Overall, he will be quite satisfied with the promptness of the service and ease of ordering searches and materials, though he may find the microfiche he receives a bit difficult to read. If he decides to order paper copies of ERIC documents from the United States, he will not be nearly so satisfied with the promptness and ease of ordering. In most cases, though, he will have access to a microfiche reader and will order microfiche instead.

After using the information retrieved through EISO, the client will still want more information about the topic he searched, even though he is fairly well satisfied with the bibliography and materials.

In all probability, the client will relate his experiences with EISO to a colleague and he may even volunteer to write a letter supporting the continued availability of the service, since he is enthusiastic about the service and hopes that it will continue.

The social and psychological profile of the user, according to the data provided by the questionnaire, is identical to the profile of adopters of innovations, a topic well described in the literature. Socially, users are high status individuals: men in their prime with a good education and upwardly mobile in their careers, who interact a great deal with colleagues. Psychologically, they are experienced learners who know how to seek information and how to use it. Their roles in urban organizations provide an impetus, a motivation to acquire information for research, programme development, or whatever. Their ambitions and attitudes toward innovations accentuate these motivations. They are, in short, early adopters (Rogers, 1962).

Economic Considerations

To know if EISO is viable, one must know in full detail the cost, quality, and demand for the services provided. Because the service is so new, it is difficult to discern what the cost and demand would be for a well-established system.

The cost data provided by the questionnaires and data sheets are selective and only minimal costs are included -- those for computer time, citations printed, and search analyst's time. Costs for these might even be lower limits for what might occur in a regular service since the search analyst employed for the project is very highly trained. A slower, less efficient analyst could waste enormous amounts of computer time while correcting errors or making unnecessary changes in search strategies. Finally, no overhead costs have been collected. Costs for space, lights, heating, supplies, depreciation of equipment, processing of records, collection of charges, losses due to non-payment, and the idle time of the search analyst have all been excluded from this analysis.

The cost of providing microfiche and article duplication services is even less distinct than is the case for search costs. Supplies for duplicates

are inexpensive, but the costs of labour in locating and reshelving library materials, or processing order forms, and of making copies have not yet been estimated.

Implications

Several tentative implications can be drawn from the preceding summary. First, it is clear that the typical EISO user is not representative of the educational community taken as a whole. Few users are teachers, although teachers represent an overwhelming majority of educators. Only one-quarter of the clients are women, whereas women represent a majority of educators. Clearly, to test the viability of EISO, it is necessary to direct publicity activities toward those individuals most likely to use the service: middle level administrators in urban areas, and advanced graduate students.

Second, it is too soon to make conclusions regarding EISO's economic viability; insufficient data are available for analysis. Six months of operation, a period which included a long postal strike, is too short a period on which to base projections. The system needs an opportunity to operate near full capacity for sufficient time for adequate data to be collected on both direct and indirect costs.

APPENDICES

No. 125 (Inc. No. 126)
1974/75 Research Contract

APPENDIX A. Ministry of Education Contract

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

1.0 CONTRACTING PARTIES:

This contract is between:

1.1 Her Majesty The Queen, in the right of Ontario, represented by the Minister of Education, Ontario (hereinafter called The "Minister") of the first part, and

1.2 The Ontario Institute for Studies in Education (hereinafter called "O.I.S.E.") of the second part.

2.0 SCOPE OF RESEARCH:

This is a contract for research services involving a study of an Educational Information System for Ontario to be undertaken for the Minister of Education by O.I.S.E.

The research undertaken shall:

2.1 study the nature and levels of demand (including the factors affecting the demand) by educators of the Province for access to a generalized information base of educational resources through the use of the existing ERIC * data/base service.

2.2 develop and refine methods of placing search orders, order delivery, and advertising the availability of such a service

2.3 examine the technical and fiscal viability of the interactive on-line search techniques (in contrast to batch-processing methods) as a service to educators, students, and researchers in the Province.

2.4 study the impact of the use of such a service upon the nature and levels of demand for the use of micro-fiche and hard copy forms of data and to assess the effectiveness of such new uses as may be identified. Cost effectiveness elements of the use of micro-fiche vs. paper copy shall be included.

2.5 determine the manpower and technical requirements to match a given level of demand for such information services in the Ontario setting.

2.6 research and evaluate the level of user satisfaction by category of users and to analyse how such data/information is being used.

2.7 study the fiscal viability of the operation of an information system of the ERIC type through using varying fee levels relating to user volume. The study shall include an assessment of incentive devices such as the introductory search without user fee.

2.8 study the effectiveness of an intermediary (consultant) in interacting with users in a more remote geographic setting in Northern Ontario in clarification of search scope and in interpretation of output.

2.9 develop and refine strategies of utilizing such services through existing remote service facilities, such as a field office of O.I.S.E., a regional office of the Ministry of Education, and an office of a school board.

2.10 interpolate the resource requirements were such strategies/services (including those noted in 8 and 9 above) to be extended or made available on a more general basis to other areas of the Province.

2.11 conduct a literature search relating to a study of the school board as a corporate user of such a service, and report on such experiences or incorporate this consideration into the study if such does not exist.

2.12 establish the viability of such a provincial service within a maximum period of two (2) years.

2.13 report to the Minister of Education on the above questions along with a chronicle of developments of the service through an interim report at the end of one (1) year and a final report at the end of the two (2) year period.

3.0 DESIGN OF THE RESEARCH:

3.1 The complete design of the study indicating its uniqueness will be forwarded in triplicate within a month, following the signing of this contract, to the Chief Educational Officer (Research), Ministry of Education.

3.2 A preliminary annotated bibliography of related research and literature shall accompany the design.

4.0 RESPONSIBILITIES OF PARTIES:

The responsibilities of the two parties involved in this contract shall be as follows:

4.1 The Minister shall provide the necessary research funds and a Supervisory Official for the investigation.

4.2 The O.I.S.E. shall provide the Principal Investigator and support personnel to oversee and execute the project, administer the funds provided by the Minister of Education, and follow the procedures outlined in Appendix B.

5.0 PERSONNEL INVOLVED:

The personnel assigned to the project shall be:

5.1 The Ministry of Education, represented by the Chief Educational Officer (Research) - Dr. E. J. Quick; and the Educational Officer (Contractual Research) - Mr. W. C. Taylor.

5.2 For the Ministry of Education, as Supervisory Official - Mr. Donald Rose, Educational Officer, Curriculum Services Branch.

5.3 For the O.I.S.E. as Principal Investigators - Dr. S. B. Lawton, ~~Assistant~~ Associate Professor, and Mrs. E. Auster, Head - Reference and Information (Library), and support personnel.

6.0 PUBLICATIONS AND REPORTS:

6.1 The copyright of any publications and reports made as a result of the research project herein provided for or produced in accordance with this agreement shall be the property of the Minister, provided however, that subject to the prior approval of the Minister, which approval may be arbitrarily withheld or limited in extent, the O.I.S.E. shall have a right in the nature of a license or assignment of copyright to publish any such material in Ontario and throughout the world, but no such exercise of the right of publication by the O.I.S.E. with the approval of the Minister shall operate so as to prevent or interfere with the right of the Minister to make available to students at schools in Ontario, their parents or guardians and to school boards and teachers upon such terms as the Minister may determine, all or any of the findings of the research carried out under this agreement.

6.2 Subject to 6.1, all reports, articles, papers, speeches, etc. concerning this project prepared by the O.I.S.E. or its personnel shall give prominent recognition of the involvement of the Ministry of Education. Recognition shall be placed on the title page of the final report with the wording:

"THIS RESEARCH PROJECT WAS FUNDED UNDER CONTRACT BY THE MINISTRY OF EDUCATION, ONTARIO".

Prior to the release of the final report to the public, three (3) copies of any report, article, paper, speech, etc. concerning this project shall be submitted to the Chief Educational Officer (Research) for permission to release to the public.

6.3 Thirty (30) copies in bound form of all final reports, articles, or papers concerning the project are to be forwarded to the Chief Educational Officer (Research) for the use of the Ministry of Education. One of these shall be suitable for reproduction. All reports shall be submitted on 8 1/2" x 11" or A4 (International Standard) size paper.

6.4 An ABSTRACT of 400-500 words shall form a part of the final report.

6.5 Notwithstanding sections 6.1 and 6.2 the O.I.S.E. shall retain the right to make public the findings of this study two (2) years following submission of the final report to the Minister.

7.0 FINANCIAL ARRANGEMENTS:

7.1 This contract is concerned with all research services, as stated in Section 2, undertaken by the O.I.S.E. between 1 March 1975 and 29 February 1976.

7.2 This contract may be terminated by the Minister at the end of any fiscal year of the Province of Ontario (March 31st) if adequate research funds for this purpose are not available in the subsequent fiscal year's budget of the Ministry of Education.

7.3 The Ministry of Education shall provide, subject to the provision in 7.2 of this contract, a total amount of $96,169. Payments will be processed upon receipt of appropriate numbered invoices from the O.I.S.E. in instalments of $14,000 on each of 15 March 75; 30 April 75; 30 June 75; 31 August 75; 31 October 75; 31 December 75. Upon submission of a satisfactory final report and numbered invoice on or before 29 February 76, the final instalment of $12,169 will be processed for payment to the O.I.S.E.

7.4 With each numbered invoice (submitted in quadruplicate) the O.I.S.E. shall submit to the Chief Educational Officer (Research) a progress report (also submitted in quadruplicate) on the project, providing evidence that the services have been rendered as stated in the contract.

7.5 The budget allocation of the O.I.S.E. for the funds involved is to be attached as Appendix A.

7.6 An accounting of the expenditure of the funds shall be submitted by the O.I.S.E. within fifteen (15) days of receipt of a written request from the Ministry of Education.

7.7 The research conducted under this contract is unique and is not being funded from any other source.

8.0 CONTRACT RENEWAL:

8.1 It is the intention of the parties involved that this contract may be renewed subject to the agreement of all parties, and the provision of 7.2 of this contract.

8.2 The terms and format of this contract shall not be deemed to establish a precedent for future contracts.

9.0 NON-COMPLIANCE:

9.1 Should there be evidence of non-compliance with the terms of the contract, this contract may be terminated upon written notice to the party concerned by the Minister.

No. 125
1974/75 Research Contract

10.0 **AGREEMENT:**

The conditions of this contract are accepted on behalf of the parties, in witness whereof the parties of the first and second parts have hereunto set their hands by the authorized officials whose signatures appear below:

DATE 13/3/75

for the Minister of Education
Ontario

DATE 18/3/75

for the Ontario Institute for Studies in Education

An Educational Information System for Ontario

Schedule

March 1975 - February 1976

DATE	ACTIVITIES
March	Establish project in Department of Educational Administration. Transfer funds from Field Development Standing Committee pool to Department of Educational Administration. Identify suitable equipment-fiche duplicator, reader, computer terminal. Identify members of OISE advisory committee. Meet with Supervisory Officer at Ministry of Education to clarify procedures, contract terms. Interim report due at Ministry of Education March 15.
April	Transfer salary of Principal Investigators to project. Create job descriptions for Librarian II, Library Assistant II , Research Officer III. Purchase equipment before April 15. Determine location of service in the Library. Arrange for project room to be built in Library. Submit research design and annotated bibliography. Interim report due at Ministry of Education April 30.
May	Hire Librarian II, Library Assistant II, Research Officer III. Establish financial mechanisms for charging fees. Design financial forms. Contract with SDC. Submit furniture requisition. Meet with Administrators of target northern Ontario school boards. Hire Timmins FD agent. Identify local "gatekeepers", equipment needs.
June	Begin service June 16. Orient project staff to R and I, Library. Hold seminars on project for Library staff. Informal social evening for R and I and project staff. Develop search forms for service. Have forms printed. Interim report due June 30.
July-August	Transfer project files to office in Department of Educational Administration (July 2) Hold seminars on service for Summer Session students. Prepare publicity and training materials. Train intermediaries. Interim report due August 31.

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

Schedule
September 1975 - February 1976

A C T I V I T I E S

September	Publication of publicity articles in Orbit, Ontario Education, etc.
	Mailing of brochures to Ontario educators
	Drafting and distribution of search evaluation forms for summer clients
	Printing of revised search forms
	Announcement of cost recovery program to OISE staff and students
October	Draft of User Manual
	Demonstration for Field Development Personnel
	Revised version of evaluation questionnaire
	Testing of interview schedule
	Workshops in North Bay
	Interim Report
November - December	Collection of data
	Budget projection for second year of project
	Interim Report
January	Collection of data
	Preliminary analysis of data
	Outline of year-end report
February	Analysis of data
	Year-end report

Educational Information System for Ontario

Schedule of Activities

March 1976 - February 1977

Month	Activities
March	Detailed analysis of first year's data Revise evaluation questionnaire Print EISO user's handbook Scarborough PD days
April	Report detailed analysis of data Plan interview schedule Plan analysis of negotiation session interviews North York PD days Interim Report
May	Collect interview data Visit EIC's in Northeastern Region Visit sites of Educational Information Stations
June	Collect interview data Plan dissemination to summer session students (OISE, faculties of education, Ministry of Education courses) Interim report
July	Analysis of interview data Classroom presentations Articles for fall journals and newsletters
August	Report on user interviews Analysis of negotiation sessions Interim report
September/October/ November	Dissemination activities Analysis of negotiation sessions Interim report
December/January/ February	Analysis of questionnaire data Analysis of cost data Recommendations concerning future of EISO Interim Report (December) Final Report (February)

Educational Information System for Ontario
The Ontario Institute for Studies in Education
Room S218, 252 Bloor St. W., Toronto M5S 1V6
(416) 923-6641 Ext. 487

Dear EISO User:

According to our records, you conducted a search of the ERIC data base through the Educational Information System for Ontario (EISO) during the last two months, or so. As you know, this is an experimental service, and is part of a research project aimed at learning more about the information needs of Ontario educators, and how these needs can be met.

Could we impose upon you to complete the enclosed evaluation questionnaire and return it to us in the self-addressed and stamped envelope, which is also enclosed.

Let us assure you that all data will be held in strict confidence and used only for research purposes.

The questionnaire should take no more than twenty minutes to complete. It just looks longer!

Many thanks for your cooperation.

Sincerely,

Ethel Auster

Stephen B. Lawton

Stephen B. Lawton, Ethel Auster
Principal Investigators

ay

P.S. If you requested the search on behalf of another user, please pass this questionnaire on to the individual concerned for completion.

1-5

Educational Information System for Ontario*

The Ontario Institute for Studies in Education
Room S218, 252 Bloor St. W., Toronto M5S 1V6
(416) 923-6641 Ext. 487

Search No. _____

Topic: _____

EISO USER EVALUATION QUESTIONNAIRE

6-35 Name _____ (Last) _____ (First) _____ (Middle)

Address _____ Phone Number ( ) _____

IF YOU HAVE COMPLETED A PREVIOUS EVALUATION, PLEASE START AT ITEM 26

Organization Characteristics

36,37 1. Please indicate the type of organization or institution with which you are primarily associated by placing a check (✓) in the appropriate space below.

(01) ___ preschool
(02) ___ public board
(03) ___ separate board
(04) ___ private school or board
(05) ___ CAAT
(06) ___ Faculty of Ed. or Teachers' College
(07) ___ OISE: Dept. or Unit _____
38,39 ( ) _____
(08) ___ University
(09) ___ Ministry of Education
(10) ___ Professional Organization
(11) ___ Government (not Ministry of Ed.)
(12) ___ Business or Industry
(13) ___ Other: Please specify _____

2. Name of Organization _____

Address _____ Phone Number ( ) _____

* Funded under contract with the Ontario Ministry of Education

40,41 3. Is your organization located in

(01)___District or District Municipality
(02)___County or Regional Municipality
(03)___Metro Toronto
(04)___Ottawa
(05)___London
(06)___Hamilton
(07)___Windsor
(08)___Sudbury
(09)___Canada (outside Ontario)
(10)___Outside Canada

42,43 4. Is your organization located in the Northeastern Region (Region 3) of the Province of Ontario?

(1)___Yes (2)___Not Sure (3)___No

5. Is the community your organization serves

(1)___Mostly rural
(2)___Equally rural and urban
(3)___Mostly urban

Professional Role

44,45 46,47 48,49 6. Please indicate your primary professional role or function by placing the number "1" in the appropriate space below. If you have more than one major role, please enter the number "2" in the space corresponding to your second most important professional role, and a "3" in the third most important (if applicable). Leave the remaining spaces blank.

(01)___Administration or Supervision
(02)___Teaching
(03)___Pupil Personnel Services
(04)___Research
(05)___Field Development
(06)___Ministry Regional Office
(07)___Library Services
(08)___Private Consultant
(09)___Undergraduate Student
(10)___M.Ed. Student
(11)___Ed.D. Student
(12)___M.A. Student
(13)___Ph.D. Student
(14)___Other: _____

50,51 7. How many years have you been in your current position?

