THE ONTARIO EDUCATIONAL RESEARCH INFORMATION SYSTEM (ONTERIS): THE RESULT OF SHARED GOALS, INFORMATION AND COSTS

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ABSTRACT

This paper describes the development of an online, interactive information system for educational research and curriculum guidelines in Ontario. The contributions, financial and otherwise, of individuals and agencies are highlighted for each stage of the system's development, from its conception through document collection, intellectual processing procedures, including abstracting and subject analysis, machine entry and storage, and information retrieval.

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LE RESULTAT D'UN SYSTEME DE PARTAGE DE FRAIS, D'OBJECTIFS ET D'INFORMATION

RESUME

Cette étude décrit le développement d'un circuit d'un système d'information pédagogique inter-dépendant pour le département de recherche péda-gogique et de recherche de principe de curriculum pour la province de l'Ontario. Toutes contributions financières ou autres, à partir d'individus ou agences sont présentées pour chaque stage de développement du système. Nous examinons sa conception, à partir de la collection des documents, la reproduction des procédures intellectuels, les analyses de sujet et les relevés d'information.

Five years ago, several collections of educational research reports were sitting on shelves scattered across Ontario. Physical access to these collections was poor. There was no common system for arranging or ordering reports, most were unpublished, and none were available on microfiche. Most boards sent their reports to the Canadian Educational Association's Directory of Educational Studies in Canada, some sent theirs to the National Library for inclusion in Canadiana, some to ERIC for inclusion in Research in Education. But there was no one place where all the reports could be found.

Bibliographical access to the reports was erratic. Some boards published annual listings, usually without complete information and without author or subject access; none of the board reports were abstracted, except for the occasional document sent to ERIC; and although Ministry-funded reports were supposed to have abstracts, there was no standard format. Subject analysis was crude, inadequate, frequently non-existent or confined to a single set of documents.

As an answer to these problems, the Ontario Educational Research Information System (ONTERIS) was established, funded by the Ontario Ministry of Education through a contract with the Metropolitan Toronto School Board.

The first year contract for ONTERIS sketched out a grand design:

> "(1) development of first phase of a documentation system of educational research ... which would have bilingual capabilities and lend itself to computerization; (2) concurrent development of a Canadian thesaurus for this documentation system; (3) development of preliminary appropriate search and retrieval mechanisms ...; (4) development of a manual of procedures; (5) preparation of a report ... describing the process, the results, and the value of the study."

A team of three people bravely and naively set out to accomplish these goals. Two were librarians, one a library technician; all three had degrees in the humanities. Two had reference backgrounds in a professional education library; one had spent 4-5 years doing educational research. None was fully bilingual, although one was reasonably comfortable working in French. The glaring gap in the team's collective curriculum vitae was knowledge of computers or information systems. None knew the difference between hardware and software, let alone the meaning of baud, byte or inverted file.

With hindsight, it is not really surprising that the contract's goals were not fully reached in the first year. But there were some accomplishments: 550 documents were collected and manually organized; abstracting was begun; and PRECIS was being investigated for the subject analysis. We were also able to talk more knowledgeably about computers and boolean logic after the development of a 50-document trial database and a two-week online demonstration for Ministry personnel.

Four years later, ONTERIS is still very much in a "first phase" when compared to the American ERIC with its third of a million records accessible online through three large commercial information services, two monthly indexing journals with annual cumulations, 16 clearinghouses located strategically across the U.S.A., and ongoing thesaural development. Nevertheless, ONTERIS has produced two volumes of detailed abstracts, containing 1200 records, and a cumulated author and PRECIS subject index. There are also now three bibliographical databases in ONTERIS: EDUC, containing 1500 educational research records; CODE, containing records of all 253 briefs and about 65 working papers and information bulletins of the Commission on Declining Enrolment; and CURR, containing 150 Ontario Ministry and 300 local board curriculum guidelines. There is online access to all three through the OISE search service, EISO (Educational Information System of Ontario), 10 hours a day, five days a week, with overnight customized batch printing. The availability of hard copy and microfiche by purchase, loan or reference is noted on each record.

The thrust of this paper is that ONTERIS could never have reached this stage of development without a great deal of cooperation and sharing of resources and costs at each stage of development.

