ABSTRACT
        The Mechanized Information Center (MIC) at the Ohio
State University conducts retrospective and current awareness
searches for faculty, students, and staff using data bases for
agriculture, chemistry, education, psychology, and social sciences,
as well as a multidisciplinary data base. The final report includes
(1) a description of the background and history of MIC; (2)
characteristics and operating procedures of the batch off-line
system, with a brief description of the system's five main programs;
(3) a description of each MIC's machine-readable bibliographic data
bases, accompanied by statistics on the number of citations in each
data base; (4) an analysis of users of MIC services by type of data
base; (5) a description of the MIC search system, including retrieval
modes, term weighting, truncation, and system requirements and
constraints; (6) operations information; (7) advertising and public
relations strategies employed to encourage use of MIC services by the
OSU community; and (8) conclusions and observations after four years
of operation. The report is supported by tables, graphs, and figures
and supplemented by three appendices pertaining to fourth year
activities, users of MIC current awareness services by academic
department, and a description of computer programs and procedures.
The MIC is currently operating with support from the OSU community
now that the grant period has ended. (JPF)

PROVIDING COMPUTER-BASED INFORMATION SERVICES

TO AN ACADEMIC COMMUNITY

BEST COPY AVAILABLE

Final Technical Report

of the Mechanized Information Center

FEBRUARY 1, 1971 THROUGH JANUARY 31, 1975

Prepared by
Bernard Bayer

MIC-AN-04

i

FOREWORD

The Mechanized Information Center (MIC) was established at The Ohio State University in September 1970 and began operation in February 1971, when a grant was awarded by the Office of Science Information Service of the National Science Foundation (NSF). The material in this report is based upon research supported by the National Science Foundation under Grant Number GN-27458, from February 1, 1971 through January 31, 1975. Any opinions, findings, and conclusions or recommendations expressed in this report are those of the author and do not necessarily reflect the view of the National Science Foundation.

Bernard Bayer
Director, Mechanized Information Center
July 1977

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Cont.)

SECTION 1.0 INTRODUCTION

This final report is being published some time after the grant period ended, and that may be an advantage in trying to gain a perspective on the Mechanized Information Center (MIC):

In retrospect, it is evident that the grant from the National Science Foundation, Division of Science Information served its purpose well. From February 1, 1971 through January 31, 1975, the MIC received a major portion of its funding from NSF. This enabled MIC to become a large-scale information center. Two years after the grant period ended, MIC is still a large-scale center, but is supported mainly by the people and institutions of The Ohio State University. The seed money from NSF made it possible.

During the grant period, MIC designed its own systems, wrote the software to make the systems work, developed profiling methods, did basic research, performed marketing studies. It started from an organization on paper to one developing new approaches to handling information and evolved into an operational information center.

MIC started from scratch in offering services, and within a three-year period more than 4,000 people were being kept up to date through any of its five current awareness services and a thousand other people were coming in every month for retrospective searches. Most of these people were from the OSU campus. The growth of the services is indicated in Table I.

Did the flood of material generated by the MIC services have an impact on the OSU campus? The answer is yes. The demand for government reports grew until the Libraries had to subscribe to SCIM (Selected Categories in Microfiche) from the National Technical Information Service to bolster its collection of government reports. The Acquisitions, Interlibrary Loan, and Circulation Departments of the Libraries have all felt the impact of the type of active information dissemination that MIC does. Because the output from the MIC searches are three-by-five file cards, one citation to a card, it is easy for a person to give the MIC output to various library functions and ask that an item be acquired or borrowed, if it is not in the OSU collection, or charged out, if it is in the OSU collection. MIC is an integral part of the Libraries both operationally and organizationally (see Figure 1). The Director of MIC reports to the Assistant Director of Libraries, Public Services.

It is easy to count things, as we have done in past reports, and say that MIC was, and continues to be, a successful operation. We now provide hundreds of thousands of customized bibliographies and produce millions of notifications every year. Each succeeding year was more successful than the year that went before it, as shown in Table II. The number of bibliographies produced, shown rounded off, is counted as follows: each

Table I. People Using MIC Services During the Grant Period

MIC Service	Year of Grant*			
	1	2	3	4
Computer-based Current Awareness	328	2,086	3,288	4,143
Computer-based Retrospeetive Search	0	1,623	5,936	11,445
Non-computer-based Reference Service	10	150	400	520
TOTAL	338	3,859	9,624	16,108

*

Year 1 - February 1, 1971 through January 31, 1972
Year 2 - February 1, 1972 through January 31, 1973
Year 3 - February 1, 1973 through January 31, 1974
Year 4 - February 1, 1974 through January 31, 1975

10

2
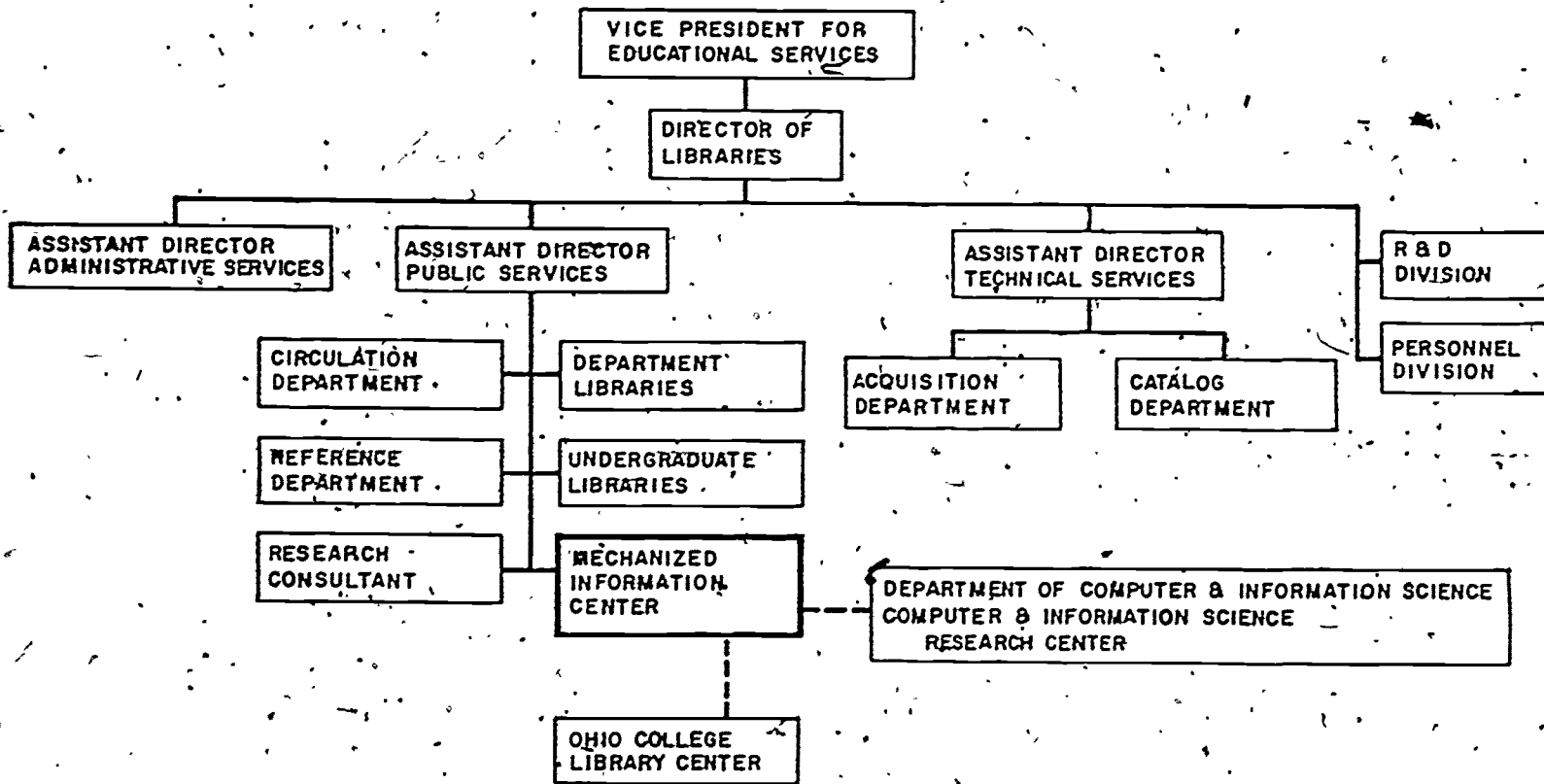
FIGURE 1. ORGANIZATIONAL RELATIONSHIPS OF THE MECHANIZED INFORMATION CENTER

Table II. Number of MIC Bibliographies and Notifications Sent to Users
of MIC Computer-based Services

Year of Grant	Number of Bibliographies Produced for Users	Number of Notifications (3 x 5 File cards) Sent to Users
1	1,700	51,520
2	46,000	1,153,769
3	130,000	3,174,355
4	170,000	4,705,901
TOTAL	347,700	9,085,545

12

retrospective query run against a data base produces one customized bibliography. It is done once only to bring a user up to date in a field. However, a current awareness profile is run against a new data base every week, every two weeks, or every month, depending on the service. Each new search produces a new bibliography of current information.