(1)___less than one year
(2)___1 year
(3)___2 years
(4)___3 years
(5)___4 to 6
(6)___7 to 9
(7)___10 or more

8. Would you like to obtain a more senior position within your organization within the next five years?

(1)___Yes
(2)___Not sure
(3)___No

School Board Personnel please answer questions 9 to 12. Others please go to 13.

52,53 9. Please indicate the level of your primary professional position.

(1)___Elementary grades only
(2)___Secondary grades only
(3)___Elementary and secondary
(4)___Central board office
(5)___Other:_____

10. What is the mother tongue of the majority of students served by you?

(1)___English
(2)___French
(3)___Other:_____

54-59 11. Board enrolment _____

12. School enrolment _____

60-63

64,65 13. Have you ever been an officer of a professional organization?

(1)___Yes (2)___No

14. Are you a member of any professional organization other than those required by provincial legislation?

(1)___Yes (2)___No

66 15. Have you written any professional papers for publication or for presentation at conferences in the last five years?

67 (1)___Yes (2)___No

16. Have you participated in an educational research project in the last five years?

(1)___Yes (2)___No

68 17. Do you plan to undertake additional study toward a higher academic degree sometime within the next five years?

(1)___Yes (2)___Not Sure (3)___No

18. Please indicate (A) the amount of time per week you normally spend in obtaining information from each of the sources listed below, and (B) how valuable the information gained from each source is to you.

Source	(A) Approximate Time Spent (hours per week)						(B) Value		
	0	1/2	1	2	3-6	7+	Low	Medium	High
69,70 a. Colleagues									
71,72 b. Prof. journals, books									
73,74 c. Outside consultants									
75,76 d. Inside consultants									
77,78 e. Office files, reports									
7,7 f. Supervisors									
8,9 g. Prof. organizations									
10,11 h. Libraries									
12,13 i. Conferences									
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)

Source	(A) Approximate Time Spent (hours per week) 0	1/2	1	2	3-6	7+	(B) Value Low	Medium	High
14,15 j. Prof. Dev. Days									
16,17 k. Academic, prof. courses									
18.19 l. Curric. guides, texts									
20,21 m. ERIC materials									
22,23 n. Ed. abstracts, indices									
24,25 o. Other: _____									
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)

19. How often do you seek information for the following purposes?

Purpose	Frequency Never	Some-times	Often	Very often
26 a. To keep abreast in the field				
27 b. Assignments, term papers, and theses				
28 c. Preparing or updating bibliographies				
29 d. Curriculum development				
30 e. Program improvement				
31 f. Preparation of speeches, reports, articles				
32 g. Research and development projects				
33 h. Browsing				
34 i. Personnel recruitment or evaluation				
35 j. Policy development				
36 k. Other: _____				
	(1)	(2)	(3)	(4)

Educational Opinions

Please indicate your opinion about the following statements.

	Opinion Agree	Agree Somewhat	Disagree	Disagree Somewhat	Don't Know
37 20. Most innovations in education today, such as initial teaching alphabet (i.t.a), electronic calculators in classrooms and the credit system, are really worthwhile and help children to learn better.					
	(1)	(2)	(3)	(4)	(5)

		Opinion				
		Agree	Agree Somewhat	Disagree	Disagree Somewhat	Don't Know
38	21. Colleagues often ask me for advice about their professional problems.					
39	22. I am one of the few people in my organization who are continually trying out new ideas in their work.					
40	23. Most educational innovations today cost more money than they are worth.					
41	24. Only local school people know what their educational problems and needs are, not outside experts.	(1)	(2)	(3)	(4)	(5)

EISO Search Information

42,43 25. How did you first learn about the Educational Information System for Ontario (EISO) and its services? (Check one only)

(1)___Brochure or flyer
(2)___Article in prof. journal
(3)___Prof. Development Day
(4)___Classroom instruction
(5)___Colleagues
(6)___Ed. Information Consultant
(7)___Library tour
(8)___Cannot recall
(9)___Other:_____

26. Did an Educational Information Consultant (EIC) trained by EISO assist in developing your search request? (Check one only)

(1)___No EIC consulted (went directly to search analyst)
(2)___OISE Field Centre EIC
(3)___Faculty of Education EIC
(4)___Ministry of Education EIC
(5)___CAAT EIC
(6)___Not sure
(7)___Other:_____

27. Please indicate in the table below the number of articles, microfiche, and documents ordered as a result of this search from EISO and ERIC Document Reproduction Service (EDRS).

	Type of Order	Ordered From EISO	Ordered From EDRS
44-46	Journal article	a. __none b. ___number?	Not available
47-49	Microfiche	a. __none b. ___number?	a. __none b. ___number?
50-52	Documents from microfiche	Not available	a. __none b. ___number?
53-55			

56,57 28. Is a microfiche reader available in your organization?

(1)___No fiche reader available

(2)___Portable fiche reader available for use at home

(3)___Non-portable reader available

(4)___Don't know

29. How much did you learn about the topic that was searched as a result of the search?

(1)___Nothing or very little

(2)___Some

(3)___A great deal

58,59 30. How much did you learn about the Educational Information System for Ontario as a result of your search?

(1)___Nothing or very little

(2)___Some

(3)___A great deal

How much additional information do you still desire concerning the topic that was searched?

(1)___Nothing or very little

(2)___Some

(3)___A great deal

32. How helpful was the information provided as a result of your EISO search for each of the following activities (if applicable).

		Not at all	Somewhat	Very	NA
60	a. Keeping abreast of the field				
61	b. Completing assignments, theses, etc.				
62	c. Preparing or updating a bibliography				
63	d. Curriculum development				
64	e. Improving programs				
65	f. Preparing a speech, article or report				
66	g. Undertaking or completing a research or development project				
67	h. Browsing				
68	i. Recruiting and/or evaluating personnel				
69	j. Developing policy				
70	k. Other:_____				
		(1)	(2)	(3)	(4)

Satisfaction with EISO Search

Please indicate your degree of satisfaction with each of the following aspects of the Educational Information System for Ontario. Feel free to comment in the space provided or on the back of the page.

		Satisfaction			
		Low	Medium	High	NA
71	33. Convenience of arrangements to obtain EISO searches				
	Comments:_____	(1)	(2)	(3)	(4)

		Satisfaction Low	Medium	High	NA
72	34. Helpfulness of search analyst or Educational Information Consultant. Comments:				
73	35. Length of bibliography. Comments:				
74	36. Readability of microfiche copies, if applicable. Comments:				
75	37. Accuracy of publicity materials, EISO presentations, etc. Comments:				
76	38. Comprehensiveness of publicity materials, EISO presentations, etc. Comments:				
77	39. Adequacy of directions for submitting search requests to EISO. Comments:				
78	40. Adequacy of directions for ordering copies of materials. Comments:				
C 3 6	41. Time devoted to search interview with search analyst or Educational Information Consultant. Comments:				
7	42. Time taken to deliver the EISO bibliography. Comments:	(1)	(2)	(3)	(E)

Satisfaction

Low Medium High NA

8 43. Time taken to deliver microfiche or paper copies ordered from EISO.

Comments: _____

_____

9 44. Time taken to deliver microfiche or paper copies ordered from EDRS in the United States, if applicable.

Comments: _____

_____

10 45. Value of bibliography itself.

Comments: _____

_____

11 46. Value of materials located via EISO bibliography.

Comments: _____

_____

12 47. Availability of microfiche readers.

(1) (2) (3) (4)

Comments: _____

_____

3,14 48. Before using EISO, how helpful did you expect it to be?

(1)___Not very helpful

(2)___Somewhat helpful

(3)___Very helpful

49. Would you use EISO again?

(1)___Yes

(2)___Perhaps

(3)___No

5,16 50. Would you recommend use of EISO to a colleague?

(1)___Yes

(2)___Perhaps

(3)___No

51. Do you think EISO search services should be offered on a permanent basis?

(1)___Yes

(2)___Perhaps

(3)___No

Personal Data

7,18 52. Age (1)___25 or under (4)___46 - 55

(2)___26 - 35 (5)___56 - 65

(3)___36 - 45 (6)___Second youth

53. Sex (1)___Male

(2)___Female

9,20

54. No. of previous EISO searches, if any.
(1)___None
(2)___One
(3)___Two
(4)___3 - 5
(5)___6 or more

55. Highest earned degree
(1)___High school or less
(2)___Teachers' college
(3)___Bachelor's
(4)___Master's
(5)___Doctorate

Many thanks for your assistance in completing this questionnaire, and participation in the EISO project. Please mail the completed questionnaire in the enclosed addressed and stamped envelope to: Educational Information System for Ontario, OISE Library, Room S218, 252 Bloor Street West, Toronto, Ontario M5S 1V6.

ALL DATA WILL REMAIN CONFIDENTIAL AND WILL BE USED ONLY FOR RESEARCH PURPOSES

APPENDIX D. EISO Service Evaluation Data-Sheet

Col 1-5

Educational Information System for Ontario

Search No. _____

Topic: _____

EISO SERVICE EVALUATION DATA SHEET

Search Request

1. Rc'd. _____ (6) 2. Intvw. _____ (12) 3. Run _____ (18)

24-25 4. Purpose (01)__Keep abreast of field
(02)__Assignment, term paper, thesis
(03)__Prep., update of bibliography
(04)__Curriculum develop
(05)__Program improvement
(06)__Prep. speech, article, report
(07)__Research/development report
(08)__Browsing
(09)__Personnel recruit, eval., sup.
(10)__Policy development
(11)__Other: _____

26 5. Contact (1)__In person (2)__Phone (3)__Mail (4)__Bus pick-up

6. Earliest yr. rq'd. _____ (27) 7. No. ref. rq'd. _____ (29) 8. Ref. exp. _____ (33)

41 9. Cit. known _____ (37) 10. Price _____ (39) 11. Payment (1)__Cash (2)__Invoice

Charge for search

42 12. Who pays (1)__EISO(free) (2)__Requestor (3)__Organ. (4)__Other: _____

13. OISE charge Unit _____ (43) Proj. _____ (45) Line _____ (49) Inv. no. _____ (53)

Search

61 14. Intvw., strat. time _____ (58) min. 15. System (1)__SDC (2)__Lockheed (3)__Manual

62 16. Data base (1)__ERIC (2)__Psych. Abs. (3)__SSCI (4)__Other: _____

17. Connect time _____ (63) min. 18. Cit. printed _____ (66) 19. Cost/cit _____ (70)

73 20. Bib. sent (1)__Requstr (2)__Search Anlyst (3)__EIC (4)__Other: _____

Card 5

C 5 21. Date bib. rc'd. _____ (6) 22. Cost/hr system _____ (12)

Materials Charge

15,16 23. Payment (1)__Cash (2)__Invoice 24. Who pays (1)__EISO (2)__R (3)__Org (4)__Oth.

25. OISE charge Unit ___ (17) Proj. ____ (19) Line ____ (23) Inv. no. ____ (27)

Materials

26. N EISO fiche ____ (32) 27. N EISO art'cl ____ (35) 28. N EDRS pap doc ____ (38)

44 29. N EDRS fiche ____ (41) 30. EISO reader av'lbl (1)__Y (2)__N (3)__Don't know

45 30. Another rd'r av'lbl (1)__Y (2)__N (3)__Don't know

31. Price first search ___ (46)

APPENDIX E. Equipment Used by EISO

Computer Terminal (Computer Devices, Teleterm 1030, APL/ASCII)

The computer terminal is used by the search analyst to access the ERIC data base.

Telephone

The telephone is the connecting link between the terminal and the computer.

Fiche Printer (NB Rotary 404A)
Fiche Processor (NB Processor 404) } Bell and Howell

The fiche printer and processor produce duplicate fiche. This two step process which uses heat and diazo technology takes 3 minutes to reproduce 1 fiche.

Fiche Reader (Micro-Scan Systems, Escort K100)

This portable microfiche reader is used to check the legibility of the duplicate fiche produced.

Type Recorder

This is to record interviews with clients for future reference and analysis.

Xerox Machine (Xerox 4000)

Photocopies of journal articles are made for clients on the xerox copier.

Typewriter (IBM Selectric)

APPENDIX F. Publications Used by the Educational Information System for Ontario

Thesaurus of ERIC Descriptors (6th ed.) New York: Macmillan Information, 1975.

Resources in Education, National Institute for Education, Department of Health, Education and Welfare, Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1966 -

Current Index to Journals in Education, National Institute for Education, Department of Health, Education, and Welfare, Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1969 -

EISO User's Manual, Educational Information System for Ontario, Toronto: The Ontario Institute for Studies in Education, 1975. Unpublished manuscript.

APPENDIX G. Educational Information Stations

The purpose of the Educational Information Stations is to provide the user with information concerning how to make use of the Educational Information System for Ontario, to supply him with search request and order forms, and to give him access to a microfiche reader. These stations are normally installed in the resource centre, staff room, or professional library of a school, board, or regional office. The equipment and materials that comprise such a station include:

1. Portable microfiche reader with instructions for use.
2. Microfiche filing box with capacity for 1000 fiche.
3. Loose-leaf binder containing:
   a) Information flyer describing the service
   b) Search request forms
   c) Sample output bibliographies
   d) Instructions for interpreting bibliographies
   e) Document order forms
   f) Sample journal articles and fiche
   g) EISO staff list and local EIC
4. Extra light-bulb for fiche reader.

As a result of a survey taken last summer, it was revealed that few elementary schools in the Region 3 target area of the EISO project had microfiche readers. In order to adequately test the acceptibility and use of microfiche in this area, it was felt that such readers should be installed in several locations. Accordingly, the availability of this equipment was made known to the local school boards, the OISE Northeastern Field Centre and the Regional Office of the Ministry of Education. As a result, the Director of Education of the Nipissing District RCSS arranged for the installation of Stations at three elementary schools in his jurisdiction: St. Vincent de Paul and St. Hubert School in North Bay, and Echo Jeunesse in Sturgeon Falls. A Professional Development session describing the project and search service was held at each location. The first and last of these are French language schools.

Other Educational Information Stations were also installed in the central offices of the East Parry Sound Board of Education, the Muskoka Board of Education, the OISE Northeastern Field Centre, the Regional Office of the Ministry, and the Library of Canadore College/Nipissing Faculty of Education.

APPENDIX H. EISO Brochures

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

(Northeastern Region)

Front

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

EISO Search Analyst
OISE Library
252 Bloor Street West
Toronto, Ontario M5S 1V6
(416) 923-6641 Ext. 487

Back

Have You Heard About EISO?

Chances are you face problems now where additional information would be of help. If so, the Educational Information System for Ontario (EISO) project is ready to assist by locating and duplicating materials contained in the collection of the Educational Resources Information Center (ERIC).

What Is ERIC?

ERIC is an information gathering and disseminating network comprised of 16 subject-specialised clearinghouses operating under the auspices of the U.S. National Institute for Education. The clearinghouses collect, index and abstract research reports, conference papers, curriculum materials and handbooks, including many from Canadian sources, and announce them monthly in *Resources in Education* (*RIE*). They also index more than 700 journals, including 26 from Canada, for the *Current Index to Journals in Education* (*CIJE*). In all, the ERIC data base includes over 200,000 references, to which almost 2,500 new references are added each month.

How Can EISO Help?

By searching the ERIC data base for information on a particular problem or area of interest, you can learn how others have approached the issue. EISO provides direct access to ERIC, retrieving references quickly and inexpensively. The service will be of particular help to those working under the pressure of deadlines. For public addresses and research reports EISO will prove helpful; for planning and decision-making it may prove indispensible.

How Does EISO Work?

A search request is submitted to the search analyst, a specially trained reference librarian in the OISE Library, who rewords the content to conform to a list of subject headings designed for computer scanning of the ERIC data base. Via a computer terminal, the search analyst queries the data base which is stored in a computer operated by the System Development Corporation of Santa Monica, California. When combinations of subject headings are entered (e.g., business mathematics AND secondary school), the number of relevant citations and sample citations are printed on-line. If the citations are appropriate, the complete set of references and abstracts are printed off-line in Santa Monica and mailed directly to the requestor.

How Long Does a Search Take?

The computer search itself normally takes fifteen minutes, but follows a half-hour's discussion with the search analyst whenever possible. The bibliography usually arrives within a week of receipt of a search request.

How Much Does a Search Cost?

The current charge for a complete literature search, including consultation and printed bibliography, is $20.00 in the Northeastern Region (Region 3).

How Do I Obtain Documents and Articles?