THE CONCEPT

The original concept and ultimate goals for the system were shared by the Ontario Ministry of Education and The Metropolitan Educational Research Committee (MERC), composed of the research directors of eight school boards in Metropolitan Toronto who meet monthly to share information and discuss mutual concerns. As the MERC research units developed, as more reports were published and as personnel changed, finding relevant local research became more and more difficult since the researchers "could no longer trust their memories for reference to local research." (Wright 1977)

Two years prior to the first ONTERIS contract, the Metropolitan Toronto School Board (MTSB) passed a motion

that MERC "consider the development, at the school board level, of a data repository system that would be accessible to other researchers and graduate students." The boards decided to pool their efforts and produce a metro-wide bibliography of research studies to provide a fast and effective clearinghouse for all educational research produced in Metropolitan Toronto. At the same time, the Metro researchers foresaw their bibliography as a node in a wider network. In a position paper to the Ontario Ministry of Education in the fall of 1973, "Notes on Dissemination of Research Findings in Ontario", they clarified this belief:

> "There are several significant nodes of research information in Ontario ... What users of research information require is easy access ... a hooking together of existing collections."

Coincidently, the Ministry of Education, concerned about wider access to the research funded by its grants-in-aid and contractual research programs, mounted a feasibility study for a Ministry system (Ironside 1974). The investigators put together a resource committee which included people from OISE, CEA and MTSB. I worked on this committee for its four-month duration prior to becoming the principal investigator for ONTERIS. From this committee stemmed the good working relationships among these bodies in the development of ONTERIS.

After the feasibility study the Ministry approached MTSB with a proposal for a contract. The Ministry and the board had similar conceptions about an information system. Both were primarily concerned about immediate access to their own research documents, but both were looking toward a wider network in the future.

Both MTSB and MERC have continued their moral support of ONTERIS over the five years of its existence and MTSB has also contributed in a practical way by covering some costs for space, personnel, training and programs. The Ministry has also contributed more than moral and financial support. Most Ministry-funded contracts operate at the contracting institution; ONTERIS shares physical facilities at the Ministry itself. As well as the space and some accompanying physical benefits (e.g., use of mailroom, supplies, some equipment), ONTERIS gains because of communication with Ministry staff. For instance, Ministry personnel review abstracts of Ministry-funded research; we can call on the French expertise available in the Branch; and decisions by the Supervisory Official can be obtained without any red tape.

THE SYSTEM

The sharing of resources and costs during the system's development will be discussed under its four main functions: collection, intellectual processing, machine processing, and retrieval.

Collection

There would of course be no ONTERIS if research producers were not willing to share their documents. The collection of material for EDUC has been relatively easy since the Ministry had reports on hand, Metropolitan Toronto boards had been involved in the system from the beginning, and other Ontario boards knew about the system through AERO (Association of Educational Researchers of Ontario). OISE, OECA (Ontario Educational Communications Authority) and OERC (Ontario Educational Research Council) also have good communication links both with the Ministry and local board researchers and provided documents on request. With the support of MERC it was decided not to create a review committee and criteria for entry, but to aim for inclusive coverage of research reports using the tools available within the system to indicate to the user the worth of the document.

The collection of curriculum documents for CURR has also been a cooperative effort. Most Ministry guidelines were available in one collection, but several fugitive documents had to be tracked down through the Ministry library and various individuals. The Faculty of Education at the University of Toronto (FEUT) had initiated a collection of local board guidelines in order to aid students, faculty and curriculum consultants. They most generously made these documents available to ONTERIS; in turn, ONTERIS paid for the follow-up collection of new documents and for two abstracters for a 4-5 month period.

CODE briefs and working papers were made freely available to ONTERIS as they were received by the Commission. ONTERIS has supplied the Commission with abstracts.

Intellectual Processing

Intellectual processing of documents includes numbering, bibliographical description, abstracting and subject analysis.

Numbering. ONTERIS documents are sequentially numbered. Both OISE and the Ontario Government have so far not used the numbers in their sales catalogues for hard copies. The Ontario Government Monthly Publication lists both hard copies and microfiche separately, listing the

microfiche by number, the hard copy by author. ONTERIS numbers should be useful to tie the microfiche to the hard copy of the same document. This is one area in which the sharing of common procedures has not occurred but would be desirable.

Bibliographical Description. ONTERIS uses AACR for bibliographical descriptions and can therefore participate in any future sharing of bibliographical information.

Abstracting. ONTERIS has invested a lot of time, energy and money in abstracting, which is considered one of the most important processes in the system. We believe that a well-written abstract can stand in the place of the original document and that readers should be able to decide from the abstract whether or not they need to read the whole document.