Although the curve goes upward, the progress of MIC was not a straight path through the stages of planning, testing, implementation, evaluation, and refinement over the four year period.

Basically, the goal remained constant over the four-year period: to efficiently and effectively use machine-readable indexes (bibliographic data bases) to provide computer-based information services for users, principally students and faculty members of The Ohio State University. And the basic objectives were:

(1) to select and acquire appropriate machine-readable bibliographic data bases

(2) to develop, adapt, and maintain software to maximize the service potential of the data bases, and then to freeze the final design of the software

(3) to perform user-oriented research into the operation, marketing, and management of information services and centers

(4) to demonstrate that the utility of existing library resources is increased by utilizing mechanized library services like those offered by MIC

(5) to enhance the role of the OSU Libraries as an active disseminator of information.

Yes, we did reach the goal and meet the objectives. And we learned a lot along the way. I hope to touch on those aspects in the final section of this report. The first seven sections are the summaries of what we did for four years, in terms of citations searched, data bases selected, programs designed, and notifications produced. Because the details of the first three years have been published in annual reports, two of which are part of the NTIS collection*, this report will not repeat much of the detailed information that can be found there. To complete the record, we are including summary tables, like those found in our other three reports, that spell out the operation in the fourth year. Those tables will be found in Appendix A.

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* The two MIC reports in the NTIS collection are: Second Annual Report of the Mechanized Information Center (PB-230 075/4GA) and Third Annual Report of the Mechanized Information Center (PB-252 855/2GA).

The grant period was February 1, 1971 through July 31, 1975, including a six-month extension. The activities discussed in this final report and previous three annual reports cover the period ending January 31, 1975. The information furnished is on behalf of the almost 100 people--full time staff members, faculty associates, graduate students, student assistants-- who did the work of the center. In particular, the full-time staff members provided the continuing momentum that kept the place going. In chronological order those people were:

(1) Information specialists--Jon Cobes, Linda Heineman, Loraine Adkins, Marlene Petry Sentyrz, Linda Drake, Rosario Poli, Susan Miller, Noelle Van Pulis, Lawrence Perk

(2) Programmers and Systems Analysts--John Hsu (Manager), Ronald Beaton, Conchita Yao Beaton, Tu-An Cheng. Mr. Hsu and Mr. Beaton are still with MIC.

(3) Operations Supervisors--Mark Fennessy, Ruth Roys, Martin Goldsmith

(4) Data Entry Operators--Jean Womack, Valerie Anderson

(5) Secretaries--Constance Conway, Martha Armstrong, Clarissa Alexander, who was also the original data entry operator

(6) Administrators--Gerald J. Lazorick (Principal Investigator and Di- rector of MIC during three-and-a-half years of the grant period), C. Samuel Craig (Assistant Director during the first two-and-a-half years), and Bernard Bayer (Coordinator of Information Services and then Director of MIC during its later phases, and editor of this and previous reports).

All of us at MIC would like to thank the National Science Foundation, Division of Science Information, and the Information Science Program Director, Dr. Edward C. Weiss for making it all possible, and The Ohio State University Libraries, principally Hugh C. Atkinson and Larry X. Besant, for letting it all happen.

6

SECTION 2.0 GENERAL SYSTEM

Very broad data bases, a series of batch off-line services, specially designed software, output appearing on file cards, were all part of the general computer-based system that MIC used to provide information services on the campus of The Ohio State University. (See Figure 2.) Putting the pieces together and making sure they all worked was a major emphasis of the first three years of the grant period. We tried, year by year, to expand our services to match the interests of the users. As MIC moved more and more into an operational phase, especially in the fourth year, time was also spent in insuring that the MIC services were fully integrated into the Public Services of the Libraries. That was always part of the plan from the inception. "We are all information disseminators in one form or another," said Hugh Atkinson, who was the Assistant Director for Public Services in 1970 when he anticipated the MIC impact on the Libraries system.

We spent time and effort on the non-computer aspects of the system as well. This included a document delivery system and an expansion of the information specialist interview to include an introduction to library resources in general.

When MIC first began to offer services, the general philosophy was to put together a broad multidisciplinary data base that would serve many people with diverse interests. Once that was done, MIC could then add new services based on more discipline-oriented data bases.

At the end of the grant period, MIC was offering eight services:

(1) multidisciplinary current awareness
(2) multidisciplinary retrospective
(3) chemistry current awareness
(4) education current awareness
(5) education retrospective
(6) social science current awareness
(7) agriculture current awareness
(8) psychology retrospective

The data base which are searched for these services were chosen principally to help as many people as possible on the OSU campus. The multidisciplinary data bank covers such fields as engineering, chemistry, physics, and other sciences.

2.1 How The System Works

The main theory behind the type of batch, off-line services offered by the Mechanized Information Center was to have a large pool of interdisciplinary information that is searched by many people with diverse interests to find pertinent references. The data base is broad and timely. It includes:

7
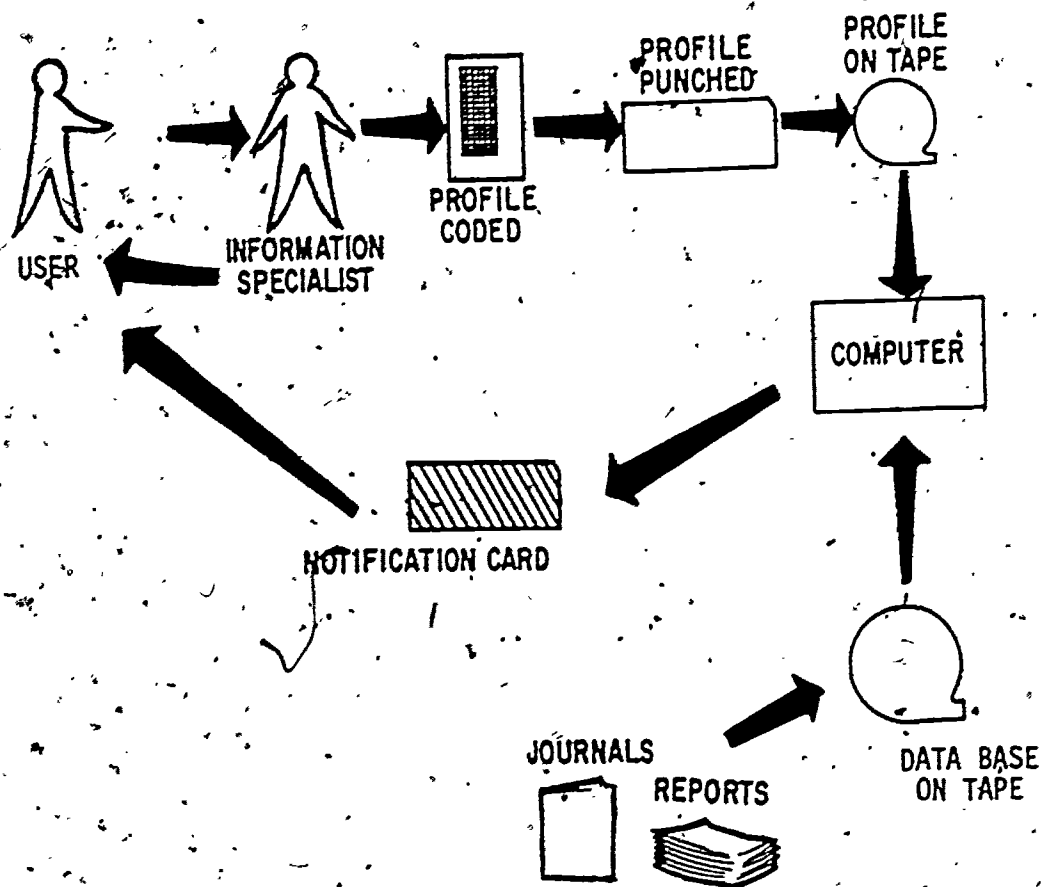
FIGURE 2. SCHEMATIC OF THE MIC INFORMATION SERVICE

(1) conference papers--which many times precede the appearance of reports of the same research that appear as journal articles and government reports. This source also yields references before the proceedings appear.

(2) journal articles--the information here normally precedes the publication in the form of a book.