Documents are available on microfiche from EISO at a charge of 35¢ per fiche, while paper copies are available from the ERIC Document Reproduction Service (EDRS) in the United States. Paper copies of journal articles are available from EISO at a charge of 10¢ per page. Order forms for both documents and articles will be sent to clients after their searches have been completed.

How Do I Request a Search?

Complete the EISO Search Request Form on the overleaf and mail it to the address below; phone the search analyst directly; or make an appointment with the search analyst at the EISO Search Service Office located in the OISE Library on the second floor of the OISE building.

EISO Search Analyst
OISE Library
252 Bloor Street West
Toronto, Ontario M5S 1V6
(416) 923-6641 Ext. 487

How Can Clients Assist EISO?

Though EISO provides what is expected to be a useful service, it is also a research project looking into the information needs of Ontario's educators. It will be greatly appreciated if clients complete evaluation questionnaires or agree to be interviewed, if asked to do so.

*Project funded under contract with the Ontario Ministry of Education. S. Lawton and E. Auster, Principal Investigators

Front

Iss ember 1975

PLEASE FILL OUT FORM ON BACK

1) Name: _____

Address: _____

_____

_____

_____

Phone: ( ) _____

2) Invoice (if payment is not enclosed):

_____

_____

_____

_____

3) Search Topic: Grade level(s) — _____ Year(s) to be searched — _____

Detailed description of topic — _____

_____

_____

_____

4) Reasons for requesting search (Please be specific, giving examples of how you hope to use the information) —

_____

_____

_____

_____

5) Maximum number of references you think possible — _____

_____

6) Actual number of references desired for use — _____

_____

7) Citations for relevant materials known to you, if any — _____

_____

_____

_____

8) Authors writing in the area, other than those cited above — _____

_____

_____

_____

Please mail completed search application to

EISO Search Analyst
OISE Library
252 Bloor Street West
Toronto, Ontario M5S 1V6

GROUPS TO WHOM COPIES OF THE BROCHURE WERE DISTRIBUTED

1. All School Boards
2. Universities
3. Community Colleges
4. Faculties of Education
5. Teachers Colleges
6. Libraries
7. Regional Offices of the Ministry of Education
8. OISE Field Centres
9. Private Schools
10. Indian Schools
11. Professional Organizations
12. Tenants of OISE Building

APPENDIX I. Articles About EISO

Publication	Issue
Educational Courier	November, 1975: 12-13
Ontario Education	September/October, 1975: 27
Forum	October, 1975: 226-227
Orbit	October, 1975: 26
News and Notes (OISE)	September 26, 1975: 3
GRADOISE (OISE)	October/November, 1975: 3
CEA Newsletter	October, 1975: 4

Educational Courier, 46 (2) Nov. 1975: 12-13

ASK ERIC...

Chances are you face new problems now where additional information would be of help; perhaps you wonder how others have approached a certain issue. A geography teacher in an Ontario elementary school may need guidelines for the teaching of geography through the use of computers; administrators may wish to learn what use has been made of trimestering in elementary schools. Educators throughout Ontario will be interested in a new information service being provided through the Library of the Ontario Institute for Studies in Education. The service is one aspect of the Educational Information System for Ontario (EISO) project at OISE being funded under contract by the Ministry of Education. Its purpose is threefold: 1) to provide schools, post-secondary institutions, etc., with several alternative answers to their questions from which they can choose; 2) to enable educators to learn from the experience of others in the approach and solution to problems or tasks that are similar to theirs, or in the introduction and implementation of innovative programs in a related area; 3) to furnish information about the most recent, up-to-date educational practices and research.

An individual interested in using the service, which has been in full operation since September 1, 1975, simply describes the topic of interest and explains the reasons for requesting the information, so that appropriate types of materials can be located. For example, the teacher who needs guidelines for the computer-assisted teaching of geography would forward the request by phone or letter to the search analyst, a specially trained reference librarian. Special search request forms are also available for this purpose.

Upon receipt of a request, the search analyst rewords the content in terms of a list of subject headings designed for computer scanning of a large data base for relevant materials. The data base itself is maintained by the Educational Resources Information Center (ERIC), an information gathering and dissemination network operating under the auspices of the United States National Institute for Education. Through the **Current Index to Journals in Education (CIJE)** and **Resources in Education (RIE)**, ERIC has indexed over 200,000 items, including curriculum materials, journal articles, conference papers, research reports, etc. Substantial amounts of Canadian materials are included in the ERIC data base, helping to make it one of the most valuable sources of information for educators.

The search analyst then conducts the search via a computer terminal connected to a computer operated by the System Development Corporation of Santa Monica, California, where the ERIC data base is stored. On typing the various subject headings into the terminal, the search analyst learns exactly how many relevant documents are contained in the collection. There might be well over 500 items listed under "geography instruction" — but as the terms "computer-assisted instruction" and "elementary schools" are added, the items that would be classified under all three headings might be limited to 11. To complete the search process, the search analyst instructs the computer to print a bibliography containing the relevant citations which includes abstracts for documents indexed in **RIE**. The bibliography is mailed directly to the requestor, where it will normally arrive within one week.

For this search service, a fee of $30 per search is being charged to cover computing and mailing costs. Users may pay in advance, or choose to be invoiced.

To assure access to complete documents and articles appearing in EISO bibliographies, the information service is also providing copying services. After reviewing the bibliography, the person requesting a search may wish to order copies of several complete documents. Paper copies are provided for journal articles at 10c per page, and microfiche reproductions (3 by 5 inch "negatives" that contain images of up to 96 pages) are provided for reports at 35c per fiche.

Individuals interested in requesting a search should contact Ms. Elizabeth Reicker, Search Analyst, EISO Search Service, OISE Library, 252 Bloor Street West, Toronto, M5S 1V6, or Phone (416) 923-6641 Ext. 487.

In-depth search related to the provision of local Educational Information Consultants (EICs) to assist in requesting and interpreting educational information will be conducted in the Northeastern Region. Educators in this region are advised to contact their director's office (or Regional Office in the case of isolated boards) to learn proper procedures for placing search requests with their Educational Information Consultant. Through its Northeastern Centre located in North Bay, the OISE Office of Field Development is particularly active in this phase of the study.

The principal investigators for the project, Mrs. Ethel Auster and Dr. Stephen Lawton of the Department of Educational Administration, OISE, will be pleased to provide additional information concerning EISO. They may be contacted at (416) 923-6641 Ext. 420 and Ext. 654, respectively.

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

EISO Search Analyst
OISE Library
252 Bloor Street West
Toronto, Ontario M5S 1V6
(416) 923-6641 Ext. 487

1) Name: _____ 2) Invoice (if payment is not enclosed):

Address: _____ _____

_____ _____

_____ _____

_____ _____

Phone: ( ) _____

3) Search Topic: Grade level(s) _____ Year(s) to be searched _____

Detailed description of topic _____

_____

_____

_____

4) Reasons for requesting search (please be specific, giving examples of how you hope to use the information):

_____

_____

_____

_____

5) Maximum number of references you think possible: _____

_____

6) Actual number of references desired for use: _____

_____

7) Citations for relevant materials known to you, if any: _____

_____

_____

_____

8) Authors writing in the area, other than those cited above: _____

_____

_____

_____

Please mail completed search application to

EISO Search Analyst
OISE Library
252 Bloor Street West
Toronto, Ontario M5S 1V6

Ontario Education
September/October 1975

NEW INFORMATION SERVICE FOR EDUCATORS

Trustees, administrators, teachers and other educators will be interested in a new information service being provided through the Library of the Ontario Institute for Studies in Education. The service, which locates and duplicates articles and reports on various educational topics in response to requests from educators, is one aspect of the Educational Information System for Ontario (EISO) project at OISE being funded under contract by the Ministry of Education.

An individual interested in using the service, which has been in full operation since September 1, 1975, simply describes the topic of interest and explains the reasons for requesting the information, so that appropriate types of materials can be located. For example, a board administrator might be interested in the use of paid teacher assistants in elementary schools in order to develop a personnel policy for this type of position. He would forward his request by phone or letter to the search analyst, a specially trained reference librarian. Special search request forms are also available for this purpose.

Upon receipt of a request, the search analyst rewords it in terms of a list of subject headings designed for locating materials contained in a large data base that will be searched by computer in order to locate relevant materials. The data base itself is maintained by the Educational Resources Information Center (ERIC), an information gathering and dissemination network operating under the auspices of the United States National Institute for Education. Through the *Current Index to Journals in Education (CIJE)* and *Resources in Education (RIE)*, ERIC has indexed over 200,000 items, including curriculum materials, journal articles, conference papers, research reports, etc. Substantial amounts of Canadian materials are included in the ERIC data base, helping to make it one of the most valuable sources of information for educators.

The search analyst then conducts the search via a computer terminal connected to a computer operated by the System Development Corporation of Santa Monica, California, where the ERIC data base is stored. On typing the various subject headings into the terminal, the search analyst learns exactly how many relevant documents are contained in the collection. There might be over 500 items listed under "teacher assistants" – but combining the term "with "elementary school" and "personnel policy" might reveal only 15 items classified under all three headings. To complete the search process, the search analyst instructs the computer to print a bibliography containing the relevant citations which includes abstracts for documents indexed in *RIE*. The bibliography is mailed directly to the requestor, where it will normally arrive within one week.

For this search service, a fee of $30 per search is being charged to cover computing and mailing costs. Users may pay in advance, or choose to be invoiced.

To assure access to complete documents and articles appearing in EISO bibliographies, the information service is also providing copying services. After reviewing the bibliography, the person requesting a search may wish to order copies of several complete documents. Paper copies are provided for journal articles at 10¢ per page, and microfiche reproductions (3 x 5 inch "negatives" that contain images of up to 96 pages) are provided for reports at 35¢ per fiche.

Individuals interested in requesting a search should contact Ms. Elizabeth Reicker, Search Analyst, EISO Search Service, OISE Library, 252 Bloor Street West, Toronto, M5S 1V6, or phone (416) 923-6641, Ext. 487.

In-depth research related to the provision of local Educational Information Consultants (EIC's) to assist in requesting and interpreting educational information will be conducted in the Northeastern Region. Educators in this region are advised to contact their director's office (or Regional Office in the case of isolate boards) to learn proper procedures for placing search requests with their Educational Information Consultant. Through its Northeastern Centre located in North Bay, the OISE Office of Field Development is particularly active in this phase of the study.

The principal investigators for the project, Mrs. Ethel Auster and Dr. Stephen Lawton of the Department of Educational Administration, OISE, will be pleased to provide additional information concerning EISO. They may be contacted at (416) 923-6641, Ext. 420 and Ext. 654, respectively.

ASK ERIC...

Chances are you face new problems now where additional information would be of help; perhaps you wonder how others have approached a certain issue. A geography teacher in an Ontario secondary school may need guidelines for the teaching of geography through the use of computers; administrators may wish to learn what use has been made of trimestering in secondary schools. Educators throughout Ontario will be interested in a new information service being provided through the Library of the Ontario Institute for Studies in Education. The service is one aspect of the Educational Information System for Ontario (EISO) project at OISE being funded under contract by the Ministry of Education. Its purpose is threefold: 1) to provide schools, post-secondary institutions, etc., with several alternative answers to their questions from which they can choose; 2) to enable educators to learn from the experience of others in the approach and solution to problems or tasks that are similar to theirs, or in the introduction and implementation of innovative programs in a related area; 3) to furnish information about the most recent, up-to-date educational practices and research.

An individual interested in using the service, which has been in full operation since September 1, 1975, simply describes the topic of interest and explains the reasons for requesting the information, so that appropriate types of materials can be located. For example, the teacher who needs guidelines for the computer-assisted teaching of geography would forward the request by phone or letter to the search analyst, a specially trained reference librarian. Special search request forms are also available for this purpose.

Upon receipt of a request, the search analyst rewords the content in terms of a list of subject headings designed for computer scanning of a large data base for relevant materials. The data base itself is maintained by the Educational Resources Information Center (ERIC), an information gathering and dissemination network operating under the auspices of the United States' National Institute for Education. Through the **Current Index to Journals in Education (CIJE)** and **Resources in Education (RIE)**, ERIC has indexed over 200,000 items, including curriculum materials, journal articles, conference papers, research reports, etc. Substantial amounts of Canadian materials are included in the ERIC data base, helping to make it one of the most valuable sources of information for educators.

The search analyst then conducts the search via a computer terminal connected to a computer operated by the System Development Corporation of Santa Monica, California, where the ERIC data base is stored. On typing the various subject headings into the terminal, the search analyst learns exactly how many relevant documents are contained in the collection. There might be well over 500 items listed under "geography instruction" — but as the terms "computer-assisted instruction" and "secondary schools" are added, the items that would be classified under all three headings might be limited to 11. To complete the search process, the search analyst instructs the computer to print a bibliography containing the relevant citations which includes abstracts for documents indexed in **RIE**. The bibliography is mailed directly to the requestor, where it will normally arrive within one week.

For this search service, a fee of $30 per search is being charged to cover computing and mailing costs. Users may pay in advance, or choose to be invoiced.

To assure access to complete documents and articles appearing in EISO bibliographies, the information service is also providing copying services. After reviewing the bibliography, the person requesting a search may wish to order copies of several complete documents. Paper copies are provided for journal articles at 10c per page, and microfiche reproductions (3 by 5 inch "negatives" that contain images of up to 96 pages) are provided for reports at 35c per fiche.

Individuals interested in requesting a search should contact Ms. Elizabeth Reicker, Search Analyst, EISO Search Service, OISE Library, 252 Bloor Street West, Toronto, M5S 1V6, or Phone (416) 923-6641 Ext. 487.

In-depth search related to the provision of local Educational Information Consultants (EICs) to assist in requesting and interpreting educational information will be conducted in the Northeastern Region. Educators in this region are advised to contact their director's office (or Regional Office in the case of isolate boards) to learn proper procedures for placing search requests with their Educational Information Consultant. Through its Northeastern Centre located in North Bay, the OISE Office of Field Development is particularly active in this phase of the study.

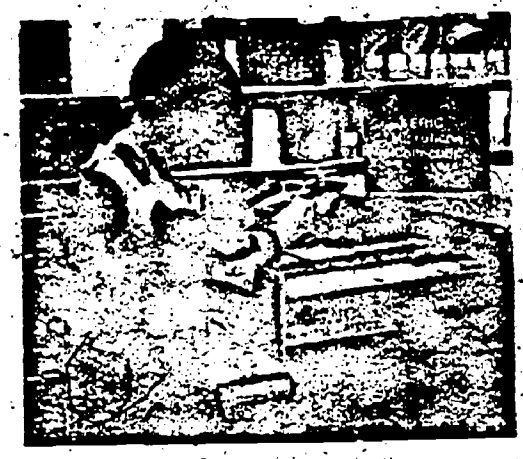
The principal investigators for the project, Mrs. Ethel Auster and Dr. Stephen Lawton of the Department of Educational Administration, OISE, will be pleased to provide additional information concerning EISO. They may be contacted at (416) 923-6641 Ext. 420 and Ext. 654, respectively.

Educational Information Service: A New Resource for Teachers

Perhaps you are not satisfied with the reading program you're using or want to try a different marking system. Perhaps you are a member of a curriculum committee trying to develop materials on a new subject — ecology, economics, or whatever. Or perhaps you are on a negotiating team and feel you need new approaches in order to hasten a satisfactory settlement. In each of these cases, there is a need for information. Others have faced similar problems, and chances are there are reports, articles, papers, or guides available on the topic at hand that would provide you with fresh ideas, insights, and even, on occasion, specific solutions. Unfortunately, finding relevant materials is a serious problem in itself. Few practicing educators have time to visit a library to search for materials; and even if they do obtain some references, obtaining the documents themselves is usually impractical or impossible.

It is hoped that a new information service being provided through the Library of the Ontario Institute for Studies in Education will help to reduce this information bottleneck by making it easy both to locate and to obtain educational literature. The service, which locates and duplicates articles and reports on various topics in response to requests from educators, is one aspect of the Educational Information System for Ontario (EISO) project at OISE being funded under contract by the Ministry of Education.

The service has been in full operation since September 1, 1975. An individual interested in using it simply describes the topic of interest and explains how the information is to be used. For example, a teacher might be interested in reading materials for grade 1 children in rural areas in order to develop a more relevant and stimulating program. She would forward her request by phone or letter to the search analyst, a specially trained reference librarian. Special search request forms are also available for that purpose.



Upon receipt of a request, the search analyst rewords the content to conform to a list of subject headings designed for computer scanning of a large data base for relevant materials. The data base itself is maintained by the Educational Resources Information Center (ERIC), an information gathering and dissemination network operating under the auspices of the United States National Institute for Education. Through the *Current Index to Journals in Education (CIJE)* and *Resources in Education (RIE)*, ERIC has indexed over 200,000 items, including journal articles, curriculum materials, conference papers, and research reports. Substantial amounts of Canadian materials included in the ERIC data base help to make it one of the most valuable sources of information for educators.