This concern for useful abstracts dates back to my own frustration in organizing the research literature on a particular topic. It was frequently difficult to dig out the sample or to find what tests or instruments had been used. Special features of a report (e.g., literature review, annotated bibliography, special glossary, etc.) were sometimes not highlighted. And how could one accept the findings without knowing how the data has been analyzed?

From the beginning it was considered essential to develop guidelines for abstracts. A check list used earlier in Metropolitan Toronto for a survey of research was examined and a draft format devised. In 1975 a Mini-Index of 17 documents was sent with an evaluation form to all local research directors. Results were tabulated and a meeting with the researchers was held to review the abstract form. Some fields were deleted as separate entities (e.g., intended audience) and other minor modifications were made.

It was decided that both standardized abstract formats should be used: the "informative" type representing the document in detail, and the "indicative" or descriptive type which we use for discursive studies, most bibliographies, literature reviews, manuals and handbooks, or studies which are so long and complex that they simply cannot be fitted into the regular format.

This regular format has evolved somewhat over the life of the project but has basically remained stable: type of study, purpose, sample, methodology, findings, conclusions, special features, tests or instruments included in the document, tests or instruments used in research but not included in the document, related records, availability, and miscellaneous notes are all included. In addition, for Ministry reports, the contracting institution

and supervisory or liaison officials are included. If there is an ERIC document number or if the ISBN is known, these are noted in the record. Whether the document is partially or wholly in another language is also indicated. Several new fields have recently been added: abstracter (to give credit to individual abstracters and to indicate author-written abstracts); whether or not the abstract has been reviewed; the source, date and amount of funding; and the status of the document - new record (bibliographical information only), final report to the Ministry, processed report (generally unpublished), published report, internal report only, journal article, conference paper or research in progress.

Abstracts are entered into the system and are available for searching as soon as they are written and the subject analysis done. However, they are not released for publication in the printed index until they have been reviewed. Ministry-funded abstracts are reviewed internally; all others are sent to the originating organization. We ask reviewers to check the accuracy of the methodology and findings and the abstract's tone and balance.

ONTERIS owes a great debt to researchers in the field who assisted in the development of the EDUC abstract format. They have continued to review completed abstracts and in most cases now send us abstracts written according to ONTERIS guidelines.

The original cost of developing the abstract format during its trial and error days was borne by MTSB, which began abstracting board documents prior to the first ONTERIS contract, continued to hire abstracters during the project's first two years, and also contributed the services of a qualified editor and proofreader for nearly a year and the services of a top notch typist for two years.

Abstract formats for the other two bibliographical databases have also been developed in conjunction with users.

Since a board official responsible for curricula construction obviously has different needs than a student teacher requiring lesson plans, the CURR abstract attempts to cover both general and specific documents. For example, a curriculum guideline for mathematics might be quite general, indicating subjects mentioned and references made, whereas an abstract of a document on teaching "money" to grade 1 would reflect the required specificity and detail methods of teaching various coins.

CODE briefs vary greatly in format, length and content, may touch on many subjects, and often include

extensive material such as statistical appendices, committee reports, draft submissions, earlier publications, and articles. Recommendations may not be supported by text. The CODE annotation describes the brief's structure and contents and indicates major recommendations. The format is versatile in organization and allows evaluative coverage of eclectic documents. A note field lists supplementary materials. EDUC-style abstracts have been written for the working papers and reports.

Subject Analysis. At ONTERIS we use PRECIS (PREserved Context Index System) for basic subject analysis. We believe PRECIS has numerous advantages for the user. It uses natural language (no inverted terms such as Research, educational), and terms may be used as soon as they appear in the literature and in as specific a form as necessary (e.g., white flight; declining enrolment; changes in names of countries, e.g., Rhodesia - Zimbabwe). Terms are context-dependent and therefore ambiguous entries are avoided, e.g.,

RINGS. Boxing
RINGS. Jewellery
RINGS. Piston rings. Automobiles.

In a traditional subject index there is no way of distinguishing a report which is about the attitudes of students to teachers, from one which is about the attitudes of teachers to students. In PRECIS, the meaning is clear, e.g.,

ATTITUDES. Teachers. Integrated elementary schools.
To trainable mentally handicapped students

Of particular use to educational research is the capability to indicate study regions, study examples, and type of study in the PRECIS string, e.g.,

RESIDENCE. Students. Elementary schools. Suburbs. High rise apartments & single family homes related to academic achievement, motor development, self concept & social development. -- Study regions: North York -- Study examples: Grades 1 & 5 -- Comparative studies

There is multiple access to a document and as many entries as necessary are made for a single document. There is always maximum information at each access point, with all necessary 'see' and 'see also' references included in the reference structure.