(3) government reports--an untapped resource of information.

(4) books.

It is like many layers of information. It is possible that the same piece of information appears in all four sources. It is possible that it only appears in one. In any case, your chance of seeing it is enhanced by searching all these sources.

Further, there is an express look to the service because you don't have to wait for an abstract service to process the document. For example, the table of contents--sometimes in page proof form--can be input directly. Therefore the lag time between the appearance of an article and its bibliographic citation appearing on one of the source tape services might be negligible. The same is true for conference papers, where the title and author of papers are known from the program before the conference is even held.

Further, many user interests are interdisciplinary. The MIC data base covers materials from sources you might not normally see. For example, if you were interested in information science, you may not need any computer-based system to select items from the Journal of the American Society for Information Science or from Datamation, but you might need our type of system to search the Methods of Information in Medicine. And what about government reports? This is the major source of information about centers like MIC, for example.

The trick is to carefully define a person's interests in order to retrieve pertinent documents from the pool of information. There is a trade-off between recall and precision; the expertise in profiling is to find out what the person wants. You can define a person's interests so narrowly that he or she receives only highly relevant documents. In the process much would be missed. You can also define interests so broadly so that all possible documents are received. There is high recall, but there is a lot of extraneous material. For example, a term like "system" would pull in too much material, much of it not too relevant. A term like "mechanization of information storage and retrieval systems at large academic institutions" might pull in this report if the correct discriptor terms were used, and nothing else.

The output of the basic system is a set of 3 x 5 file cards, each with a bibliographic reference to a particular document. This makes it easy to screen materials. You keep the pertinent references, building

your own card catalog of relevant items. This is a way of making the system more user-oriented.

Further, MIC furnished a direct document delivery system and made it easy for users to take advantage of the libraries document delivery system: circulation, interlibrary loan, and acquisitions. And as the basic system fell into place, the information specialists at MIC turned the patron interview into more of an informative interview explaining information sources in general and those available at MIC and the other parts of the Library.

The MIC system has two basic types of services:

(1) Retrospective searches that go back in time through the literature to bring a user up to date.

(2) Current Awareness literature searches that keep a user up to date through weekly, bi-weekly, or monthly searches of current materials only.

The services complement each other.

2.1.1 Profiles

The MIC system matches profile words against keywords in the titles of articles, reports and papers in the Data Bases. The system can also search authors, and in the case of the MARC records, Library of Congress subject headings and classification numbers. Each profile term or group is weighted with a number. When a match occurs and the numerical value of the weights exceeds a certain threshold value, a notification card is generated. The choice of weighted number can control whether that term group alone or several groups will be necessary to exceed the threshold value, therefore search longer strings of words. There is "and" and "or" logic. Negative weighting eliminates citations with unwanted terms.

The search strategy for current awareness can differ from that of the retrospective service. You would not search a single term that would produce over six hundred titles for a retrospective search. However, that same search in current awareness would yield an average of three cards a week, thus delivering more citations to the user who can best judge the relevance.

Searching by title words is a problem at times. However, titles in the natural, physical and health sciences are generally descriptive of the content. Terminology is precise and synonyms rarely occur beyond the scientific and popular names. However, since MIC Information Specialists are generalists, they must rely on the user to know his topic well in order to maximize the retrieval.

Because of these factors among others, current information specialist philosophy has emphasized the need of instruction during the interview.

10.

If the users can understand as fully as possible how the retrieval system works, they can judge for themselves if the profile is as effective as possible. The search can be modified as new ideas occur.

The Thesaurus, which is used for the multidisciplinary services, is designed to dictate entry terms. Variant forms of a word such as the plural or foreign language will indicate which one term will retrieve all the variants. It is not a thesaurus that suggests alternative terminology.

The MIC information specialists help the user to identify his or her specific interests and to set those interests down as a series of words. For example, a user might say that she wants information on pollution. The conversation might run something like this:

Information Specialist: Are you interested in water or air pollution?

Patron: Water.

Information Specialist: All types of water pollution? from chemicals? from human waste?

Patron: No. I'm interested in chemical pollution by industry.

Information Specialist: Which chemicals?

Patron: Mostly phosphorus.

Information Specialist: How to detect it? How to remove it?

Patron: Really, how to remove it and how it's treated at sewage plants.

In this manner, the specialist narrows down an interest area and builds an interest profile for the patron. The final one would consist of sets of terms, like those shown in Figure 3.

2.1.2 Software

The inputs into the system are the profiles developed by the information specialists and the data bases to be searched by those profiles.

Each profile in the system consists of a series of words, or groups of words (with a maximum of five words per group), with a term weight that reflects the probability that a user would be interested in a citation that has that word or word group in its title. The word group may also contain a person's name or the name of a journal, in which case the term weight would reflect the user's desire to see all articles written by or about the person or all articles appearing in the listed journal.

FIGURE 3. SAMPLE PROFILE FOR THE MULTIDISCIPLINARY CURRENT AWARENESS SERVICE

21

Each title that contains words that match with one or more profile terms, yields a total significance value, which measures the relevance of the citation to the particular user's interest. When the total significance value of an article is equal to, or greater than, a particular threshold value for the user profile, a notification describing the citation is generated.

The data bases are processed to yield searchable words in an exploded form. The terms from the profiles and the words from the data bases are matched to produce pertinent notifications. The search system consists of ten applications programs, mainly written by the MIC staff, and three utility programs supplied by IBM.

The nucleus of the system are five programs: (1) PROMAIN, (2) WORDGEN, (3) INVERT, (4) MATCH, and (5) MICPRINT. Their relationships are shown schematically in Figure 4, and they were explained in depth in previous annual reports. In general this is what the five programs do:

(1) PROMAIN - adds new profiles to, deletes old profiles from, and updates current profiles in, the system. (PROMAIN is short for profile maintenance.).

(2) WORDGEN - produces the searchable words from the titles of the papers and articles and from descriptor terms if available. (WORDGEN is short for Word Record Generation.) Two output files are created;

  a) a word record file containing significant words with article numbers

  b) a random access article file containing title, author, and journal information ordered by article number.

  The word record file is then sorted alphabetically by word, and sequentially by article number.

(3) INVERT - produces an inverted file, from the sorted word record file produced by WORDGEN. By "inverted" is meant that all documents that have the same access word are sorted by that word. For example, if documents 8, 200, 700, and 1492 have the word "Mechanization" in their titles, then Mechanization 8, 200, 700, 1492, would be the inverted file.

(4) MATCH - matches the terms from all the profiles in systems, with the access words (mainly keywords from the titles), and performs the necessary computations to produce notifications (hits) for each user.

(5) MICPRINT - sorts and prints the hits for each user.
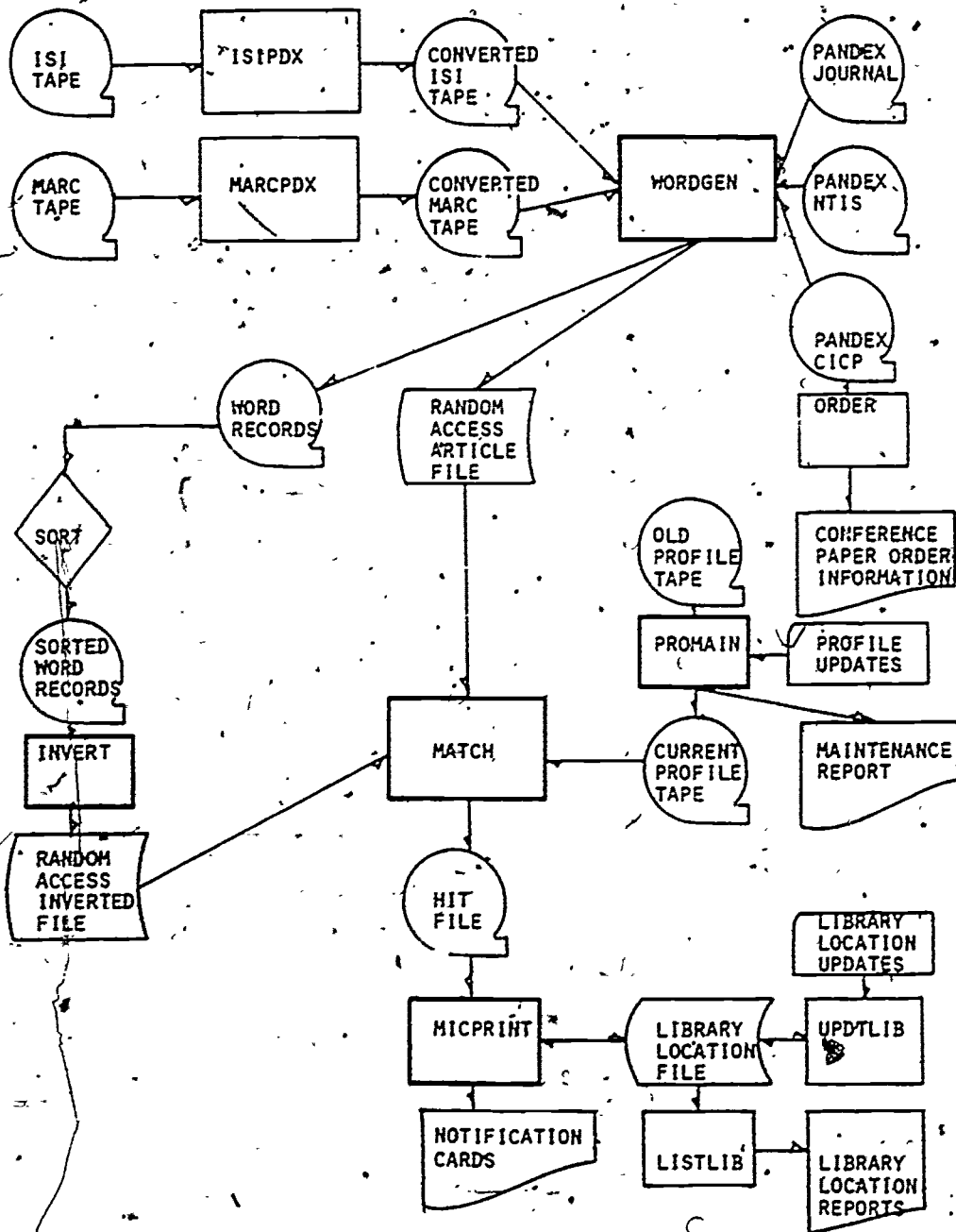
Figure 4. General MIC Search System