The search analyst then uses a computer terminal connected to a computer operated by the System Development Corporation of Santa Monica, California, where the ERIC data base is stored. As each of the various subject headings is typed into the terminal, the number of relevant documents is narrowed down. For example, there might be over 500 items listed under 'reading materials,' but as the headings 'grade 1' and 'rural schools' are added, the items that would be classified under all three headings might be limited to 35. To complete the process, the search analyst instructs the computer to print a bibliography containing the relevant citations (which includes abstracts for documents in *RIE*) The bibliography is mailed directly to the requestor, where it normally arrives within a week.

For this search service, a fee of $30 per search is being charged to cover computing and mailing costs. Users can pay in advance or be invoiced.

To assure access to complete documents and articles appearing in EISO bibliographies, the information service is also providing copying services. After reviewing the bibliography, the person who requested the search may wish to order copies of several complete documents. Paper copies are provided for journal articles at 10¢ per page, and microfiche reproductions (3" by 5" 'negatives' that contain images of up to 96 pages) are provided for reports at 35¢ per fiche.

Individuals interested in requesting a search should contact Elizabeth Reicker, Search Analyst, EISO Search Service, OISE Library, 252 Bloor Street West, Toronto, M5S 1V6, or phone (416) 923 6641, ext. 487.

In-depth research is being carried out in the Northeastern region of Ontario to determine the value of having Educational Information Consultants in each region. Educators in the Northeastern region are advised to contact their directors (or Regional Office, in the case of isolated boards) to learn proper procedures for placing search requests with their Educational Information Consultant. Through its Northeastern Centre located in North Bay, the OISE Office of Field Development is particularly active in this phase of the study.

The principal investigators for the project, Ethel Auster and Dr. Stephen Lawton (Department of Educational Administration), will be pleased to provide additional information concerning EISO. They may be contacted at (416) 923 6641, ext. 420 and ext. 654 respectively.

Literature searches expedited by new computerized service

Dr. Bob Stinson, head of the Western Ontario Centre, discusses a request with search analyst Elizabeth Reicker.

The teacher developing curriculum materials, the principal setting objectives for his school, the director of education planning experimental programs, the graduate student working to a deadline on a course paper — all can profit by reading research reports and learning about other people's experiences.

A way to help them do so quickly and effectively is being offered by a new project housed in the Institute's Library.

The project, the Educational Information System for Ontario (EISO), is a search service providing computerized bibliographies to fill specific information needs. The service has been in full operation since September 2 following a successful trial period last summer.

Dr. Steve Lawton, Department of Educational Administration, and Ethel Auster, an OISE doctoral student on leave from the Library, are heading the project. Elizabeth Reicker is the search analyst, and Ann Yeung is her assistant. Jutta Keylwerth is the research officer.

Funded by Ministry of Education

The project, funded by a Ministry of Education contract, aims to increase the accessibility of educational literature to Ontario educators by providing computerized searches of the Educational Resources Information Centre (ERIC) data base.

ERIC is an information-gathering and dissemination network of 16 clearinghouses operating under the U.S. National Institute for Education. They collect, index, and abstract research reports, conference papers, curriculum materials and handbooks, including many from Canadian sources, and announce them monthly in *Resources in Education (RIE)*. They also index more than 700 journals, including 26 from Canada, in *Current Index to Journals in Education (CIJE)*.

In all, the ERIC data base includes over 200,000 references and is brought up-to-date monthly.

The Institute Library already has an extensive collection of journals to provide the back-up material to *CIJE* and has the complete ERIC document collection on microfiche.

The EISO service provides on-line (computerized) access to this great store of information. It is expected to help especially those working under the pressure of deadlines — on course papers, dissertations, research reports, and conference presentations — and those educators responsible for planning and decision-making.

Here's how the system works. When a request is submitted to the search analyst, Ms. Reicker assists the client to frame questions in precise terms chosen from the *Thesaurus of ERIC Descriptors*. She then types the request into a computer terminal connected to the ERIC data base in the SDC computer in Santa Monica, California. The computer responds almost immediately by printing out the number of references indexed by those descriptors. Sample citations can be examined and the retrieval modified on-line. When the references generated by the search are appropriate, the complete bibliography is produced in Santa Monica and mailed to the EISO search service room (S208) for pick-up, or directly to the requestor.

Complex requests handled quickly

The system makes possible quick and efficient handling of complex, hard-to-define requests. The computer search itself takes about 15 minutes, usually following a 30-minute interview with the search analyst. The print-out arrives less than a week later. Current charge for a complete search, including consultation and printed bibliography, is $30.

The last phase of the EISO service involves ordering documents and articles. Photocopies of articles or microfiche copies of the documents may be ordered from EISO at 10¢ a page for articles and 35¢ per fiche.

In addition to the operation in Toronto, the project staff are working with Institute field centre personnel in order to introduce the service across the province. The Northeastern region, with its centre in North Bay, has been selected as a target area for intensive research.

Further information about the project can be obtained from either of the principal investigators. To request a search, an appointment may be arranged with the search analyst at Ext. 487, or 923-2936.

Si vous voulez parler francais..

Staff members and students interested in improving their French language skills can enroll in *Lunch and Learn French*, a course to be held at OISE during the noon hour beginning Oct. 3. The course, offered by the School of Continuing Studies of the University of Toronto, will meet Monday, Wednesday, and Friday for ten weeks. Instruction will concentrate on the development of speaking fluency and aural comprehension. The course is designed for those who have already acquired a basic knowledge of the structure and vocabulary of French but who cannot speak it well. The fee is $75. Students may register, by mail or in person, at 119 St. George St. The office is open 9 a.m. — 9 p.m. Monday through Thursday and 9 a.m. — 5 p.m. on Friday.

GRADOISE Press (OISE)
4 (5) Oct./Nov. 1975

The Educational Information System For Ontario (EISO) Project

•Thanks go to Jutta Keylwerth for EISO

Following a successful six-week period of trial operation during the OISE Graduate Summer Session, the educational information service provided by the Educational Information System for Ontario (EISO) project* has been in full-scale operation since September 2.

The project's purpose is to plan and test ways to increase the accessibility of educational literature to Ontario educators. The first stage of this process is providing computerized searches of the Educational Resources Information Centre (ERIC) data base. ERIC is an information gathering and dissemination network comprised of 16 subject-specialized clearinghouses operating under the auspices of the U.S. National Institute for Education. The clearinghouses collect, index and abstract research reports, conference papers, curriculum materials and handbooks, including many from Canadian sources, and announce them monthly in *Resources in Education* [*RIE*]. They also index more than 700 journals, including 26 from Canada, for the second major ERIC publication, *Current index to Journals in Education* [*CIJE*]. In all, the ERIC data base includes over 200,000 references; *RIE* and *CIJE* are updated monthly by the addition of over 2500 citations. (The OISE Library already has an extensive collection of journals to provide the back-up material to *CIJE*, and the complete ERIC document collection on microfiche.) EISO provides computerized access to the information contained in these two files, retrieving references quickly and inexpensively.

The flexibility of the system allows for easy and efficient handling of extreme complex, hard-to-define requests. In terms of speed of service, the computer search itself normally takes fifteen minutes, but follows a half-hour discussion or interview with the search analyst wherever possible. The bibliographic printout, complete with abstract for RIE citations, will usually arrive within a week of receipt of the search request. As for cost, the current charge for a complete literature search, including consultation and printed bibliography, is $30.00

The last phase of the information service involves ordering complete documents and articles. Each reference in the computer-printed bibliography will be identified by an ED (ERIC Document) or EJ (ERIC Journal) number. The documents are on microfiche and are filed by number, so that ordering by number is required. Journals, on the other hand, are shelved by volume, issue and year of the specified journals, so articles should be ordered accordingly. Photocopies of the articles or microfiche copies of the documents may be ordered from EISO at 10c per page for articles and 35c per fiche. (Paper copies of documents are available from the ERIC Document Reproduction Service (EDRS) in the United States.) Order forms for both documents and articles will be given or sent to clients after their searches have been completed.

For additional information about the project, its principal investigators, Dr. Steve Lawton and Mrs. Ethel Auster, may be reached under Ext. 654 and Ext. 420, respectively. To request a search, an appointment with the search analyst, Ms. Reicker, may be arranged by calling either Ext. 487, or 925-2936.

*Funded under contract with the Ontario Ministry of Education.

CEA Newsletter
October 1975

Bibliographic notes

A new project housed in the OISE library in Toronto assists educators by providing computerized bibliographies to fill specific information needs. Through its search service, the Educational Information System for Ontario (EISO) project, funded by a Ministry of Education contract, provides direct access to the Educational Resources Information Center (ERIC) data base, a store of information containing over 200,000 references. Relevant citations from the two ERIC publications, *Resources in Education (RIE)* and *Current Index to Journals in Education (CIJE)*, are retrieved immediately (on-line) via a computer terminal operated by a trained search analyst.

The service began full-scale operation on September 2, following a successful trial period during the summer. It is seen as especially helpful to those educators working under the pressure of deadlines and to those engaged in planning and decision-making in educational institutions throughout the province of Ontario — classrooms, school board offices, research centres, libraries, community colleges, teachers' colleges, universities and professional organizations. Complex, hard-to-define requests are handled quickly and efficiently.

In addition to its service aspect, the EISO project includes an extensive research component investigating the information needs of Ontario educators. The Northeastern Region has been selected as a target area for in-depth research related to the provision of local Educational Information Consultants (EIC's) to assist in requesting and interpreting educational information. To this end, EISO clients will be asked to complete evaluation questionnaires or agree to be interviewed.

Further information may be obtained by contacting the principal investigators, Dr. S. Lawton and Mrs. E. Auster, Department of Educational Administration, OISE, 252 Bloor Street West, Toronto M5S 1V6. — *Ethel Auster*

APPENDIX J. Professional Development Day

Educational Information System for Ontario

Activity	Minutes	Equipment
Background of study	5	EISO Contract
ONTERIS project	2	--
Why use EISO?	3	
Introduction to ERIC	10	ERIC Thesaurus Resouces in Education Current Index to Journals in Education
ERIC documents	3	Microfiche sample
Canadian content of ERIC	1	
Type of information retrieved	3	Sample SDC bibliography
Ordering microfiche or paper copies of journal articles	5	Order forms
Request for sample topic	2	--
Negotiation of question	5	ERIC Thesaurus
Sample search	20 - 60	Telephone Computer terminal
Closing remarks	3	EISO brochures

Total time: one to two hours.

Host to supply: telephone in meeting room
(EISO covers long distance costs, if any)

EISO participants: Dr. Steve Lawton, Principal Investigator
Mrs. Ethel Auster, Principal Investigator
Ms. Elizabeth Reicker, Search Analyst
(Normally, two of these three are involved in any one presentation)

APPENDIX K. Educational Information Consultant: Role Description and Training Program

Role

1. Gain access to potential users
   a) Let clients know you are there and why
   b) Describe service you can offer
2. In cooperation with clients, identify their information needs
3. Help formualate problem
4. Relay request to EISO search analyst at OISE
5. Deliver and interpret bibliographies
6. Assist in ordering complete documents
7. Follow-up and evaluation

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

TRAINING SESSION FOR EIC

TIME	ACTIVITY	OBJECTIVES	MATERIALS	RESOURCE PERSONS
:00	Meet at Airport	Transport to OISE	Car	SE
:30-10:00	OISE and Library Tour	Familiarity with functions, layout, people. Relationship of project to Library.	OISE Bulletin, Library Guide, R & D Studies, Annual Report.	EA, SL
0:00-10:20	Review of Project	Aims and scope of project. Reporting network in Region 3.	Diagram of reporting network. List of project staff. Contract copy..	EA, SL
0:20-11:00	Introduction to searching (Manual)	Familiarity with contents and how to use RIE, CIJE, Thesaurus, journals, microfiche	RIC, CIJE, fiche, Thesaurus, journals, microfiches	EA
1:00-11:15	Coffee			
1:15-12:30	Client approach and EIC role vis a vis client. EIC role vis a vis search analyst. Search analyst support function.	Knowledge regarding client approaches. Knowledge regarding EIC response.	EIC role description, Chart showing approaches Search Form (sample).	SL, ER
12:30-2:00	Lunch	12:45 Le Trou Normand Reservations		

TIME	ACTIVITY	OBJECTIVES	MATERIALS	RESOURCE PERSONS
2:00-3:00	Negotiation of requests.	a) Understand searching. b) Understand Boolean Logic. c) Search strategy using thesaurus. d) Ability to negotiate requests and translate into machine-readable format.	a) SDC Materials b) Thesaurus	ER
3:00-3:30	Manual Search.	Independent ability to do manual search.	Thesaurus, CIJE, RIE	ER
3:30-4:00	Review and evaluation of manual search.	Independent ability to do manual search.		
4:00-5:00	Computer search.	Familiarity with search methods and output.	a) Terminal b) Bibliography	ER
5:00-5:15	Ordering documents.	Ability to obtain original documents, journals, fiche copies.	Order forms.	
5:15-5:30	Wrap-up, questions.			EA, ER SL

Educational Information System for Ontario
The Ontario Institute for Studies in Education
252 Bloor Street West, Room N754
Toronto, Ontario M5S 1V6

Evaluation of Training Session for Educational Information Consultant in North Bay

1. In general, how would you rate the adequacy of the training session you underwent to become an Educational Information Consultant (EIC) for the Educational Information System for Ontario (EISO) project?

_____ Excellent _____ Good _____ Poor

Comments:

2. Overall, what was the practical value to you of the information or assistance that you received from EISO staff during your training session?

	Information (forms, samples)	Personal assistance (EISO staff)
Very useful	_____	_____
Moderately useful	_____	_____
Only slightly useful	_____	_____
Not useful	_____	_____

Comments:

3. What do you see as your role as an EIC as a result of your EISO training?

4. Please give your opinion of the following statements regarding your EISO training session.

Length of training session:

_____ too long _____ too short _____ just right

Amount of detail or specificity conveyed:

_____ too much _____ too little _____ just right

Level of treatment of sessions provided related to your needs:

_____ too complex _____ too simple _____ just right

Comments:

5. Please rate the training session with regard to the following items.

	Excellent	Good	Poor
Explained clearly the purposes and services of the EISO project			
Defined well what EIC role involved			
Taught me to use ERIC indexes and thesaurus			
Explained how to formulate search strategies for manual and automated retrieval			
Taught me how to read and interpret a computer-generated bibliography			
Taught me procedures for ordering microfiche and paper copies of original documents			

Comments:

6. How would you rank the following influences in helping you to learn how to be an EIC? (Place the number "1" for most important, "2" for next in important, etc.).

_____ trial and error in dealing with client

_____ advice from client

_____ the EISO training program and staff

_____ my own previous experience working in the field

_____ literature I have read on the role of change agents or knowledge dissemination and utilization

_____ discussion of my role with other EICs

_____ advice or help from other colleagues (Please specify name and position)_____

_____

_____

_____ other (Please specify)_____

_____

_____

Comments:

7. How often do you use the EISO service in the course of your normal duties?

_____ Frequently _____ Sometimes _____ Never

8. Has your EISO training influenced the way you approach your normal duties?

_____ Yes _____ No

If Yes, please specify:

9. What activities do you engage in as an EIC?

10. Which sources do you turn to most often when you require educational information?

11. What problems are you encountering in your role as EIC for which your EISO training did not prepare you?

12. In what ways would you recommend that the training of EICs by EISO staff be changed or improved?

Please use the remaining space for any additional comments you would like to make.