PRECIS also has multilingual capabilities. ONTERIS has produced a sample index in French (Beardsley and Phillips 1978) and, hopefully, will be doing more work in this area

in the coming year. Even more exciting is the translingual research undertaken by the British National Bibliography over the last 2-3 years. They are now at the breakthrough point. It is expected that PRECIS will be the first general indexing system capable of converting machine-readable indexing data in one language into a fully precoordinated printed index in another.

In addition to all the access points provided by PRECIS for both the printed index and online use, there are frequently 10-15 additional access terms from the body of the abstract for online use. Subject analysts look at every word or phrase in the abstract to decide if it would have any value to a user. Such terms are then incorporated along with terms from the PRECIS string in an inverted file which is available to all users of the system.

The use of PRECIS at ONTERIS provides perhaps the prime example of cooperation in action. On the cost side, MTSB paid for the PRECIS training for the principal investigator, hired an additional indexer for a summer during the initial stages of indexing, and covered all the PRECIS computer work at UTLAS for the first year.

On the resource side, we have had excellent help from everyone involved in PRECIS on both sides of the Atlantic. At the beginning we talked with: Audrey Taylor, who had been developing PRECIS for the Aurora H.S. Library and who subsequently received a contract to computerize her files and develop a model of a one-stage PRECIS catalogue for school libraries; Francoise Lamy-Rousseau, who was enthusiastic about the system and had done a small manual index of audiovisual materials; Ann Schabas, Faculty of Library Science, University of Toronto, who worked on the first version of PRECIS while doing her Master's degree is London, England; and Chris Robinson, then of the College Bibliocentre, who provided cost figures from his experience and who indexed 15 educational research reports to make a mini-index used to assess the usefulness of the abstract format and of PRECIS as a tool for indexing educational research.

Later we were able to take advantage of Derek Austin's expertise as the original developer of PRECIS. His advice and encouragement is a constant prop for us. We look forward to the development at the British Library of the thesaural and translingual side of PRECIS.

Another aspect of sharing has been the feedback on PRECIS we have received from users. Several indexing decisions have been influenced by users' reactions to collocation, density of entry or vocabulary and we expect

to draw on more such reactions.

We have also recently become involved in a PRECIS users group which meets to discuss common problems and possible solutions. This group is particularly important for negotiations with UTLAS for the ongoing development of PRECIS. Because ONTERIS has only small databases, we would not have much clout as a single voice.

Machine Processing

Machine Entry. Although all corrections and, recently, all bibliographical entries are done online, the basic means of entering documents into the database is by batch process and the use of OCR (Optical Character Recognition). Once again MTSB assisted in getting OCR entry off the ground. During the initial investigations, we discovered most OCR programs did not provide for upper and lower case. One user had developed a special program and was willing to sell it, but there was no contract money for OCR, so the Ministry paid for the program and MTSB paid for the first year of use.

Storage. During the first few months of the contract it became evident that to develop a system "which lends itself to computerization", it was necessary to do more than give software a casual glance. As stated earlier, none of the ONTERIS team had the slightest bit of computer experience or knowhow. In this area the system was completely dependent on outside help.

We read, phoned people, contacted organizations, invited ourselves to demonstrations, and pumped information out of anyone and everyone. One of the most useful things we did was to bring together a group of local librarians and information scientists to share ideas and expertise. We called ourselves EAGER (Effective Automation Group for Educational Research). This group has been meeting regularly ever since. The composition changes but the general purpose of sharing information remains the same.

It was not long before the ONTERIS team decided that the only way to begin was to begin. Building a trial database might tell us more about our own needs than reading and talking.

At a library conference, one of our resource people had heard a paper on ISIS, an online information storage and retrieval system developed by ILO and used by the International Development Research Centre (IDRC) in Ottawa. From this fortuitous occurrence, our relations with ISIS began.