Different versions of this basic software is used for all the MIC search services; both current awareness and retrospective.

2.1.3 Output

The output from the MIC searches is a customized set of references pertinent to the user's interests. Each set is reflective of the skill of the profiler, who is the information specialist, and the user, who is the subject specialist.

The MIC notification card was developed as a two-part form with a main section and a tear-off stub. (See Figure 5 for samples of the results of a current awareness search performed on the profile shown in Figure 4.)

The stub is intended to hold necessary information for use in the Document Delivery System: the patron's name and address for mailing purposes, journal identification, truncated author and title references, and the OSU library location code for the journal cited.

The main section is then a 3 x 5 inch file card for a personal card catalog of pertinent items, and the stub becomes the order form for the MIC copy service, which is optional.

2.2 How The Instruction Program Operates

Most people who contact MIC are unfamiliar with computer-based information services. In fact, many of them, in particular undergraduate students, lack general library skills and are attracted to MIC by the idea of having bibliographies generated for them. This phenomenon has resulted in the development of an informal and individualized library instruction program.

Requests to use MIC's services are submitted during a reference interview, conducted by the Information Specialist. The primary function of the interview is the development of the MIC search profile. However, as more students began to use the service, a second function, personalized library instruction, gained importance. Thus, the Information Specialist not only explains the use of MIC services but also suggests and explains the use of other library resources and services. This additional instruction is most frequently provided for students and is especially important when MIC services are inappropriate for the research topic. This often occurs when the request is for retrospective information in the social sciences or humanities, or when the information is needed sooner than allowed for by the minimum one-week turn-around time for retrospective searches.

Instruction about MIC covers four key points: (1) types of services, (2) data bases, (3) search strategy, and (4) content and use of MIC notification cards. Instruction about other library resources is individualized according to the patrons' information needs and library use

15

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DAVIS JA, ... RF                               MW PETRY
                                               MIC
MICROBIOLOGY OF AN ACTIVATED SLUDGE WASTE-WATER   10 LAZENBY
  TREATMENT PLANT CHEMICALLY TREATED FOR
  PHOSPHORUS REMOVAL.

WATER RESEARCH                                 DAVIS JA, UNZ R
  VOL. 7 1973 NO. 1/2          PAGE  325       MICROBIOLOGY OF

                                               ENR, BOT
TERMS: +REMOVAL, PHOSPHORUS, WASTE,            WTREA
       +TREATMENT, PHOSPHORUS                  ISSUE 1/2    '73
                          721166553094347      VOL.7     P.325
                                   4/13/73
HW PETRY                                        721166553094047
                                               ORDER FORM
         CURRENT  AWARENESS  SERVICE
    MECHANIZED INFORMATION CENTER · OSU LIBRARIES
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Journal Article

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MULBARGER, M. C.                               HW PETRY
                                               MIC
THE THREE SLUDGE SYSTEM FOR NITROGEN &          10 LAZENBY
  PHOSPHORUS REMOVAL,


U S GOVERNMENT REPORT NUMBER:-     PB-213 778/9   MULBARGER, M. C
. NTIS PRICES: PC$4.50/MF$0.95                   THE THREE SLUDG
  APR 72,59P*
                                               TECH REPORT
TERMS: +REMOVAL, PHOSPHORUS                     PB-213 778/9
                          721166553080011
                                   3/30/73
HW PETRY                                        721166553080011
                                               ORDER FORM
         CURRENT  AWARENESS  SERVICE
    MECHANIZED INFORMATION CENTER · OSU LIBRARIES
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Government Report

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BLACK, S. A.                                   HW PETRY
                                               MIC
PHOSPHORUS REMOVAL BY LIME ADDITION TO A        10 LAZENBY
  CONVENTIONAL ACTIVATED SLUDGE PLANT,


TORONTO,  ONTARIO WATER RESOURCES COMMISSION,   BLACK, S. A.
  1969.                                         PHOSPHORUS REMO
  III, 49 P.
                                               CALL 2-3900
TERMS: +REMOVAL, PHOSPHORUS, SEWAGE,           TO CHECK
       PHOSPHORUS                              AVAILABILITY
       72190721            721166553080090          72190721
                                   3/30/73
HW PETRY                                        721166553080090
         CURRENT  AWARENESS  SERVICE
    MECHANIZED INFORMATION CENTER · OSU LIBRARIES
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Book

FIGURE 5. SAMPLE OUTPUT CARDS

skills. The Information Specialist might explain the use of the card catalog and even demonstrate the use of the Library of Congress List of Subject Headings. However, the most frequently mentioned tools are manual abstracting and indexing services. To facilitate instruction in this area, MIC maintains a supply of sample copies of Biological Abstracts, Science Citation Index, the Wilson indexes, and others. Students who use MIC regularly have become used to this type of service, and they often contact MIC first, expecting and welcoming referral to other resources.

Supplemental to the individualized and informal program, MIC Information Specialists give class lectures and other group presentations upon request. Content and style of the lectures varied according to the subject area to be emphasized, the nature of the audience, and the approach of the Information Specialist. An estimated two to three lectures are given each month during the academic year. Thus, through these lectures and the individualized instruction, MIC provides computer-based literature searches and general reference and referral service, both valid functions of this kind of unit in a large university library.

2.3 Who Uses The Service

In the first year, the emphasis was on serving an academic community with diverse interests, by means of a multidisciplinary data bank. (OSU is a large, urban university. Its Columbus campus has more than 50,000 students, the largest enrollment of any single campus in the nation. More than 7,000 courses are offered in 250 programs of study in such fields as the sciences, engineering, medicine, law, agriculture, home economics, business, dentistry, optometry, and education.)

In the second year, the emphasis shifted to acquiring available data bases in disciplines such as education, and in building retrospective data bases.

In the third project year, the emphasis was on expanding existing data bases and on acquiring new ones in the social sciences, agriculture, and psychology.

In the fourth year, MIC moved into a more operational phase, concentrating on expanding the use of existing services.

MIC was successful in all the four years. During 1974, we analyzed the impact on MIC services in the various academic departments. We found heavy usage of the MIC services in the graduate and undergraduate colleges. For the current awareness services, the major users were the College of Biological Sciences, Mathematics and Physical Sciences, Agriculture and Home Economics, Education, and Engineering. See Appendix B.

We also found that major use of current awareness services came from faculty members and graduate students, who have continuing interests that

17

23

do not change quarter by quarter. Students, both undergraduate and graduate, made the most use of the retrospective services, especially at the middle of the quarters when term papers were due. (See Table III.)

Therefore, both current awareness and retrospective services are needed to serve an academic community well.

Table III. Comparison of Users of Current Awareness
and Retrospective Services.

Users	Type of Service Used	
	Current Awareness	Retrospective
Faculty members	41%	14%
Graduate students	51%	56%
Undergraduate students	2%	23%
Staff	5%	4%
Others (mainly outside users)	1%	3%

SECTION 3.0 DATA BASES

MIC selected machine-readable bibliographic data bases that would satisfy many of the information needs of faculty and students at The Ohio State University.