Please return your completed questionnaire in the envelope provided to:

Mrs. Ethel Auster
Department of Educational Administration, N754
Ontario Institute for Studies in Education
252 Bloor Street West
Toronto, Ontario
M5S 1V6

THANK YOU VERY MUCH

P7065252

THIS IS AN OFF-LINE CITATION LIST GENERATED BY

ORBIT III

S.D.C.'S INTERNATIONAL SEARCH SERVICE

ADULT LEARNING SEARCH NO 402

NUMBER OF CITATIONS PRINTED = 43

FEBRUARY 17, 1976

THIS SEARCH WAS PERFORMED ON ERIC

REQUESTED BY
R ALLEN X357

PLEASE SEND THIS LISTING TO

S E REICKER, EISO OISE, RM S208
252 BLOOR ST W
TORONTO ONTARIO CANADA M5S 1V6

ADULT LEARNING SEARCH NO 402

ERIC ACCESSION NUMBER	ED108747
CLEARINGHOUSE ACC NO	PS007929
AUTHOR	CONRAD, EVA
TITLE	PEER TUTORING: A COOPERATIVE LEARNING EXPERIENCE.
PUBLICATION DATE	74
ISSUE	RIE75NOV
INSTITUTIONAL NAME	ARIZONA UNIV., TUCSON. ARIZONA CENTER FOR EDUCATIONAL RESEARCH AND DEVELOPMENT.
EDRS PRICE AVAILABILITY	EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE INFORMATION OFFICER, ARIZONA CENTER FOR EDUCATIONAL RESEARCH AND DEVELOPMENT, COLLEGE OF EDUCATION, UNIVERSITY OF ARIZONA, TUCSON, AZ 85721 (PAPER, $1.00)
DESCRIPTIVE NOTE	29P.
DESCRIPTORS	*ELEMENTARY EDUCATION
DESCRIPTORS	ELEMENTARY SCHOOL STUDENTS
DESCRIPTORS	*INDIVIDUALIZED INSTRUCTION
DESCRIPTORS	INDIVIDUALIZED PROGRAMS
DESCRIPTORS	PEER RELATIONSHIP
DESCRIPTORS	*PEER TEACHING
DESCRIPTORS	REINFORCEMENT
DESCRIPTORS	SMALL GROUP INSTRUCTION
DESCRIPTORS	TEACHING TECHNIQUES
DESCRIPTORS	TRAINING TECHNIQUES
DESCRIPTORS	*TUTORIAL PROGRAMS
DESCRIPTORS	*TUTORING
DESCRIPTORS	TUTORS
IDENTIFIERS	ARIZONA
IDENTIFIERS	*TUCSON EARLY EDUCATION MODEL
ABSTRACT	THIS BRIEF ILLUSTRATED BOOKLET SUGGESTS PROCEDURES FOR THE INCORPORATION OF PLANNED PEER TUTORING INTO DAILY CLASSROOM ROUNTINES. THIS METHOD OF INSTRUCTION HAS BEEN FOUND TO BE USABLE WITH A VARIETY OF ACADEMIC TASKS AND IS SEEN AS ONE WAY TO ACHIEVE INDIVIDUALIZATION OF INSTRUCTION. THE BOOKLET FOCUSES ON THE DEFINITION OF PEER TUTORING; BENEFITS OF THE TUTEE, TUTOR AND TEACHER; TUTOR TRAINING TECHNIQUES; APPROPRIATE TUTORING TASKS (GROUPED BY ACADEMIC AREAS); APPROPRIATE MATERIALS; AND RECORD-KEEPING. A BRIEF LOOK AT HOW ONE TEACHER USES PEER TUTORING IN HER CLASSROOM IS INCLUDED. (ED)

APPENDIX M. Sample Microfiche

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

The Ontario Institute for Studies in Education
Room S218, 252 Bloor St. W., Toronto M5S 1V6
(416) 923-6641 Ext, 487

Search No. _____

Topic: _____

SEARCH REQUEST FORM (completed by search analyst)

1. Name _____ 2. Invoice: ( ) Same, or

Address _____

Phone ( ) _____ Phone ( ) _____

3. Bibliography to: _____

4. Search Topic: Year(s) to be searched — _____ Level or group — _____

Detailed description of topic —

5. Reasons for requesting search (Please specify how you hope to use the information) —

6. Number of referehces expected: _____ 7. Number of references desired: _____

8. Citations of relevant materials known to you, if any, or authors writing in the area.

9. Data base: ERIC ☐ SSCI ☐ PA ☐ OTHER ☐ _____

10. Search strategy —

11. Comments (actual form is 14 inches long).

Copies - EISO (1) white
Requestor (1) pink

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EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

The Ontario Institute for Studies in Education
Room S818, 252 Bloor Street W., Toronto M5S 1V6
(416) 923-6641 Ext. 487

Search No. _____

Topic: _____

SEARCH REQUEST FORM (completed by EIC)

1. Name _____ 2. Invoice: ( ) Same, or

Address _____

Phone ( ) _____ Phone ( ) _____

3. Bibliography to: _____

4. Search Topic: Year(s) to be searched — _____ Level or group — _____

Detailed description of topic —

5. Reasons for requesting search (Please specify how you hope to use the information) —

6. Number of references desired: _____

7. Citations of relevant materials known to you, if any, or authors writing in the area.

_____

_____

8. Price: Free ☐ $20 ☐ $30 ☐

9. Contact: In person ☐ Telephone ☐ Mail ☐

10. Date request received _____ (D M Y) Date of interview _____ (D M Y)

Length of interview _____ min.

11. Does the client have access to microfiche reader? Yes ☐ No ☐ Don't know ☐

EISO Reader? Yes ☐ No ☐ Don't Know ☐

Search Strategy — 13. Comments (actual form 14" long). Copies - EISO (1) white; EIC (1) yellow; User (1) pink

EISO Search Request Form (completed by user)

1) Name: _____
Address: _____

Phone: ( ) _____

2) Invoice (if payment is not enclosed): _____

3) Search Topic: Grade level(s) — _____ Year(s) to be searched — _____

Detailed description of topic — _____

4) Reasons for requesting search (Please be specific, giving examples of how you hope to use the information) — _____

5) Maximum number of references you think possible — _____

6) Actual number of references desired for use — _____

7) Citations for relevant materials known to you, if any — _____

8) Authors writing in the area, other than those cited above — _____

Please mail completed search application to

EISO Search Analyst
OISE Library
252 Bloor Street West
Toronto, Ontario M5S 1V6

REFERENCE RECORD

Dates of Search	Search #	Name	No. of Refs.	Dates Received

iv(2)

Search Log (Search Analyst)

Daily			Weekly				
Date	Time	Print	No. of Searches	Total Time	Total Print	Time/ Search	Print/ Search

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO
THE ONTARIO INSTITUTE FOR STUDIES IN EDUCATION
252 BLOOR STREET WEST, TORONTO, ONTARIO, CANADA M5S 1V6 TELEPHONE 923-6641

A bibliography containing references on

is on its way to you from the SDC computer centre in Santa Monica.

We are enclosing an explanation of the printout and order forms so that you may order copies of the documents from the EISO. Photocopies of journal articles cost 10¢ per page, duplicates of each microfiche are 35¢. Hard (paper) copies of the documents must be ordered from EDRS, on the form enclosed. All orders to EISO must be prepaid if the total is less than $10.00.

If you have any problems please do not hesitate to write, or to telephone me at (416) 923-2936.

Sincerely yours,

S. Elizabeth Reicker
Search Analyst

SER/ay
Enclosures

Understanding the Printout

The printout provides full bibliographic references--enough information to decide if the paper should be read (abstract & descriptors) and to retrieve the document (ED# or journal title).

There are two types of references corresponding to the two indexes which comprise the ERIC data base. References with an ED prefixed accession number are reports from the RIE portion of the file; almost all the documents so indexed are available on microfiche. The OISE Library subscribes to the complete microfiche collection in which the reports are kept in order of ED#. Some copyrighted materials are not available on microfiche--details to obtain these are provided in the descriptive note category. Most of these monographs will be available in the OISE Library.

References to journal articles are assigned an EJ accession number. The document will be found in the journal specified under "source". Issue, number and pages are also given. All of these periodicals are held at OISE.

If you have any difficulty in finding the references, or ~~if you~~ require the documents or articles for your client's or your files, the OISE EISO project staff will be pleased to photocopy journal articles and reproduce microfiche for a charge of 10¢/page and 35¢/fiche respectively. The EISO is not able to provide paper copies from the microfiche. Prepaid requests for such copies should be directed to EDRS (ERIC Document Reproduction Service) in Arlington, Virginia.

PRINTOUT SYMOBLS OF THE ERIC DATA BASE

ED 000 001 (ERIC ACCESSION NUMBER)	ERIC accession number for document reproduced on microfiche. This information is required when ordering a duplicate of a microfiche.
	The document on microfiche is filed by this number in the microfiche cabinet in the south central area of the library's second floor.
	The full citation including the abstract and descriptors may be found in RIE Documents Abstracts (Navy blue vols.) to the west of the microfiche collection.
EJ 000 001	Refers to a journal article indexed in CIJE.
	To learn the source of the article look up under the EJ number in the Main Entry section of CIJE (the bright blue volumes in the area for index stands).
AU (AUTHOR)	Author of the article or document.
TI (TITLE)	Title of the article or document.
PD (PUBLICATION DATE)	Publication Date of the article or document.
DE (DESCRIPTORS) IDENTIFIERS	Those with *'s in front are major descriptors which reflect the main content or thrust of the information.
AB (ABSTRACT)	Abstract of the ERIC document.
NO (DESCRIPTIVE NOTE)	Information about availability of the document if not on microfiche and the number of pages of the document.
SO (SOURCE)	Source of the journal article: Journal Volume, Issue, and Pages Numbers. This information is required when ordering a photocopy of a journal article.

*research project is funded under contract by the Ministry of Education, Ontario.

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO
OISE Library, 252 Bloor St. W., Toronto M5S 1V6
ORDER FORM FOR MICROFICHE AND ARTICLES

Name _____
Address _____
_____
Telephone ( ) _____
Date _____

EISO Search #	ERIC Documents on Microfiche: ED #	# of fiche (96pg/fiche	# of copies	Cost. (35¢/fiche)	EJ #	Journal Title

Total $ _____

Completed by user and sent to EISO

(Continued on next page)

Page ____ of ____

Payment enclosed ☐ (necessary for orders under $10.00)

Journal Articles

	Vol #	Issue #	Date	# of Pages	# of copies	Cost (10¢/page)

Note: Actual form printed horizontally on 14" paper.

Total $ _____

GRAND TOTAL _____

SUMMARY OF STATISTICS ON EDUCATIONAL INFORMATION PROJECT FOR ONTARIO

Search			Documents Ordered				Invoice					
							Search			Documents		
#	Date	User	Date order recd	Date material sent	# ED	# EJ	Date	# of Docs.	Amount	Date	# of Docs.	Amount

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO
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Sincerely yours,

SER/ay

S. Elizabeth Reicker
Search Analyst

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SEND TO: ERIC Document Reproduction Service
P.O. Box 190, Arlington VA 22210
Phone 703 841-1212

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Cheque or money order in U.S. funds payable to EDRS must be enclosed.

Prices

No. of pages	Price
1-25	$1.58 U.S.
26-50	1.95
51-75	3.32
76-100	4.43
each additional 25 pages	1.27

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ED Number	No. of Pages	Cost
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ED		
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Postage _____

Total $ _____

Version A
8/7/75

xi

197
Dates Covered

DEPOSIT SLIP

Educational Information System for Ontario

Please credit the attached cash/cheques to account 95.90 - 5551-51

Search Number	Cash	Cheque	Purpose Search	Fiche	Paper	Other
	$	$				
TOTALS	$	$	$			

Sent from EISO: _____ (Signature) _____ (Date)

Received in Banking Section, Finance: _____ (Signature) _____ (Date)

Copies - EISO (1) white
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THE ONTARIO INSTITUTE
FOR STUDIES IN EDUCATION

252 BLOOR STREET WEST, TORONTO, ONTARIO, CANADA M5S 1V6 TELEPHONE 923-6641

INVOICE

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO PROJECT*

INVOICE TO:

INVOICE NO. _____

INVOICE DATE _____

CUSTOMER NO. _____

EISO SEARCH NO. _____

COMPUTER SEARCH OF ERIC DATA BASE $_____

Search conducted for _____

_____

_____

_____

Date of search _____

MICROFICHE REPRODUCTIONS

_____ Microfiche @ 35¢ per fiche _____

PHOTOCOPIES

_____ Pages at 10¢ per page _____

TOTAL _____

*This project is funded under contract by the Ministry of Education, Ontario.

TERMS: PAYABLE UPON RECEIPT OF INVOICE
MAKE CHEQUES PAYABLE TO THE ONTARIO INSTITUTE FOR STUDIES IN EDUCATION
MAIL: ATTENTION FINANCE DIVISION — BANKING SECTION

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PLEASE RETURN REMITTANCE COPY OF THIS INVOICE WITH YOUR PAYMENT CUSTOMER'S COPY

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO (EISO)

Search Authorization Form
(Cost Recovery for OISE Staff & Students)

Requestor _____

_____

_____

_____

Unit _____

Authorization by unit head
or budget officer _____ Date _____

Account Number _____

EISO COPY

Copies - EISO (2) white and green; white copy sent to OISE Finance with Summary Form at month's end.
Budget Unit (1) blue
Requestor (1) pink

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

Charges Incurred by OISE Department

Summary of Account Distribution

Dates Covered _____

Account	Budget Unit	Cost

Copies - EISO (1) white
OISE Finance Division (1) white

Submitted by _____
(EISO)

Date _____

EDUCATIONAL INFORMATION SYSTEM FOR ONTARIO

Cost Recovery Program

Statement of Charges

Dates covered _____

Budget Unit _____

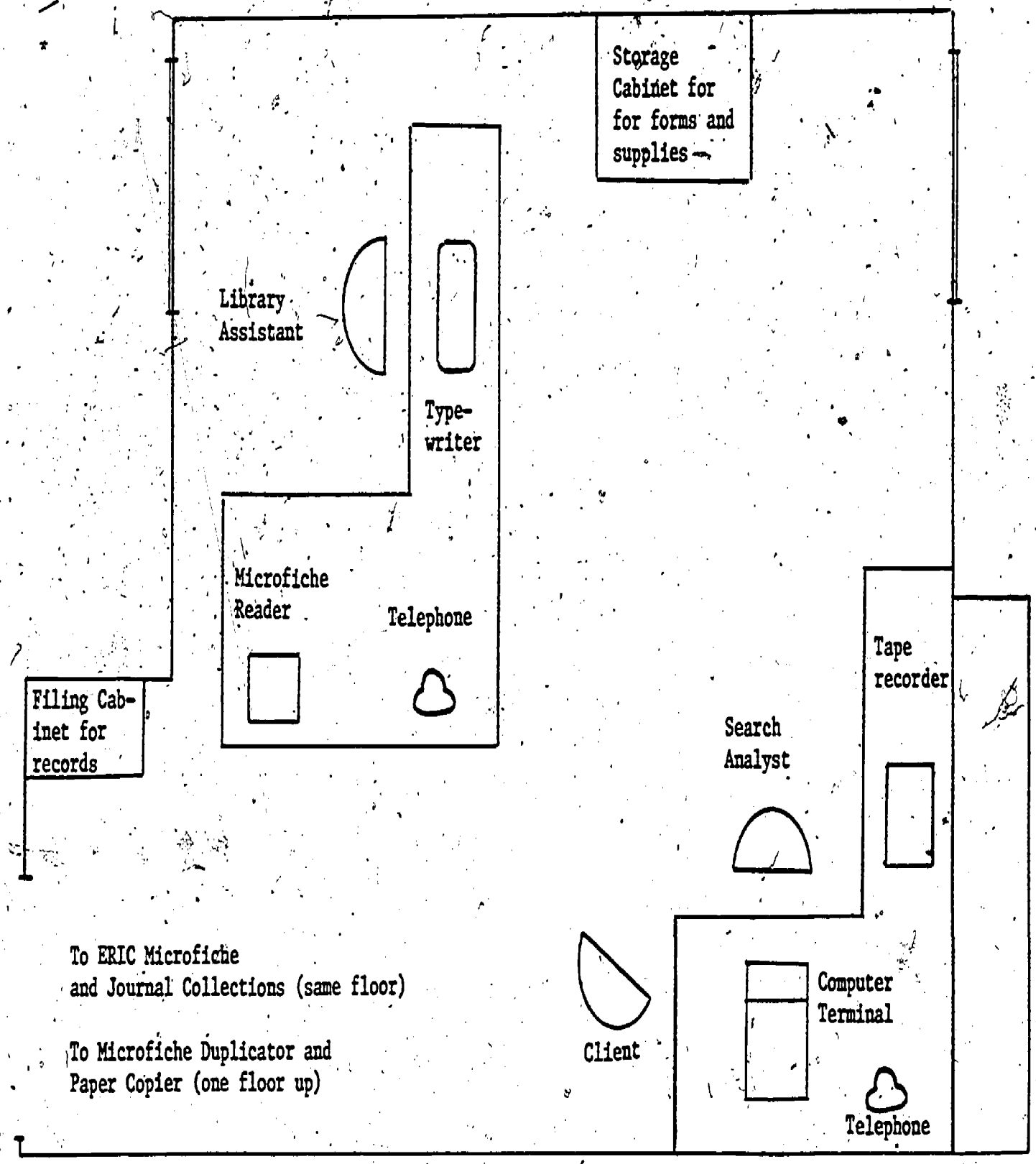
Search Number	Date of Search	Requestor	Amount
		TOTAL	

Accounting Distribution

Account Number	Amount
TOTAL	

Approved _____ (EISO) Date _____

Copies - OISE Budget Unit (1) white
EISO (1) white


Storage Cabinet for for forms and supplies
Library Assistant
Type-writer
Microfiche Reader
Telephone
Filing Cab-inet for records
Tape recorder
Search Analyst
To ERIC Microfiche and Journal Collections (same floor)
To Microfiche Duplicator and Paper Copier (one floor up)
Client
Computer Terminal
Telephone

APPENDIX P. Search Analyst

Position Summary:

Under direction of the Principal Investigators performs a variety of professional duties, but not limited to: providing automated bibliographic search service from the OISE/Library for Ontario school board officials, OISE staff, students, and field centres, administrators, consultants, and other professional educators, providing orientation to the search service for OISE staff, students, members of Ontario's educative society, members of government and professional associations, other search service users; preparing training materials in the techniques and use of automated bibliographic searching; scanning literature for current awareness; acting as liaison between search service and library and project staff and users; supervising Library Assistant.