IDRC was extremely helpful. They demonstrated the system, offered to put up a trial database, gave us advice

on our worksheets (e.g., suggesting that the individual parts of our abstract - methodology, findings, etc. - could each be separate fields) and provided sufficient support that we were able able to build the database in three months. Successful demonstrations of this trial database over a two-week period led to a decision to use ISIS for a further trial period of four months. IDRC gave us substantial help with the photocomposition interface to produce our first printed product from the computerized database of 600 documents in July 1977; indeed they continued to share their expertise with ONTERIS until October 1977 when CDS/ISIS (the OS Unesco version of ISIS) was installed on the Ontario government computer.

Unesco did not merely undertake to provide a tape of the ISIS system with instructions for installation. They provided a three-week training period under the expert and stimulating leadership of G. del Bigio at the cost of his expenses. In addition, Unesco maintains a database of changes to ISIS so that they can keep installations up to date on all corrections or new features in the system. They also intend to continue a series of technical advisory meetings on an annual or biennial basis.

We certainly feel comfortable calling on Unesco on an ongoing basis, although as the number of Canadian and American users grows, it might be useful to form a North American users group.

The Ontario Educational Communications Authority (OECA) became interested in ISIS at the time ONTERIS was looking into installing the ISIS software at Queen's Park. David Watson, Manager of the Management Systems at OECA, spent a lot of time prior to the installation looking at the code, cataloguing the programs, and allocating files for the pre-installation test tape. He attended the three-week training course and helped ONTERIS during the first few months of the new installation. He now provides the system with ongoing software support. We believe this sharing has had mutual benefits for OECA and ONTERIS.

Retrieval

The original DOS version of ISIS available through IDRC had several limitations for retrieval: only one online display format, no truncation facility, very little search adaptation, no postings on text searches, and no subfields.

The Unesco version is far more flexible:

Advantages	Disadvantages
- Boolean logic	- No adjacency feature

Advantages	Disadvantages
-Query built and adapted step by step	-Paging commands a part of CICS; therefore must be in upper case and no backspacing allowed with most terminals
-Right truncations; postings of each truncation	-Zero postings a problem
-Capability of free text search	-Symbols for OR (*) and AND (+) are the reverse of most other databases
-Can check for field presence or absence	-Messages relating to text commands are not precise
-Can "flush" search after a "save" or when no longer needed	
-Ability to build ANY tables of "OR"ed terms	
-Can recall search strategy at any point	
-Can use prefixes to build special inverted files, e.g., PRECIS fields use P=, Test Fields use T=	
-Subfields enhance flexibility in output	
-Output may be sorted by user definition	
-Any number of display and print formats may be pre-defined or requested online	

During its developmental period ONTERIS has only been available to the public through one source, EISO (Educational Information Service of Ontario) at OISE. The EISO principal investigators and search analyst have been most supportive. The search analyst has provided us with all her search topics so that we can analyze the vocabulary used in indexing. She has made good suggestions for our training manuals and for the system in general, and she is always willing to provide feedback. Recently we debated with searchers the virtues of controlled vocabulary vs. free-text searching. Such discussions will continue to have an effect on the future development of the system.

CONCLUSION

ONTERIS is still going through some growing pains. In the past year, the same year as the shakedown from the OS installation, we have been kept busy building two new databases, taking on a contract for thesaural development, continuing the building of the original database and publishing a second printed edition of research abstracts and a cumulated index.

ONTERIS is still a small information system. It is not yet a repository for all types of educational material,

neither is it a Canadian ERIC, a node in a nationwide system, a bilingual system nor a fully operational system. But it is still a sophisticated system that provides a useful service to the educational community. And without the financial support, solace, and expertise from innumerable sources in almost every aspect of the system during the developmental period, ONTERIS would not exist in its present state. With continued cooperation and sharing of resources the system could achieve its full potential.

Postscript

When I was thinking about this paper, I resolved that it would not be only a glowing tribute to sharing and how ONTERIS had gained from it, but would discuss constraints as well.

Sometimes negotiations took time and diplomacy, particularly if people were doing something another way or were not sure what they would gain (or lose) by sharing with us. But after examining the various types of sharing we have experienced - physical facilities, materials, costs, and most importantly, human resources and expertise - I have to scrape the barrel to find the constraints from our point of view.

Just as I was finishing this paper the October issue of Canadian Library Journal came across my desk and the first article I read was "The Concept of Resource Sharing" by Rose Mary Magrill.

> "Sharing means not only giving
> and receiving a part, but taking
> part in the process, sharing
> both the objects involved and the
> work of distribution ...
> Reciprocity in the sharing process
> is important."

I agree.

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