In the first year, the MIC emphasized serving an academic community with diverse interests by means of a multidisciplinary data base, weighted heavily in the sciences and technology. In the second year, MIC began to acquire data bases in fields such as education, and began building retrospective data bases. In the third year, the MIC expanded existing data bases and acquired new ones in the field of social sciences, and in the disciplines of agriculture and psychology. In the fourth and last year of the grant period, MIC added no new data bases, but expanded the use of existing ones.

3.1 Multidisciplinary (MDS)

A unique aspect of MIC's operation is its use of an integrated, discipline-crossing data base in science and technology. Because the subject interests of researchers and teachers are often interdisciplinary and enter many areas of knowledge, it is necessary that they should be aware of developments in related fields, as well as their own. Students' interests also overlap into many subject areas.

Therefore, MIC constructed a multidisciplinary data base to satisfy the needs of a wide spectrum of researchers, teachers, staff, and students at The Ohio State University. The retrospective file, which contains almost 2.4 million citations after four years, and the current awareness file, which searched an average of 7297 citations a week, include references to:

(1) Journal literature
(2) Government reports
(3) Books
(4) Conference papers.

The coverage by the data base is most complete in engineering, physics, technology, biological sciences, and chemistry.

The data base is composed of five individual data bases which share a common format (either as received or after reformatting) and are physically integrated into one file. See Figure 6.

3.1.1 Current Awareness

The Multidisciplinary Current Awareness data base has been available since October 22, 1971. The first current awareness run searched 4913 records from Pandex and Science Citation Index. During the last year of
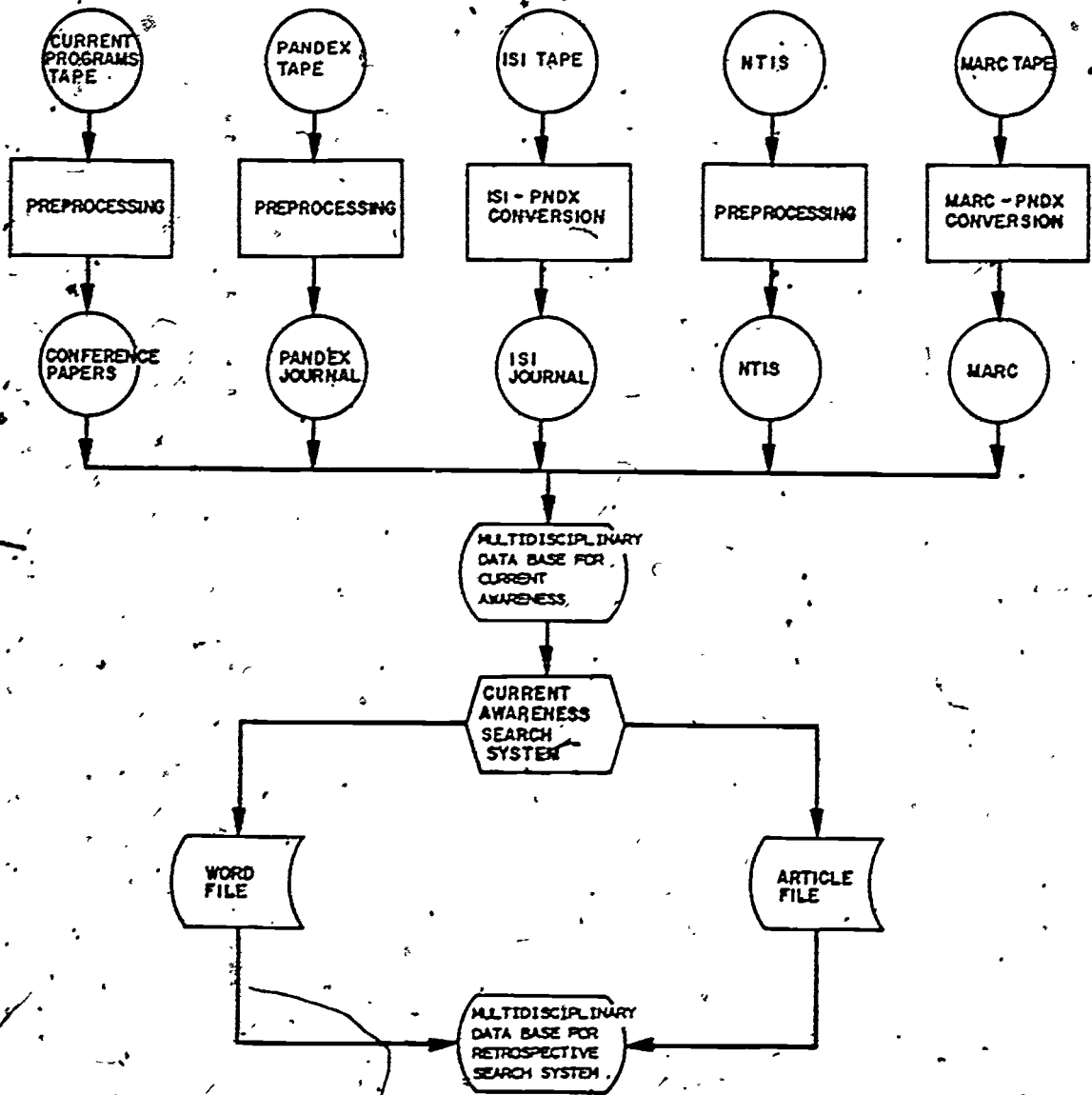
FIGURE 6. CONSTRUCTION OF THE MULTIDISCIPLINARY DATA BASE

30

the project, an average of 8,330 citations were searched each run. A total of 1,517,783 citations were searched in the current awareness service during the project. (See Table IV.)

The MDS Current Awareness data base is in a format called Pandex. The Pandex journal tape, government reports tape and the Conference Papers source tapes are received from the vendor in this format. A second journal tape, received in ISI format, and the book tapes, received in MARC II format, are converted into the Pandex format before they are merged into the MDS data base, as shown in Figure 6.

3.1.1.1 Pandex Journals

The main source for bibliographic citations of journal articles through most of the grant period was Pandex Current Index to Scientific and Technical Literature. The index was available on magnetic tape from MacMillan Information, a division of MacMillan Publishing Company, Inc., New York City. MacMillan ceased publishing Pandex in November 1974. The Pandex format for these tapes is the one used for all the MDS tapes, whatever the source.

In general, the journals and magazines indexed by the Pandex service were in science, technology, and medicine. The Pandex tape contains bibliographic information on article appearing in more than 2,400 journals. The bibliographic information for each record included the title of the article, author, full title and coded abbreviation of the journal, volume number, page number and appended thesaurus words. Originally, the thesaurus words were selected from the Pandex thesaurus by MacMillan Information and then added to the Pandex bibliographic records. This was done by a Pandex program which compared each word in the article title to a Pandex thesaurus and appended to the record the appropriate thesaurus term, when one was available.

The Pandex thesaurus was constantly changing. This had an impact on coding profiles for the current awareness system, and more importantly, would make it mandatory to either reprocess the various segments that would eventually comprise the retrospective data base, each time the thesaurus changed; or make the coding for retrospective searches much more complicated. MIC decided to freeze the thesaurus at the 1971 version. In early 1973, MIC began using a preprocessing program which compared each word in the title against a 1971 Pandex thesaurus and replaced the Pandex supplied thesaurus words in each record with MIC selected thesaurus words.

During the project, 649,527 articles and technical notes were supplied by Pandex and searched by the MIC search system. (See Table V.)

3.1.1.2 Science Citation Index Source Journals

The journal article citations from the Science Citation Index (SCI) source tapes were originally added to the MDS data base to supplement the

23

31

Table IV. Citations Searched Through the MIC Multidisciplinary Current Awareness Service

PUBLICATION TYPE	PROJECT YEAR				
	1	2	3	4	TOTAL
Journals	70,658	315,804	265,573	292,198	944,233
Government Reports	6,747	50,215	55,202	65,193	177,357
Conference Papers	13,146	29,156	47,710	97,042	187,054
Monographs	--	50,437	80,013	78,689	209,139
TOTAL:	90,551	445,612	448,498	533,122	1,517,783

32

33

Table V. Pandex Citations

Time Period	Citations Number For Period	Citations Cumulative
February 1, 1971 - January 31, 1972	45,354	54,354
February 1, 1972 - January 31, 1973	224,151	269,505
February 1, 1973 - January 31, 1974	214,151	483,656
February 1, 1974 - January 31, 1975	165,871	649,527

25

Pandex journal coverage. When Pandex ceased publication in November 1974, the SCI source tapes became the only source of journal citations in the MDS data base. The SCI tapes are available from the Institute for Scientific Information (ISI), Philadelphia, Pennsylvania.