Duties and Responsibilities:

50% 1. Provides automated bibliographic search service for Ontario school board officials, OISE staff, including field centres, students, other members of Ontario's educative society, members of government and professional associations by:

a) conducting in-depth reference interviews with users.
b) compiling search strategies to fill the requests.
c) operating computer terminal in interactive bibliographic searching.
d) maintaining explanatory correspondence with service's users.

10% 2. Provides orientation to OISE staff and students, other users on techniques of automated bibliographic searching and use of the search service.

10% 3. Prepares training materials in the techniques and use of automated bibliographic searching.

5% 4. Collects data on the service by accurate record-keeping.

5% 5. Suggests improved procedures and policies to Principal Investigators.

5% 6. Scans educational and related journals for current awareness.

5% 7. Acts as liaison between the service and Library staff, Principal Investigators, users.

5% 8. Monitors the operational efficiency of the commercial services used.

5% 9. Supervises Library Assistant working on the project.

Auxiliary Duties:

Attends project and professional meetings and performs other related duties as required.

Work Complexities:

A. Choice of Action:

Exercises professional judgment in compilation of search strategies to answer automated reference requests. Exercises professional judgment ensuring smooth-running efficiency of the search service.

B. Consequence of Error:

1. Errors in judgment in compilation of search strategies or failure to accurately interact with automated information could result in frustration and delay to educators and others, have a wide-ranging effect on Library, project, and Institute public relations throughout Ontario.

2. Errors in judgment in data collection could seriously undermine the accuracy and reliability of the data analysis of the project.

C. Difficulty:

1. Assessing the true needs of patrons submitting vaguely-worded enquiries.

2. Working as an integral part of both library and project staff.

3. Keeping abreast of latest developments in data base usage.

4. Working with numerous interruptions due to open plan of library facilities.

5. Patience and flexibility in overcoming difficulties associated with implementation of a new service.

D. Contacts:

Frequent contacts with Principal Investigators, OISE students and staff, school board officials, research assistants, non-OISE students and librarians, educational and professional associations, and field centre personnel, and government officials.

Supervision Received:

Direction

Supervision Exercised:

A. Number of employees supervised: Directly 1

B. Highest level supervised: Library Assistant

C. Nature of Supervision Exercised: General supervision

Equipment Used:

Microfiche reader/printer and duplicator
Photocopying machine
Computer terminal

Qualifications required:

A. Formal Education:
Accredited degree in Library Science

B. Experience:
Over two years professional experience

C. Manual Skill:
Ability to enter searches accurately at key-board terminal.

D. Other:
Knowledge of French an asset; good judgment, tact, analytical ability.
Knowledge of highly specialized educational literature and materials essential.

APPENDIX Q. Library Assistant

Position Summary:

Under general supervision, handles correspondence; types letters, reports, etc; duplicates articles and fiche; maintains files of records and correspondence; does billing and invoicing; compiles simple statistics for the project and the search service, codes data for statistical analysis.

Duties and Responsibilities:

5% 1. Receives in-coming telephone calls, answering queries when possible.

35% 2. Types all correspondence, reports, other items or materials as necessary, that are associated with the project and search service.

15% 3. Duplicates journal articles, fiche, etc., as required for the project and search service.

10% 4. Handles all in-coming and out-going mail associated with the project and search service.

5% 5. Maintains records and correspondence files of the project and search service.

10% 6. Responsible for all billing and invoicing associated with the search service.

10% 7. Codes data for statistical analysis.

10% 8. Compiles simple statistics and budgetary records associated with the project and search service.

Auxililiary Duties:

Attends meetings of project staff and performs other duties as required.

Work Complexities:

A. Choice of Action:

Exercises judgment in sorting mail, referring telephone calls. Sets work priorities for self.

B. Consequence of Error:

1. Inaccurate billing or invoicing can result in lost revenue, bad public relations.
2. Delay in duplicating can result in damage to optimum turn-around time of service.
3. Inaccurate record-keeping and coding can result in annoyance to project staff and lessen the reliability of the data required for analysis.

C. Difficulty:

1. Newness of service requires patience and tolerance until routines are established.
2. Sharing physical facilties with library staff requires tact, flexibility.

D. Contacts :

Frequent contact with library and project staff and with search service users. Occasional contact with staff in Dept. of Educational Administration.

Supervision Received:

General supervision received from Librarian II and Principal Investigators.

Equipment Used:

Calculator
Microfiche duplicator
Microfiche reader/printer
Photocopying machine
Typewriter

Qualifications Required:

A. Formal Education:
High School graduation

B. Experience:
One year as a Library Assistant I, or related experience preferred.

C. Manual Skill:
Accurate typing essential

D. Other:
Good judgment, accuracy, alertness for detail, conscientiousness, ability to withstand routine, ability to work under limited supervision.

ERIC, Information, and Change in Education: Selected Annotated Bibliography

Part A. Change and Innovation: Theory and Practice

Part B. ERIC and the Schools

Part C. Issues and Concerns in Information Handling

PART A: CHANGE AND INNOVATION: THEORY AND PRACTICE

Bennis, Warren G.; Benne, Kenneth D.; and Chin, Robert. The Planning of Change. 2nd ed. Toronto: Holt, Rinehart, and Winston, 1969.

Consisting of almost fifty articles, this volume presents a valuable overview of many aspects of the change process. It not only traces the historical roots of planned change, but also presents currently accepted theories and strategies for implementing change. It is one of the few texts that treats resistance, conflict and ethical dilemmas and goals involved in planning change. The emphasis is on using transactional, problem-solving techniques developed by organization development experts Sheldon Davis and Richard Beckhard.

Carlson, Richard O. Adoption of Educational Innovations. Eugene, Ore.: University of Oregon, Center for the Advanced Study of Educational Administration, 1967.

Carlson is concerned with explaining the factors that account for the varying rates of adoption and diffusion of educational innovations. His unit of analysis is the superintendent of the school system and the innovation he traces is modern math. By examining the characteristics of the adopting unit, the sources of information, and the position of the adopting unit in the social structure of similar units, he found that superintendents who adopted modern math early had greater involvement in social networks and a higher position in the status structure. They tend to seek advice more often from those higher than themselves in the status structure. Early adopters tend to be younger, have higher professional ratings, have shorter tenure in their present positions. New practices that were characterized by high relative advantage, compatibility, divisibility, and communicability and low complexity had faster rates of diffusion. The rate of diffusion for new math was five years.

Christie, Samuel G., and Scribner, Jay D. "A Social System Analysis of Innovation in Sixteen School Districts." Paper presented at the conference of the American Educational Research Association, Los Angeles, California, February 1969. (ED 029 369).

In the belief that the school-community should be viewed as a social system, the authors collected data from 65 board members, 16 superintendents, 16 principals, and 358 teachers in 16 southern California school districts. They developed two scales to measure the dependent variable, rate of adoption of educational innovations: the first to measure district adoption, the second to measure individual teacher adoption. Independent variables included were, among others, cosmopoliteness, opinion leadership on innovation, communication patterns. Multiple regression analysis was used to obtain results from data collected.

Farr, Richard. "Knowledge Linkers and the Flow of Educational Information." An Occasional Paper for ERIC at Stanford. Stanford, Calif.: Stanford University, ERIC Clearinghouse on Educational Media and Technology, 1969.

"The linking institution of tomorrow is no longer a single individual, no longer a salesman with a commercial ax to grind, no longer a nonentity in the educational information flow system. Educational linkers are being called upon to shape the educational future of this country. Why? Because they are really the only ones in a position to do it. They are central to the flow of information, in touch with those who need to know and those who can tell them. A linking institution is not to be a passive midpoint in the flow of educational knowledge, but rather an active force in sending to, and seeking from all those who make up the educational community." (p. 7). Farr presents a general discussion of the need for and role of the "knowledge linker" in education.

Fliegel, Frederick C., and Kivlin, Joseph E. "Attributes of Innovations as Factors in Diffusion." American Journal of Sociology 72 (November 1966): 235-48.

In attempting to generalize about the extent to which perceived attributes of innovations affect their adoption, the authors collected data on attributes of thirty-three farm practices from 229 farmers. They found that those innovations which were perceived as being the most rewarding and involving least risk were accepted soonest; high costs did not represent a deterrent. Little emphasis was placed by farmers on the potential cost recovery or savings in time but reliability in producing desired results repeatedly was an important positive factor of the innovative practices under consideration.

Havelock, Ronald G., et al. Planning for Innovation through Dissemination and Utilization of Knowledge. Ann Arbor, Mich.: University of Michigan, Institute for Social Research, Center for Research on Utilization of Scientific Knowledge, 1973.

"This report provides a framework for understanding the processes of innovation, dissemination, and knowledge utilization, and it reviews the relevant literature in education and other fields of practice within this framework. Dissemination and utilization (D & U) is viewed as a transfer of messages by various media between resource systems and users. Major sections analyze characteristics of individuals and organizations which inhibit or facilitate this transfer. The process is interpreted at four levels; the individual, the interpersonal, the organization, and the social system. Additional chapters deal specifically with specialized 'linking' roles between resource and user, types of messages, types of media, and phase models of the process." (Summary).

Havelock groups D & U models used by other authors according to their major viewpoints: (1) Research, Development, and Diffusion models, (2) Social Interaction models, and (3) Problem Solving models. He takes features from each of these to develop his "linkage model". He explains D & U phenomena using seven factors: linkage, structure, openness, capacity, reward, proximity, synergy. He concludes by suggesting needed research on D & U.

7 Katz, Elihu. "The Social Itinerary of Technical Change." The Planning of Change. 2nd ed. Edited by Warren G. Bennis, Kenneth D. Benne, and Robert Chin. Toronto: Holt, Rinehart, and Winston, 1969.

The landmark study by Bryce Ryan and Neal Gross, "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology 8 (March 1943): 15-24, is compared to the studies by Elihu Katz and Herbert Menzel tracing the adoption of a new drug. The time of initial adoption, the decisions that influenced adoption, and the social structure of the adopters were traced. The findings of both studies show that the rate of diffusion is represented by an S-curve; that informal sources "legitimate" decisions to adopt; that early adopters read more, travel more, have higher incomes, are better educated, and are younger than late adopters of innovations.

8 Katz, E.; Levin, M. L.; and Hamilton, H. "Traditions of Research on the Diffusion of Innovation." American Sociological Review 28 (1963): 237-52.

Defining diffusion as "the acceptance over time of some specific item-an idea of practice, by individuals, groups or other adopting units, linked to specific channels of communication, to a social structure, and to a given system of values, or culture," the authors present an overview of the contributions made to each of these elements in the diffusion process by studies in anthropology, education, sociology of mass communication, rural sociology, public health, and marketing. They suggest that "time" is the key factor in diffusion research and draw distinctions between first use and continued use of an innovation. They also point to the lack of research that examines all the elements of their definition and enumerate avenues of research they consider to be in need of exploration.

9 Marcum, R. Laverne. Organizational Climate and the Adoption of Educational Innovation. Washington, D.C.: Department of Health, Education, and Welfare, Bureau of Research, 1968. (ED 023 158).

In a study of thirty schools in five western states, if was found that the most innovative schools had open climates, higher expenditures per student, younger, more numerous, less experienced staff. Includes a copy of the Organizational Climate Description Questionnaire developed by Andrew W. Halpin and Don B. Croff.

10 Marker, Gerald W., and Mehlinger, Howard D. Report of the Social Studies Field Agent Training Program. Final Report. Bloomington, Ind.: Indiana University Foundation, 1972. (ED 076 463).

The primary goal of the program was to test the feasibility of employing specially trained social studies teachers to increase the rate of diffusion of innovations in their subject area. The recruitment and training program are described. The personalities of the field agents, the degree of local commitment to change, and follow-up support for field agents are identified as key variables in the success of inside change agents.

11 Michigan. State Board of Education. A Study of the Diffusion Process of Vocational Education Innovations. Lansing, Mich.: State Board of Education, 1967. (ED 011 297).

In attempting to shorten the time lag between research discoveries and adoption of innovations in vocational education, 600 Michigan high schools were surveyed. Each of four vocational areas-agricultural, business, home economics, and trade and industrial education-was asked to identify five innovative practices. Data was collected on the time of adoption of these practices, sources that influenced adoption, visitation and communication networks, practices observed in other schools. Questionnaires are included.

12 Miles, Matthew B. "Educational Innovation: The Nature of the Problem." Innovation in Education. Edited by Matthew B. Miles. New York: Teachers College Press, 1964.

In the first chapter of this anthology of readings, the author describes the climate for innovation in the U.S. in the sixties, provides causative factors, underlines the need for further enquiry. He reviews a wide range of innovations, explains strategies used to promote the adoption of innovations and mentions as yet unexplored areas of the field in need of research. He identifies four stages which occur prior to the adoption of an innovation by a target system: design (of innovation), awareness-interest, evaluation, and trial. The strategy for adopting an innovation may be initiated by the target system, or by an outside system, and may involve the use of existing structures or the creation of new ones. He gives examples of each of the possible sixteen combinations that result from these variables.

13 Miles, Matthew B., ed. Innovation in Education. New York: Teachers College Press, 1964.

Resulting from a seminar series held during 1960 at the Horace Mann-Lincoln Institute, this volume presents an overview of the title's topic by some of the major contributors to the field: Rogers, Mort, Carlson, Miles. Divided into three parts, it presents case studies, research and theories, and characteristic features of the American educational system as they relate to educational innovation.

14 Miller, Donald P. Planned Change in Education. Washington, D.C.: Department of Health, Education, and Welfare, 1968. (ED 022 250).

This document presents a synthesis of ideas from various areas of the behavioral sciences to prepare educational planners in California to effect planned change. The variables affecting the change process such as the need for collaborative efforts between researchers, teachers, and school administrators; the forces that affect an individual's degree of involvement in the process of adoption i.e. (1) sense of security, (2) dominant values, (3) mental ability and conceptual skill, (4) social status, (5) cosmopoliteness, (6) opinion-leadership ability; the process of adoption itself from awareness, interest and evaluation, through to trial and adoption; the role of the change agent; the importance of group dynamics and communication networks are all outlined and drawn together in a model for implementation of innovations in educational practice.

15 Mort, Paul R. "Studies in Educational Innovation From the Institute of Administrative Research: An Overview." Innovation in Education. Edited by Matthew B. Miles. New York: Teachers College Press, 1964.

Mort and his students at the Institute of Administrative Research at Columbia carried out over 200 studies between the 1930's and late 1950's on the adaptability of public school systems and the adaptability process. Among their now-famous findings were that, typically, fifty years elapse between the recognition of a need by a school system and the adoption of a means of meeting that need. The diffusion process takes another fifty years. Innovative school systems were shown to have supportive administrators, highly trained teachers, high community expectations and financial support. D. H. Ross in Administration for Adaptability (New York: Metropolitan School Study Council, 1958) analyzed most of the studies and organized them into those that described what happened in the adaptation process, those that treated the influences on the adaptability of school systems, and those that described the characteristics of the adapters.

16 Mort, Paul R., and Cornell, Francis G. Adaptability of Public School Systems. New York: Columbia University, Teachers College, 1938.

A school system's "adaptability" is defined as its capacity to reject outmoded practices and to take on new ones to meet its new needs. Its ability to do this is governed by the nature of the environment, the structure of the school system, and the agencies and methods used in the adaptation process. Mort develops hypotheses that relate to each of these areas. This volume is one of the earliest to formulate and insist on the importance of hosts of variables in examining the adoption process and as such traced the path that much later research was to follow. A major portion of the work deals with the positive relation of average expenditure per pupil to the degree of adaptability of the school system.

17 National Seminar on the Diffusion of New Instructional Materials and Practices, Racine, Wisconsin, June 1-3, 1973. Boulder, Colo.: Social Science Education Consortium, 1973. (ED 083 111 - 083 116).

This series of working papers offers general observations on the diffusion process for developers, users, participants in dissemination and implementation activities; describes characteristics of subject matters and developers that tend to encourage or inhibit ideas or products; identifies characteristics of schools that discourage or encourage the introduction and use of new ideas; and outlines the role of communication mechanisms within the diffusion system that facilitate or hinder diffusion of innovations.

18 Rogers, Everett M. "What Are Innovators Like?" Seminar on Change Processes in the Public Schools. Eugene, Ore.: University of Oregon, Center for the Advanced Study of Educational Administration, 1965.

"Innovators are the first members of a social system to adopt new ideas." (p. 55). That is, innovators are among the first 2.5 per cent to adopt a new practice. Generally, they tend to be young, have relatively high social status, rely on impersonal and cosmopolite sources of information. They travel widely, exert opinion leadership, and see themselves (and are seen by their peers) as deviants. Innovative school systems are usually found in affluent areas where the community desires an effective education for its children. Systems may encourage change through choosing teachers with the desired social characteristics, by exposing teachers to educational innovations at conferences and workshops, by utilizing change agents.

19 Rogers, Everett M., and Shoemaker, F. Floyd. Communication of Innovations: A Cross-Cultural Approach. 2nd ed. New York: Free Press, 1971.

The authors have analyzed and synthesized over 1,500 research studies on the adoption and diffusion of innovations. They summarize the various research traditions and then treat selected major concepts found in the literature: the innovation-decision process, the relation of attributes of innovations to their rate of adoption, adopter categories, opinion leadership, the characteristics and role of the change agent, communication channels. They point out the shortcomings of existing studies and call attention to areas requiring further research. The generalizations contained in the book are listed at the end with examples of empirical diffusion studies that do and do not support each. Complete citations are given for the many studies.

20 Watson, Goodwin. "Resistance to Change." The Planning of Change. 2nd ed. Edited by Warren G. Bennis, Kenneth D. Benne, and Robert Chin. Toronto: Holt, Rinehart, and Winston, 1969.

Having described the typical life-cycle of an innovation, Watson identifies those forces in the individual and in the organization that constitute resistance to change. He views men as possessing an inner stabilizing force that acts as a regulatory mechanism. Habit, primacy, selective perception and retention, dependence, superego, self-distrust, insecurity and regression provide further obstacles to change in the individual. Social systems develop corresponding resistance traits. Reasons for resistance include conformity to norms, systemic and cultural coherence, vested interests, the sacrosanct, and rejection of "outsiders". He concludes that to be successfully adopted change must be supported by top officials; it must be seen as necessary, non-threatening. Participants must have opportunities for feedback and revision, and they must have trust and confidence in each other.

21 Woods, Thomas E. The Administration of Educational Innovation. Eugene, Ore.: University of Oregon, Bureau of Educational Research and Service, 1967. (ED 067 768).

In order for the superintendent of schools to implement effective programs of change, he must be aware of the various phenomena associated with change processes. Woods summarizes findings of behavioral science treating characteristics of innovation, adoption, and diffusion.

PART B: ERIC AND THE SCHOOLS

22 Bruett, Mary Jo. Iowa Network for Obtaining Resource Materials for Schools (INFORMS), Activities Manual: Operational and Promotional. Des Moines, Iowa: Iowa State Department of Public Instruction, September 1972. (ED 069 305).

Operated by the Iowa State Department of Public Instruction, Project INFORMS is an ERIC information retrieval service for the state's school districts. This manual was compiled to assist project personnel in identifying their roles, in gaining familiarity with the operational requirements of the project, in devising effective promotional activities. Examples of evaluation and field agent reports are included.

23 Cutter, Virginia M. Dissemination Policies, Procedure, and Programs of Nine State Education Agencies. Washington, D.C., January 1974. (ED 090 967).

The state programs concerned with bringing ERIC to the schools on a significant scale are the following: 1) The Florida Department of Education has a set of the ERIC fiche, 30,000 indexed resumes of journal articles, 6,000 books, newspaper clippings, and subscriptions to 300 journals listed in CIJE. It serves DOE staff, teachers and administrators of school districts, junior colleges and state universities through a network of sixty-six satellite centers located in colleges, universities and area technical-vocational centers that each has a trained information consultant, a limited collection of ERIC fiche, and readers. FERIC responds to about 150 searches a month and supplies in addition to bibliographic information, microfiche, hardcopy (on loan), and copies of articles. 2) In Illinois, the Superintendent of Public Instruction has established five instructional materials centers for special education funded by state and federal grants. The central IMC in the OSPI has, among other materials, an ERIC collection and responds to approximately ten requests a week sending ERIC hardcopy, books, and abstracts. 3) The Iowa Network for Obtaining Resource Materials for Schools (Project INFORMS) is federally funded but housed in and administered by the state's Department of Public Instruction. Services are provided through volunteer field agents in eleven of the state's Regional Education Service Agencies. Resources available to teachers through INFORMS include documents in the ERIC system, articles listed in CIJE, packets from the series Putting Research into Educational Practice (PREP), names of consultants, lists of promising educational practices in Iowa. Over a thousand requests were answered in 1972 ranging from computer searches to location of an article. The field agents, appointed by the county superintendent and trained in their linking roles by the Far West Laboratory follow-up requests to assist the patron to make maximum use of the packet and to determine the effectiveness of the response. They serve as contacts for local school people, negotiate the information question, forward it to central

INFORMS at the Department of Public Instruction and provide follow-up. Although the agents at first regarded their role as a burden, they now view themselves as a service. 4) Montana subscribes to the search service provided by Northern Colorado's Board of Cooperative Services. The main users are administrative staff of the Department of Public Instruction and even this use is limited. The service is not advertized since it is felt that lack of information linkers to negotiate the question with the user and to specify the need to BOCS severely reduces the usefulness of the information received. 5) New York State's use of ERIC varies with the specific program of each of the forty-seven Boards of Cooperative Educational Services (BOCES). BOCES are agencies headed by a district superintendent which function as change agents for the State Education Department. The Education Department has also created an Educational Programs and Studies Information Service (EPSIS) located near the education section of the State Library. EPSIS provides local educators and BOCES staffs with an ERIC search service using the "Biomedical System" of the State University of New York. The extension of the service was being planned when this report was compiled. 6) North Carolina's Research and Information Center provides ERIC computer searches at a fee of $20 to $25 for local school officials and state department of education personnel. For local education agencies the RIC will reproduce journal articles, send up to twenty microfiche at no charge, develop a bibliography, and include the name of a person who may supply additional information. 7) Pennsylvania's information needs are met through Research and Information Services for Education (RISE). This statewide project serves the state's twenty-nine intermediate units by training a staff member of the IU as a resource utilization specialist (RUS) who transmits requests for information from schools to RISE, supplies fiche readers where necessary, and delivers and interprets information packets. In answer to requests, RISE supplies an ERIC bibliography and original documents in hardcopy or microfiche.

24 Havelock, Mary C., and Havelock, Ronald G. Project LINKER. Case Study of the Merrimack Education Center. Local Information Network of Knowledge for Educational Renewal (LINKER). Final Report. Chelmsford, Mass.: Merrimack Education Center, 1974. (ED 094 728).

The Merrimack Education Center was established "to bridge the gap between theory and practice in education." Founded in 1968, it serves twenty school districts with 85,000 students and 6,000 staff. It provides in-service training on specific topics for educators, sponsors conferences, acts as a broker in providing consultants for school boards. These and its other programs are supported by an information service that relies heavily on the ERIC library. The Center sells yearly subscriptions to boards that include a viewer, 200 microfiche, and sets of Research in Education. This method allows the board to enter the cost for the service as one line item in its library budget without any capital outlay. From having its initial budget of $85,000 totally funded by the

federal government, the Center has, largely because of these ERIC subscriptions and other products and services, evolved to a position where the school boards pay 50% of its current $300,000 annual budget. Budget for information activities specifically amounts to $68,000 per annum, of which $18,000 is paid for by local users. In addition to three part time field agents, there are twenty "gatekeepers" (principal, teacher, or librarian) trained by the agent in the use of information systems, ERIC in particular. The gatekeepers translate teacher requests for information into requests to the Center for specific documents or for computer searches on specific descriptors. The Center uses the Mitre Corporation for automated ERIC searches. Cost of subscriptions are $275 for new subscriptions, $150 for renewals, $485 to other schools and organizations outside the project. The authors describe in detail the linkage operation and how it conforms to and differs from Havelock's other writings.

Related document ED 094 729 by Richard Lavin, Executive Director of the Merrimack Education Center describes his concept of "linkage".

25 Havelock, Ronald G., et al. Educational Innovation in the United States. 2 vols. Ann Arbor, Mich.: University of Michigan, Center for Research on Utilization of Scientific Information, 1973. (ED 091 865).

As part of a study to determine the feasibility of doing a national survey of innovations in schools, the authors attempted to assess the use of external and internal resources which might be used in the promoting, adopting, or implementing of innovations. Other teachers were cited by 44% of the 315 representative school districts while ERIC was used by 9%. The research data was collected in 1970-71. Among the barriers to innovations that are identified are linkage, structure, openness, capacity, reward, and synergy.

26 Lindsay, Kenneth P. Utah's Pilot State Dissemination Program. Final Report. Salt Lake City, Utah: State Board of Education, May 1973. (ED 078 858).

The Utah Technical Assistance Project through the Technical Assistance Reference Center performed almost 1,800 batch ERIC searches in 1972, circulated 2,800 fiche, duplicated 219 fiche and disseminated information through 52 district agents to local educators. The agents were chosen by local school system superintendents, trained by Center staff in conjunction with the Far West Laboratory (the ERIC Training package is described by ED 069 327) to take requests from their local educators and relay them to the Center and to evaluate the Center's services through case studies. The estimated budget for the project for 1973 was $246,955. Case studies questionnaires, evaluations are included.

27 McCleary, William H. Information Retrieval Center of the Northern Colorado Educational Board of Cooperative Services. Final Report, F.Y. 1971-72. Boulder, Colo.: Information Retrieval Center, August 1972. (ED 067 134).

The Northern Colorado Educational Board of Cooperative Services (NCEBOCS) Information Retrieval Center provides computerized ERIC searches to Colorado, Utah, Oregon, South Dakota, Washington, Wyoming, Idaho, North Dakota, Kansas and Montana. In addition to ERIC bibliographies and fiche, the Center provides Packets of Educational Topics (PET), a Catalog of Computerized Searches (CAT), Current Awareness Profiles (CAP), and Searches in Depth (SID). The Center searches its own ERIC tapes in response to approximately 1,000 requests for automated searches received per month. September, October, and November are the busiest months and educational administrators are the heaviest users (superintendents, principals, consultants) followed by teachers. Researchers and graduate students requested a tenth as many searches. Volume at the Center grew from 1,435 ERIC requests filled in 1970 to 6,535 filled in 1972. Of the evaluations returned, 56% of users felt the computerized abstracts were relevant to their requests, 73% of users receiving manual searches were satisfied. The author concludes that the key to successful retrieval is for the retrieval staff to thoroughly understand the request and to interpret it as precisely as possible. Includes workshop agendas, training materials for users.

28 Research and Information Services for Education. "RISE." King of Prussia, Pa., 1974. (Mimeographed).

Formed in 1972 and funded by state and federal agencies, RISE is an educational information agency sponsored jointly by the Montgomery County Intermediate Unit and the Pennsylvania Department of Education. Among other types of information, it provides on-line computer searches of the ERIC data base free to schools of the MCIU and to the Bureau of Planning and Evaluation of the Pennsylvania Department of Education. Of the twenty-nine Intermediate Units in the state, RISE has trained Resource Utilization Specialists who act as intermediaries in twenty-five. Costs for searches depend on type of search and category of user but $25 is average. Journal articles are supplied at 10¢ per copied page, and microfiche duplicated at 25¢ per fiche.

29 Robinson, Erika L. An Analysis of the Impact of the Research Utilization Project on Principals' Attitudes and on the Use of Information Services by Teachers and Other Field Personnel in 16 Target Elementary Schools of the District of Columbia. Washington, D.C.: Office of Planning, Research and Evaluation, Departments of Research and Evaluation, 1973. (ED 086 177).

The Research Information Center of the District of Columbia Public Schools collects and disseminates information including ERIC on educational research and innovations. A project using agents to increase awareness of the center's services was undertaken. In analyzing the

Impact of RUP, several hypotheses were confirmed: that target schools requested more searches than non-target schools; that use of educational extension agents increases participation and satisfaction of users; that more searches were performed during the project period than before it. The author recommends the extension agent concept "as a model for the development of a system-wide dissemination system."

30 Schalock, H. Del, et al. The Oregon Studies in Educational Research, Development, Diffusion and Evaluation. 5 vols. Monmouth, Ore.: Oregon State System of Higher Education, Teaching Research Division, 1972. (ED 066 837 - 066 844).

Because of the lack of information on development, diffusion, and evaluation activities as they related to education, and because of the scarcity of data regarding the best methods for training personnel for these areas, the USOE in 1970 sponsored the Oregon Studies. Volume I consists of a Summary Report; Volume II: The Literature of Educational RDD & E (not available on fiche); Volume III: Conceptual Frameworks for Viewing Educational RDD & E; Volume IV: Profiles of Exemplary Projects in Educational RDD & E; Volume V: A Methodology for the Study of Educational RDD & E. Volume IV, Case Profile No. 18 presents an overview of that part of ERIC from January 1970 to November 1972 operated by Leasco in the context of a model diffusion project.

31 Sieber, Sam D.; Louis, Karen Seashore; Metzger, Loya. The Use of Educational Knowledge. 2 vols. New York: Columbia University, Bureau of Applied Social Research, 1972. (ED 065 739 - 065 740).

The Pilot State Dissemination program described was the first large-scale attempt to bring the resources of ERIC to local teachers and administrators. Three states with mainly rural and small town populations were chosen. Two extension agents were utilized full-time in two of the states, and three in the third to help clients in target areas identify their needs, to relay their needs to the retrieval center, to return and interpret information to the client, and to consider its applicability and steps for possible implementation. Volume I describes the goals of the program, the roles of the field agent in education, the information retrieval process, organizational issues, training of project staff, outcomes of the program, and recommendations. Volume II is composed of the case studies of the three states. Extensive appendices include numerous examples of forms used for data collection.

32 Timbie, M., and Coombs, D. An Interactive Information Retrieval System: Case Studies on the Use of Dialog to Search the ERIC Document File. Stanford, Calif.: Stanford University, Institute for Communications Research, 1969. (ED 034 431).

Describes user evaluation study of on-line computer searching of ERIC document file using Dialog; describes Dialog, search procedure, subject population, operating procedures; presents results of nine case studies discussing system usefulness, ease of use, advantages of interacting with search; presents results of nineteen later evaluations by visitors to the system; discusses further uses of system over a period of several months; appendix includes evaluation materials, protocols.

33 Wilder, Dolores J., ed. Tennessee Information Retrieval and Dissemination System for Vocational Education. Final Report. (July 1, 1970-June 30, 1971). Knoxville, Tenn.: Tennessee Occupational Research and Development Coordinating Unit, 1971. (ED 056 215).

The Tennessee Research Co-ordinating Unit (a Unit of the State Division of Vocational-Technical Education and the College of Education, University of Tennessee) searches the ERIC tapes using the "Query" program. The service may be used by anyone in the state working in the field of education. Users are provided with a computer-printout bibliography and microfiche of original documents at 10¢ per copy. Each search costs $15. The RCU established thirteen "Regional Resource Centers" in 1970 which contain partial ERIC files, a reader-printer, and indexes. They serve as the contact point between the RCU at Knoxville and the local user. During an October to June nine-month period, 4,526 microfiche titles were disseminated to 575 users. The total budget for one year was $38, 250. A user-satisfaction questionnaire and its results are included as are workshop agendas and information materials.

34 Wolf, W. C., Jr., and Fiorino, A. John. A Study of Educational Knowledge Diffusion and Utilization. Amherst, Mass.: University of Massachusetts, 1972. (ED 061 772).

The authors feel that there is a need for "baseline data pertaining to the educational knowledge diffusion and utilization process." To supply this information, their study examined the extent to which 600 teachers, supervisors and administrators, and teacher educators have adopted, planned to adopt or failed to adopt innovations within a one year period; the influences of recognized diffusion agents upon the adoption of innovations; characteristics of selected target audiences in relation to the adoption of innovations; relationships between five stages of innovation adoption reported by Rogers, Lionberger, and others, and the adoption process described by randomly selected educators. ERIC was one of the innovations studied. Interview questionnaires are included and criteria of computer programs to analyze the data are described briefly.