Prior to the cessation of the Pandex tapes, the SCI tapes were run against a conversion program to delete citations to journals which were included on the Pandex tapes. Of the approximate 2,300 journals in the SCI data base, 900 were not duplicated by the Pandex tapes.

In addition to eliminating duplication between Pandex and SCI journal coverage, the conversion program changes the format of the SCI citations to the Pandex format and deletes such peripheral items as reviews, editorials, and letters. After November 1974, the conversion program converted all the article citations to Pandex format and deleted the peripheral items.

The information for each article or note included: title of the article, author(s), abbreviation of the journal name, volume number, issue number, and page number. The journal abbreviations are special 11-character sets of letters devised by ISI; they are not Coden. In addition, SCI does not include subject headings.

The SCI source tapes include items from foreign journals. If the article is not in English, ISI supplies the English translation of the title preceded by a two-character code to indicate the language of the article.

After conversion into the Pandex format, the SCI tapes produced 294,706 unduplicated citations during the project. (See Table VI.)

3.1.1.3 Government Reports

In addition to citations of journal articles, the MDS data base includes bibliographic citations of unclassified government reports that are indexed by the National Technical Information Service (NTIS) of the U.S. Department of Commerce. The NTIS was the third source used during the first project year.

NTIS is the central governmental agency for storing and disseminating information on reports resulting from government-sponsored research. The reports, most of which are compiled in a publication called Government Reports Announcements, are also included in the NTIS Bibliographic Data File, which is in machine-readable form. However, MIC receives the tapes through MacMillan Information, which reformats the original tapes into the Pandex format.

The reports cover 22 fields, mainly science, engineering, and mathematics, but also include material in the behavioral and social sciences.

Table VI. ISI Journal Citations Unduplicated by Pandex

| | Citations | |
Time Period	Number For Period	Cumulative
February 1, 1971 - January 31, 1972	25,304	25,304
February 1, 1972 - January 31, 1973	91,653	116,957
February 1, 1973 - January 31, 1974	51,422	168,379
February 1, 1974 - January 31, 1975	126,327	294,706

27

The bi-monthly tapes contain standard bibliographic information such as author and title, as well as abstracts, descriptor terms, and prices for paper and microfiche copies. The abstracts are dropped during MIC processing.

During the project 177,357 NTIS citations were searched by the MIC system. (See Table VII.)

3.1.1.4 Books

During the second project year, the MARC (Machine-readable Cataloging) II tapes, distributed by the Library of Congress, were added to the MDS data base. This tape file contains the catalog records for books cataloged by the Library of Congress and by other libraries participating in the shared cataloging program.

The MARC II tapes have proven to be a valuable source of information for all patrons. In addition to the hard sciences and technology, the subject matter covered includes the humanities and the social sciences.

During the project 209,139 MARC citations were included in the MDS data base. (See Table VIII.)

3.1.1.5 Conference Papers

Two sources for conference papers were used during the project. Current Index to Conference Papers was included in the MDS data base from December 1971 through March 1972. In July 1974, MIC began adding Current Programs to the MDS data base. This new source for conference papers is published by the World Meetings Information Center Inc., Chesnut Hill, Massachussetts. In each case the tape files were supplied by MacMillan Information:

Each of the conference papers sources contained bibliographic citations of papers delivered at professional conferences and meetings held throughout the world. Among the scientific and technical fields covered are electronics, medicine, geoscience, mathematics, and engineering.

The tapes from both sources were received in the Pandex format each month. A total of 187,054 conference paper citations were searched during the project. (See Table IX.)

3.1.2 Multidisciplinary (MDS) Retrospective

After each MDS Current Awareness run, the data base is retained, and at six months intervals, the citations are added to the MDS Retrospective file. Figure 6 shows the relationship of the MDS Retrospective data base to the MDS Current Awareness data base.

28

37

Table VII. NTIS Citations

| | Citations | |
Time Period	Number For Period	Cumulative
February 1, 1971 - January 31, 1972	6,747	6,747
February 1, 1972 - January 31, 1973	50,215	56,962
February 1, 1973 - January 31, 1974	55,202	112,164
February 1, 1974 - January 31, 1975	65,193	177,357

33

Table VIII. MARC Citations

Time Period	Citations Number For Period	Cumulative
February 1, 1971 - January 31, 1972	(not in data base)	
February 1, 1972 - January 31, 1973	50,437	50,437
February 1, 1973 - January 31, 1974	80,013	130,450
February 1, 1974 - January 31, 1975	78,689	209,139

39

Table IX. Conference Papers Citations

Time Period	Citations	
	Number For Period	Cumulative
February 1, 1971 - January 31, 1972	13,146	13,146
February 1, 1972 - January 31, 1973	29,156	42,302
February 1, 1973 - January 31, 1974	47,710	90,012
February 1, 1974 - January 31, 1975	97,042	187,054

40

First generated in July 1972, the MDS Retrospective data base is composed of two searchable data sets: an article file and a word file. The article file contains article information such as authors, title, volume, issue, page. The word file, an inverted file, contains the keywords from each article. These two data sets are linked by a unique document number generated by the search system. These data sets are on separate IBM 3336 disk packs.

At the end of the project, the MDS Retrospective data base contained 2,362,409 citations in the article file and 23,242,595 words in the word file, or 9.8 words per citation. The data base was composed of:

1) seven years of Science Citation Index source tapes
2) seven years of NTIS Bibliographic Data File
3) three years of Pandex tapes.
4) three years of MARC II tapes
5) two years of conference paper citations.

3.2 Disciplinary Data Bases

MIC also inaugurated services in discipline-oriented subject areas. In chronological order, these data bases were acquired:

(1) Chemistry
(2) Education
(3) Social Sciences
(4) Agriculture
(5) Psychology

The chemistry, social science, and agriculture data bases were for current awareness services, the education data base was for a current awareness service and a retrospective service, and the psychology data base was for a retrospective service only.

3.2.1 Chemistry

The bibliographic citations in the Chemistry Current Awareness data base are obtained from Chemical Titles, an "express tape service" of Chemical Abstracts service, a Division of the American Chemical Society. Chemical Titles includes titles of articles published in approximately 730 journals before an abstract of the article appears in Chemical Abstracts, which also is published by Chemical Abstracts Service. The tapes have been received from Chemical Abstracts Service since 1971.

The data base is used in the Chemical Titles format with each record including author, title, and journal citation. This bi-weekly tape service provided approximately 533,776 citations during the grant period. (See Table X.)

Table X. Citations in the Chemistry Current Awareness Data Base

Time Period	Citations Number For Period	Cumulative
February 1, 1971 - January 31, 1972	130,000(approximately)	130,000
February 1, 1972 - January 31, 1973	127,976	257,976
February 1, 1973 - January 31, 1974	132,024	390,000
February 1, 1974 - January 31, 1975	143,776	533,776

33

42

3.2.2 Education

The data bases used in the Education services are <u>Resources in Education</u>, formerly <u>Research in Education</u> (RIE) and <u>Current Index to Journals in Education</u> (CIJE). These data bases are prepared by ERIC (Educational Resources Information Center), a part of the U.S. Department of Health, Education and Welfare, and are obtained through MacMillan Information. RIE began in November 1966 and CIJE in January 1969.

RIE lists references to recently completed research-related reports and books in the field of education, child development, and educational psychology. These are the actual reports and not summary articles appearing in journals. For the most part, the reports are available on microfiche in the OSU Education Library and identified by an ED accession number supplied by ERIC.

CIJE contains citations to articles from approximately 530 to 700 journals in the field of education. All citations are identified by an EJ accession number. Most journals are available in hard copy in the Education Library. The accession numbers furnished make it possible for the user to look up the abstracts in the printed versions of RIE and CIJE.

The ERIC data bases are received and are searched in the ERIC format. The bibliographic information on the tapes include author, title, ERIC descriptors, identifiers, and journal citations. The abstracts are dropped during MIC processing.

The Education Current Awareness service includes the current issues of RIE and CIJE, which are received and searched monthly. When the service was begun during the second project year, an average of 2515 citations were searched each month. During the fourth and last year, an average of 2,860 were searched each month. (See Table XI for cumulative statistics.

After each Education Current Awareness run, the data base is retained, and at six months intervals, the citations are added to the Education Retrospective file.

When the Education Retrospective data base was first used during 1972, the file contained approximately 51,000 citations from RIE, November 1966 through June 1972. At the end of the project the data base consisted of 172,867 citations to articles and 4,270,495 keywords through which access to citations was made (24.7 words per citation). On January 31, 1975, the data base was composed of nearly eight years of RIE and five and one-half years of CIJE.