35 Borman, Lorraine, and Mittman, Benjamin. "Interactive Search of Bibliographic Data Bases in an Academic Environment." Journal of the American Society for Information Science 23 (May-June 1972): 164-71.

The authors relate their experiences in attempting to attract appropriate research faculty and students of Northwestern University to use on-line data bases in physics and astronomy. Faculty refused to use the system without a librarian to negotiate their requests and even then their use was minimal. Student use, on the other hand, was enthusiastic. The authors attribute this difference to the classroom environment which encourages the student to learn and be receptive to new processes while the research worker's success is dependent on his previously established modes of behavior.

36 Brickley, Richard R., and Trohoski, Carolyn V. The Evaluation of Educational Information Centers. TM Report 34. Princeton, N.J.: ERIC Clearinghouse on Tests, Measurement, & Evaluation, 1974.

The authors distinguish between different kinds of information services and the issues involved in evaluating information activities. They differentiate between the various component parts of an educational information center-user needs, information resources (data bases), question negotiation (search and retrieval), impact and utilization, cost effectiveness-and analyze recent evaluative efforts in these areas. A copy of the RISE literature search evaluation is included.

37 Christ, C. W., Jr. "Microfiche: A Study of User Attitudes and Reading Habits." Journal of the American Society for Information Science 23 (January-February 1972): 30-35.

The Libraries and Information System Center of Bell Telephone Laboratories conducted a study to determine whether their scientists and engineers would accept microfiche as an alternative to paper for distribution of their technical reports and to determine whether this change in format effected the reading habits of this group. At the end of a nine month period, 55% of the participants agreed to continue receiving their reports on fiche. They cited suitability for scanning and ease of storage as factors contributing to their positive response. Lack of readers and poor quality of fiche and readers were criticisms most often cited. The reading habits of the recipients underwent subtle changes as a result of receiving their reports in fiche format: they tended to "batch" or gather fiche to scan several at a sitting and they read more at the office and less at home.

38 Cleverdon, C. W. "User Evaluation of Information Retrieval Systems." Journal of Documentation 30 (June 1974): 170-80.

It is the author's contention that most evaluations done of information retrieval systems are strongly management-oriented. They are concerned with methods of improving performance and reducing costs but rarely consider the real needs of the users and their degree of satisfaction with the service they are receiving. Therefore the criteria of precision and recall which measure the performance of a system must be replaced by measures that determine the value or usefulness of the system to the user. These should determine the extent to which users' needs are being met by the system, the reasons they are not being met, the cost-effectiveness of searches made by users themselves or by users via intermediaries, the effect on the rate of usage of charging for searches. He proposes a five-stage model that he feels can provide data that will be relevant in tackling these concerns.

39 Cooper, Michael D. "A Cost Model for Evaluating Information Retrieval Systems." Journal of the American Society for Information Science 23 (September-October 1972): 306-12.

A mathematical model was developed to provide a method of comparing costs between different information retrieval systems. The model divides the total costs of the retrieval operation into those incurred by the user and those incurred by the system. For each of these components, pre-search, search, and post-search activities costs are analyzed. The system allows separate cost allocations to the user and to the system and suggests that there is a "trade-off between the degree of generality or specificity required in the search and the cost and benefit of conducting it."

40 Deats, Tom. "Moving and Using Information." Teachers College Record 75 (February 1974): 383-93.

The author feels that ERIC's failure to be widely used by American educators has been largely (and wrongly) attributed to a failure in communication. The basic underlying assumption (equally incorrect) has been that increased knowledge of the information system among educators would mean its greater utilization. The author believes that the problem is not one of creating greater awareness but of failing to "take into account the ways in which people in a given community talk about what is important to them in that community context." The educator must feel the system is useful and relevant to him-a slow process not likely to be influenced by mass promotional campaigns. The ERIC people must start with the user's perceptions and needs and not attempt to thrust a finished product upon the consumer.

41 DeGennaro, Richard. "Providing Bibliographic Services From Machine-Readable Data Bases - The Library's Role." Journal of Library Automation 6 (December 1973): 215-22.

The libraries of the future will act as information brokers meeting the needs of their patrons through access to centrally maintained, commercially available data bases. Contrary to the popular view at this time, they will not subscribe to the data tapes themselves for they will recognize that the costs involved are not limited to the subscription fee for tapes but involve computer programs to manipulate and access the tapes, and administrative and marketing costs to acquire users. The costs for providing on-line access to bibliographic information will have to be borne by the user since it is unlikely that library budgets will increase and some mechanism for controlling unlimited usage will be necessary. While special units within libraries may be necessary to handle these new data services at the present time, in the future access will be provided as a normal service by reference librarians.

42 Elman, Stanley A. "Cost Comparison of Manual and On-Line Computerized Literature Searching." Special Libraries 66 (January 1975): 12-18.

The formula $C_{TOTAL} = (T \times C_{SUM}) + P$ was devised to represent the total cost of completing an on-line literature search. The total cost is arrived at by multiplying the on-line time in minutes, T, times the sum of all costs per minute of operation (including computer-connect time, labor, telephone hook-up charges, and terminal leasing) and adding the cost, P, of off-line printed citations. The average cost of 66 computer-aided literature searches via the Dialog on-line information retrieval system operated at Lockheed-California Company Library was $47.00. The average manual search cost $250.00. Time required for the automated search averaged 45 minutes, for the manual search, 22 hours.

43 Fry, Bernard M. Evaluation Study of ERIC Products and Services. 4 vols. Bloomington, Ind.: Indiana University Graduate Library School, 1972. (ED 060 922 - 060 926).

A large-scale evaluation of the ERIC system was made over an eighteen month period by faculty and graduate students at Indiana University. Data from 2,500 questionnaires supplemented by interviews were collected and analyzed. It was shown that users judged the ERIC system very favorably: nine out of ten users felt they obtained information they would not have obtained otherwise; seven out of ten said the information obtained resulted in improvements in the way they did things; more than half reported that ERIC had prevented them from duplicating efforts. Reasons for using ERIC publications included keeping abreast

in a field, research projects, program improvement, assignments and term papers, and curriculum development. Educational practitioners constituted the largest single group of users. Most users learnt about ERIC through classroom instruction and colleagues.

44 Katzer, Jeffrey. "The Development of a Semantic Differential to Assess Users' Attitudes Towards An On-Line Interactive Reference Retrieval System." Journal of the American Society for Information Science 23 (March-April 1972): 122-28.

A semantic differential is an instrument used to measure attitudes. It consists of a series of bipolar adjective scales on which the respondent reacts. Such a scale was developed to measure users' reactions and attitudes to an experimental interactive retrieval system providing free searches to Psychological Abstracts through SUPARS (Syracuse University Psychological Abstracts Retrieval Service). Seventy-one users completed 19 adjective scales describing 20 concepts. "The correlations among the scales were factor analyzed. Three independent dimensions were identified. Factor I was labeled 'evaluative-specific' and accounted for over 23% of the total variance. Factor II was called 'desirability'; it accounted for over 17% of the total variance. And, Factor III, entitled 'enormity' accounted for over 10% of the total variance." (p. 122). A replication of this study is described in JASIS 24 (July-August 1973): 307-308.

45 Kuehl, Philip G. "Marketing Perspectives for 'ERIC-Like' Information Systems." Journal of the American Society for Information Science 23 (November-December 1972): 359-64.

"ERIC-Like" information systems conform to the business functions that are characteristic of private enterprise: they generate revenue, they produce and market a product. Therefore, to maximize their effectiveness, the author feels these systems should recognize that they are in the marketing field and utilize basic marketing concepts to increase their effectiveness. They should therefore direct their efforts toward identifying user wants and needs and developing products that satisfy these needs. The product developed out of user suggestions would then be much more readily marketable since it would virtually sell itself. Specific marketing techniques that the information scientist should be familiar with are consumer behavior research, channels of distribution, organization theory, and market segmentation analysis.

46 Lancaster, F. W. "MEDLARS: Report on the Evaluation of Its Operating Efficiency." American Documentation 20 (April 1969): 119-42.

A comprehensive evaluation of the Medical Literature Analysis and Retrieval System (MEDLARS) operated by the National Library of Medicine was conducted in 1966-67. The search requests submitted by scientists and doctors over a twelve month period were analyzed to evaluate the operating efficiency of MEDLARS. The requirements of the users were assumed to be the coverage of the useful literature on a given topic indexed in the system, the ability of the system to retrieve documents, i.e. its "recall power", the ability of the system to yield only relevant documents, i.e. its "precision power", the time required to respond to a request, the format of the search results, and the effort the user had to expend for a successful result. The findings indicated that the system was operating at 57.7% recall and 50.4% precision. The sources of failure accounting for these low rates were found to be lack of specificity and exhaustivity of the indexing language, searching errors due to use of inappropriate terms or defective search logic, deficiencies owing to inadequately formulated requests by the user. Among the suggestions for improvement are that the user submit a statement in narrative form-not in what he believes to be search strategy-of what he is looking for and the purpose of the search.

47 Lancaster, F. W., and Climenson, W. D. "Evaluating the Economic Efficiency of a Document Retrieval System." Journal of Documentation 24 (March 1968): 16-40.

The authors separate the criteria used to measure the efficiency of a retrieval system into those that are user-oriented and those that are management-oriented. Those characteristics that signify the operating efficiency of the system to the user are its coverage, usability, recall, precision, response, presentation, and user effort required. These factors must be weighed against the need of management for economic efficiency. The break-even points, trade-off factors, and diminishing returns are considered in relation to the various component parts of the whole retrieval system: acquisition, indexing, index language, searching, and equipment. In the final analysis, however, the authors feel that the question to answer is not whether a system is operating efficiently but whether it is worthwhile. They suggest that this worth may be arrived at by measuring what users are willing to pay for it and what beneficial influence it has on decision-making.

48 Marron, Harvey, and Sullivan, Patricia. "Information Dissemination in Education: A Status Report." College and Research Libraries 32 (July 1971): 286-94.

The authors give an overview of the quantity of information produced in education and the efforts made to control and disseminate it. They treat both primary publications and secondary services, as well as reviews and summaries of the literature, on-going research and development, and new techniques available. They chart major indexing and abstracting services of special interest to educators, and list their fields of interest, availability, coverage, cost, and source.

49 Mathies, M. Lorraine, and Watson, Peter G. Computer-Based Reference Service. Chicago: American Library Association, 1973.

Intended as a text on the potential of computers for reference librarians, this volume uses ERIC as an example of a model information system. The flow of information through Research in Education, document processing, vocabulary development and control, and indexing methods used by ERIC are all described. The principles and strategies of computer searching using binary numeration and Boolean logic are outlined. Examples of profile forms, typical searches and other machine readable data bases are included.

50 Paisley, William. "Improving a Field-based "ERIC-Like" Information System." Journal of the American Society for Information Science 22 (November-December 1971): 399-408.

The ERIC system is criticized because it has not succeeded in bringing the educational knowledge base to the practitioner. To overcome this fault, the author suggests that the concept of an educational extension agent be implemented and that continuing education programs be conducted. He recommends that ERIC abandon the short abstract format of Research in Education in favor of a longer abstract on the APA model that would act as a document surrogate, that microfiche be abandoned in favor of full-size photocopies of the original document, and that information analysis products compiled on an ad hoc basis give way to a continuing review and synthesis of current documents. He feels that the information analysis activities of the clearinghouses should be separated from the on-site user services and that all document-processing operations should be centralized rather than geographically dispersed.

51 Penner, Rudolph J. "The Practice of Charging Users for Information Services: A State of the Art Report." Journal of the American Society for Information Science 21 (January-February 1970): 67-74.

Charging users for information services has not yet become a common practice among libraries. The attitudes of society may partly account for this situation but the inability of libraries to arrive at a sound basis for charges is also a significant factor. The author surveyed the literature for articles on charging systems and cost-accounting for in-house information services. Since he found very little he next tried to discover articles on any known costs for providing information. He constructed a chronological table, 1959-1968, listing twenty-two separate information-related operations, their costs as reported by their authors, and the source where they were reported. He concludes that centers are reluctant to report their costs and charges, that librarians either do not know or do not want to know the costs of their systems, that large operating centers are most capable of running their operations in a businesslike manner.

52 Stern, Louis W.; Craig, C. Samuel; LaGreca, Anthony J.; and Lazorick, Gerald J. "Promotion of Information Services: An Evaluation of Alternative Approaches." Journal of the American Society for Information Science 24 (May-June 1973): 171-79.

Three promotional programs to gain users for the selective dissemination of information (SDI) services of the Mechanized Information Center at Ohio State University were designed and evaluated. Methods used were opinion leadership, "blitz", and telephone solicitation. For each method data was collected to show the level of market penetration achieved; the level of user satisfaction generated; the influence of the program components employed (letter, telephone call, brochure, visit); the cost effectiveness. Results showed that "blitz" and telephone solicitation programs achieved greatest market penetration; there were no significant effects of program on user satisfaction; a personal visit from the information specialist was the most effective in converting a potential user into an actual one; the "blitz" program was the cheapest followed closely by the telephone solicitation. Tables showing details of costs for each method and the instrument administered to measure user satisfaction are included.

53 Summit, Roger K. "DIALOG and the User - An Evaluation of the User Interface With A Major On-Line Retrieval System." Interactive Bibliographic Search: The User/Computer Interface. Edited by Donald E. Walker. Montvale, N.J.: AFIPS Press, 1971.

DIALOG refers to the on-line information retrieval system developed by the Lockheed Palo Alto Research Laboratory. Originally used to retrieve NASA documents in 1967, it has evolved into one of the two

most widely used systems to retrieve ERIC materials, the other being System Development Corporation's Orbit II. Summit describes the design characteristics of DIALOG by following the basic steps of a computer search. He concludes by presenting the results of an extensive evaluation of the system. The DIALOG features that impressed users most were its speed and its ability to suggest other relevant areas of information or alternate ways of finding information originally sought.

54 Taylor, Robert S. "Question-Negotiation and Information Seeking in Libraries." College and Research Libraries (May 1968): 1-11.

The information seeker develops his need for information through four levels: first, he feels a vague and unexpressed but real need for information, "the visceral need;" second, he has a mental description of his need, "the conscious need;" third, he can make a concrete, rational statement, "the formalized need;" last, he can recast his question in terms of the information available, "the compromised need." It is the skill of the information specialist to filter what the inquirer communicates in order to help him to find the information he really needs. In this negotiation process the specialist must determine the limits and structure of the subject; the motivation, objective and background of the inquirer; the relationship of the inquiry description to the file organization; and the kind of answer the inquirer will accept. Only through this delicate interplay can the true needs of the inquirer be determined and met.

55 Ware, Glenn O. "A General Statistical Model for Estimating Future Demand Levels of Data-Base Utilization Within an Information Retrieval Organization." Journal of the American Society for Information Science 24 (July-August 1973): 260-64.

A general statistical model was developed that would predict the growth patterns of data base utilization and estimate future levels of demand. The model was tested against data gathered at the University of Georgia's information retrieval service on the number of users requesting current awareness search requests against seventeen separate data bases over a twenty-four month period. The model is $y = \beta(1 - e^{-\alpha t})$ where y is the number of users of a data base at time t, and α and β are parameters to be estimated. The author's claimed 99% accuracy has implications for administrators of retrieval services regarding personnel, software, hardware requirements.

56 Wood, D. N. "User Studies: A Review of the Literature from 1966 to 1970." Aslib Proceedings 23 (January 1971): 11-23.

In reviewing sixty-nine user studies on the information gathering habits of scientists, engineers, and social scientists, Wood concludes that scientists select the information source they find easiest to use (usually their own collection) more often than the one with the greatest potential value; that informal communication between scientists is of great importance and means must be developed to exploit it; that users are reluctant to use indexes and abstracts but welcome instruction; that abstracts serve the purpose of keeping the researcher up to date without resorting to primary sources; that libraries of the future will sell their services.

57 Wright, Kieth. "Social Science Information Characteristics with Particular Reference to the Educational Resources Information Center (ERIC)." Journal of the American Society for Information Science 24 (May-June 1973): 193-204.

The literature of the social sciences is widely dispersed in many books and journals and across numerous disciplines. Its terminology is ill-defined, contains much technical jargon, uses everyday words with varied meanings. These characteristics create problems for indexing, thesaurus construction, and information retrieval. Education suffers from all these problems common to the social sciences. Wright describes the components of the ERIC system, places ERIC in the context of social science information, and enumerates criticisms that have been levelled against ERIC: the problems of decentralization which do not allow for uniform practices or standards, the lack of control over the quality of the information abstracted, the inadequacy of the indexing vocabulary and the thesaurus structure. He presents a survey of the attempts to organize social science information and lists most of the major studies done of the ERIC system.

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