Table XI. Citations in the Education Current Awareness Data Base

Time Period	Citations		
	RIE	CLJE	Total
February 1, 1972 - January 31, 1973	(not compiled)		12,885
February 1, 1973 - January 31, 1974	13,824	19,181	33,005
February 1, 1974 - January 31, 1975	14,538	19,793	34,331
GRAND TOTALS			80,221

35

44.
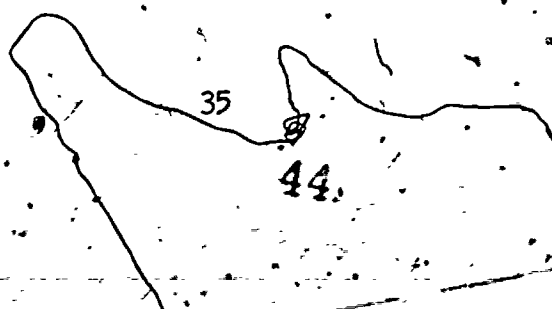
3.2.3 Social Sciences

The Social Sciences data base is composed of the Social Sciences Citation Index (SSCI) source tapes from the Institute for Scientific Information (ISI) and the MARC II tapes, distributed by the Library of Congress. The data base includes references to all articles and technical notes from approximately 1,000 journals in the social sciences as indexed in Social Sciences Citation Index and selected articles from 1,000 other journals, in addition to books cataloged by libraries cooperating in the shared cataloging program with the Library of Congress.

The Social Sciences data base, which has been available since April 1973, was used only for current awareness during the project. Approximately 4,400 citations were searched bi-weekly. A total of 207,696 citations were searched during the project. (See Table XII.) These citations have been retained in order to establish a retrospective service sometime in the future.

The information for each journal article or note includes: title of the article, authors, abbreviation of the journal title, volume number, issue number and page number. The journal title abbreviations are 11-character sets of letters devised by ISI; they are not Coden. In addition, ISI does not supply subject headings.

At MIC, SSCI source tapes and MARC II tapes are run against a conversion program which changes the original formats to the Pandex format and changes the journal titles to the full form.

Specific fields covered by the data base include Anthropology, Archaelogy, Business and Finance, Clinical Psychology, Communication, Computer Application and Cybernetics, Criminology, Demography, Economics, Environment, Ethnic Studies, Geography, Health and Rehabilitation, History, Human Development, Humanities, Industrial Psychology, Information and Library Science, International Relations, Law, Linguistics, Management Science, Operations Research, Philosophy, Political Science, Psychiatry, Psychology, Public Administration, Public Health, Social Issues, Social Work, Sociology, Technology, Transportation, and Urban Studies.

3.2.4 Agriculture

The Agriculture Current Awareness Service was established in May 1973. The Bibliography of Agriculture, which includes journal articles and research reports, was secured from MacMillan Information.* The

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* As of January 1975, MacMillan International stopped publishing the Bibliography of Agriculture. The Mechanized Information Center used tapes already received to supply the January service.

Table XII. Citations in the Social Sciences Current Awareness Data Bank

Time Period	Journal Articles	Books	Totals
February 1, 1973 - January 31, 1974	34,492	49,704	84,196
February 1, 1974 - January 31, 1975	48,403	75,097	123,500
GRAND TOTALS:	82,895	124,801	207,696

37

46

<u>Bibliography of Agriculture</u> citations are extracted by MacMillan Information from CAIN (Cataloging and Indexing Records), which is composed of bibliographic records for books, journal articles, and reports received by the National Agricultural Library. Approximately 9,700 citations were on each of the monthly tapes received. A total of 221,916 citations were searched in this data base during the project. (See Table XIII.)

The <u>Bibliography of Agriculture</u> tapes were received in the PANDEX format, which is the data base format used by MIC's processing programs. Thus, these tapes were processed by MIC in their original format. The information available in the <u>Bibliography of Agriculture</u> records includes author, title, journal citation or imprint, the language of publication if not in English, and the number of pages.

Specific fields covered include: Agricultural Economics, Agricultural Administration and Management, Land Economics, Legislation, Consumer Protection, Human Nutrition, Home Economics, Dairy Products, Livestock Products, Poultry Products, Crops, Horticulture, Animal Husbandry, Infectious and Parasitic Diseases, Forestry Management, Silviculture, Plant Taxonomy, Plant Ecology, Plant Morphology, Plant Genetics, Plant Physiology, Herbicides, Insect Pests and Controls, Soil Science, Water Resources and Management.

3.2.5 Psychology

In January 1974, a <u>Psychological Abstracts</u> retrospective file was acquired by MIC. This seven year data file, obtained from the American Psychological Association contained 139,629 citations for the years 1967 through 1973. The purchase of the 1974 data base was under negotiation at the end of the project.

The data base includes books, book chapters, journal articles, technical reports, conference proceedings, motion pictures, audio tapes, and dissertations.

The file is reformatted to the Pandex format, which MIC uses. Information retained includes:

(1) titles
(2) author
(3) journal name or book imprint or book title or Dissertation Abstracts International citation number or conference name
(4) year, volume, issue number, pages for journal articles; place, publisher, and date for books; author and title of the book for book chapters
(5) <u>Psychological Abstracts</u> reference for the location of the abstract.

The abstracts themselves are not retained.

Specific fields covered by the Psychology data base include: general Psychology, Psychometrics and Statistics, Perceptual and Motor Performance,

Table XIII. Citations in Agriculture Current Awareness Data Base

Time Period	Citations	Cumulative
February 1, 1973 - January 31, 1974	107,411	107,411
February 1, 1974 - January 31, 1975	114,505	221,916

39

48

Cognitive Processes and Motivation, Neurology and Physiology, Psychophar-
macology and Physiological Intervention, Infrahuman Psychology; Cultural
Influences and Social Issues, Social Behavior and Interpersonal Processes,
Communication and Language, Personality; Professional Personnel, Physical
and Psychological Disorders, Treatment and Prevention, Educational Psy-
chology, Applied Psychology.

3.3 Library Location Table

The Journal Library Location Maintenance File (LIBLOC) contains infor-
mation on the 6619 journal titles included in the source index tapes for _Science
Citation Index_ and _Social Sciences Citation Index_ and the Pandex tapes services.

The LIBLOC table is in machine-readable form. It contains the ab-
breviations used by the Pandex and ISI tape services, full journal title,
and three-letter codes for the library locations of the journal on campus.
MIC has verified the correct titles and checked all locations for the
journals in the Multidisciplinary Current Awareness and Social Science
Information Service.

The file was constructed so that MIC could print the location of the
cited journal on the stub of the notification card in the MDS and SSIS
services. This facilitates the first-page service and tells the patrons
where the journal is located in the OSU Libraries. (Table XIV is a list
of the location codes and the name of the Library location.)

While Pandex was being received, the file was also used during the
conversion run, to eliminate articles from approximately 1,415 journal
titles indexed in the _Science Citation Index_ which were also indexed by
Pandex. The cross reference capability of the file insured that patrons
did not receive two citations, one from Pandex and one from _Science Cita-
tion Index_, for the same article.

MIC continues to verify the titles and check all the locations for
the journals in the LIBLOC table. Although the number of journals in the
data base remained fairly constant, there were close to 100 changes a
month in the file because:

(1) the two suppliers of the journal tapes (MacMillan and ISI) change
    their journal coverages.

(2) the OSU Libraries subscribe to new journals that may also be indexed
    by the tape suppliers (not all journals in the MIC data bases are in
    the OSU collection), cancel subscriptions to journals that are in the
    data base, or decide to place a journal in the serials collection of
    a different department library.

(3) the publisher of a journal may change the name of the journal, stop
    publishing it, or merge it into another journal.

40

Table XIV.   Library Locations and Codes

Library Location Code	Name of Library	Location of Library on Campus
AGE	Agricultural Engineering	Ives Hall
AGI	Agriculture	Agricultural Administration Building
AGO	Agronomy Department	Townshend Hall
BOS	Biological Sciences	Botany Zoology Building
BSL	Black Studies	Main Library
CHE	Chemistry	McPherson Laboratory
CHI	Children's Hospital	not on campus.
COM	Commerce	Page Hall
EDU	Education	Arps Hall
ENG	English Graduate	Main Library
ENR	Engineering	Caldwell Laboratory
FIN	Fine Arts Library	Main Library
FOR	Foreign Languages Graduate	Main Library
GEO	Geology Library	Orton Hall
HEA	Health Sciences	Health Sciences Library Building
HIS	History Graduate	Main Library
HOM	Home Economics	Campbell Hall
JOU	Journalism	Journalism Building
MAI	Main Library Circulation	Main Library
MAT	Mathematics	Mathematics Building
MER	Mershon Collection	Main Library Bookstacks
MUS	Music	Hughes Hall
PHY	Physics	Smith Laboratory
REF	Reference Department	Main Library
SOC	Social Work	Stillman Hall
TOP	Topaz (optometry)	Optometry Building
UND	Undergraduate	Main Library
VET	Veterinary Medicine	Sisson Hall
WCL	West Campus	West Campus Library Building

Each change affects the file. For example, on December 20, 1973, MIC was notified by a tape supplier that the SPE Journal, which was being indexed by the supplier, was now called Plastic Engineering. MIC checked Central Serial Record Division of The OSU Libraries and found a listing for Plastics/Engineering (not Plastic Engineering), but the listing referred patrons to the SPE Journal. Two weeks later MIC received a notice from the tape supplier that it was dropping Plastics Engineering from its data base. The title was not exactly the same on the two notifications (Plastics versus Plastic), but the abbreviation was. However, the tape supplier still included the SPE Journal in its cumulative listing of journals for 1974. MIC then called the publisher, the Society of Plastics Engineers, in Greenwich, Connecticut, to verify the name of the journal (yes, it is now called Plastics Engineering and had been called the SPE Journal and it is still being published). The other tape supplier does not index the journal. The Libraries still has a subscription to it and copies can be found in the Chemistry Library. Each change necessitated checking it out and updating LIBLOC entries. Not all changes are as involved as this one, but the file takes continual monitoring.

SECTION 4.0 INFORMATION SERVICES

Basically, MIC tries to find the right information for the right person. If the right information can be generated by one of MIC's computer-based services, then that service is provided. If the right information can be furnished by other means, then those means are used. That includes sending people to other parts of the Library system, including Department Libraries, the Reference Department, the card catalog, the Circulation Department, or the Research Consultant, who provides individualized consultations with graduate students.

"We see the very same kinds of problems in helping patrons in the use of library resources, with a modern efficient MIC system for bibliographic retrieval, as we have seen historically with traditional library services," said Larry X. Besant, Assistant Director for Public Services of the OSU Libraries. "The MIC impact has been in actively reaching out to patrons."

MIC is an active disseminator of information. Once you sign up for a current awareness service, you receive updates every week, every two weeks, or every month, depending on the service. Because the services are all computer-based, MIC can serve the information needs of many users concurrently. And each new year of service is built on the base of services offered in previous years. There are some people who have used MIC current awareness service for all four years.

MIC is also an active marketer of it's services. We go out after people on campus by phone, by advertisements, by information booths, by placards on kiosks and on campus buses, and by many mailings. (The details are in the Marketing Section of this report.)

The result is that MIC is able to help an ever increasing number of people each year. In the first project year, when we were tooling up, we helped a little more than 300 people. In the fourth year, we provided service to more than 12,000 people.

The MIC services complement each other. A retrospective search brings a user up-to-date and current awareness keeps him or her up-to-date. During the four years of the project, MIC sent out more than nine million notifications of journal articles, books, government reports, and conference papers to subscribers who made use of the services.

There are now five MIC computer-base current awareness services in these fields:

(1) Multidisciplinary (mainly science and technology)
(2) Chemistry
(3) Education
(4) Social Science
(5) Agriculture.

43

52

The number of current awareness users increased (see Figure 7) as we added more data bases and services:

(1)   328 profiles by January 31, 1972,
(2) 2,086 profiles by January 31, 1973,
(3) 3,288 profiles by January 31, 1974,
(4) 4,143 profiles by January 31, 1975.

There are now three MIC computer-based retrospective search services in these fields:

(1) Multidisciplinary (mainly science and technology)
(2) Education
(3) Psychology.

As we added more data bases and marketed our services, the demand for the retrospective grew at a faster rate (see Figure 8) than even the current awareness services:

(1) 1,623 searches in the second project year,
(2) 5,936 searches in the third project year,
(3) 11,445 searches in the fourth project year.

We did not offer retrospective searches in the first project year.

Another service that was implemented was a document delivery system for users of the multidisciplinary current awareness service. MIC learned that for some people this was very useful. However, for others all we had to do was furnish sufficient information including the location of the library that has the journal in its collection and the user preferred to be his or her own document retriever.

The details about all our services are in this section.

4.1 Current Awareness

Each week more than 4,000 people are keeping up with new published literature through the five MIC Current Awareness Services. Almost half of the people use the multidisciplinary service. As shown in Figure 9, the Multidisciplinary Current Awareness is still the most widely used service.

The differences in demand for the services can partly be explained by the scope of the information covered. The broader the data base, the more people it can serve.

When MIC first began offering the services in 1971, the multidisciplinary service was offered to anyone who could not use the Chemistry service. The multidisciplinary data base was designed to cover the other fields, especially health and physical sciences and engineering. It covered other material in other fields, and still does. People from other
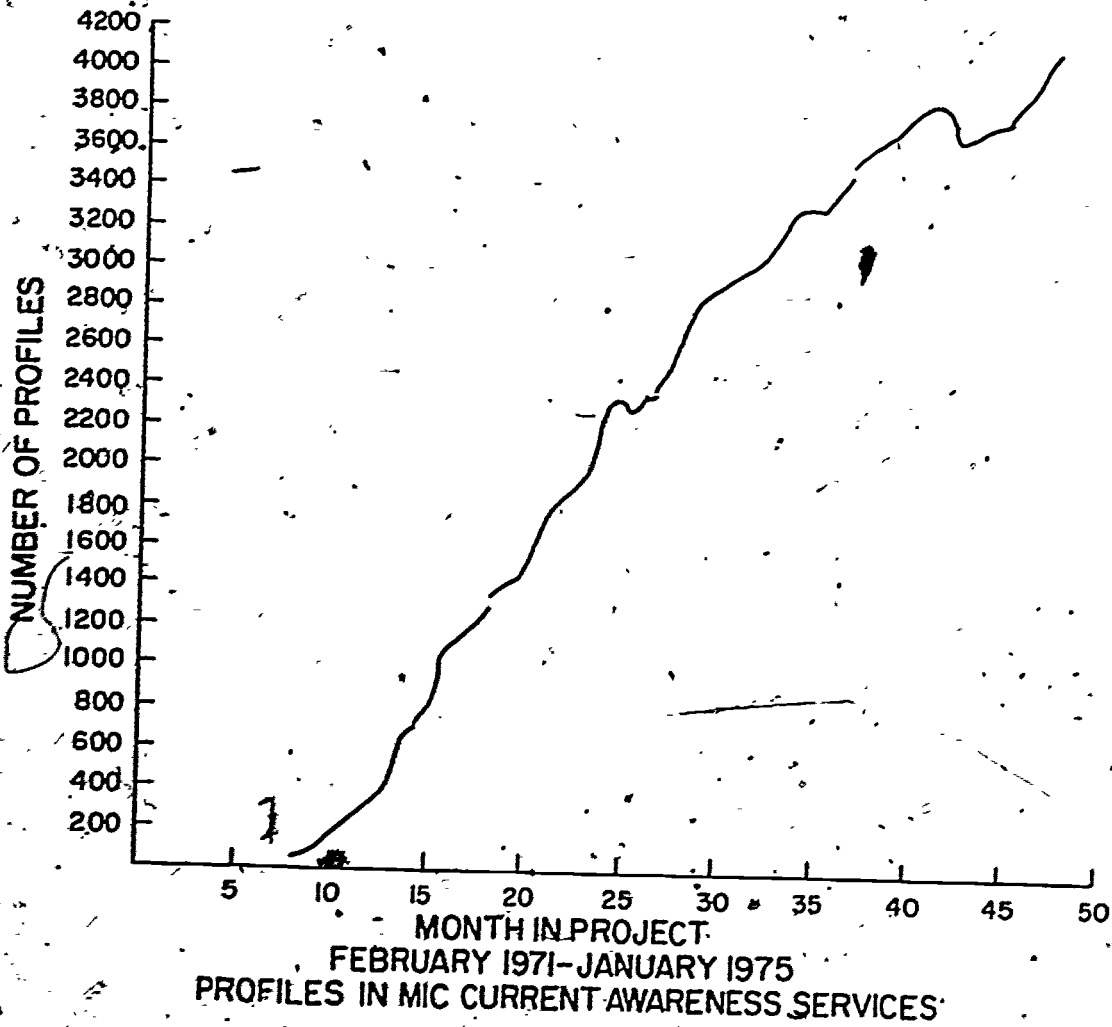
Figure 7. Growth in MIC Current Awareness Services
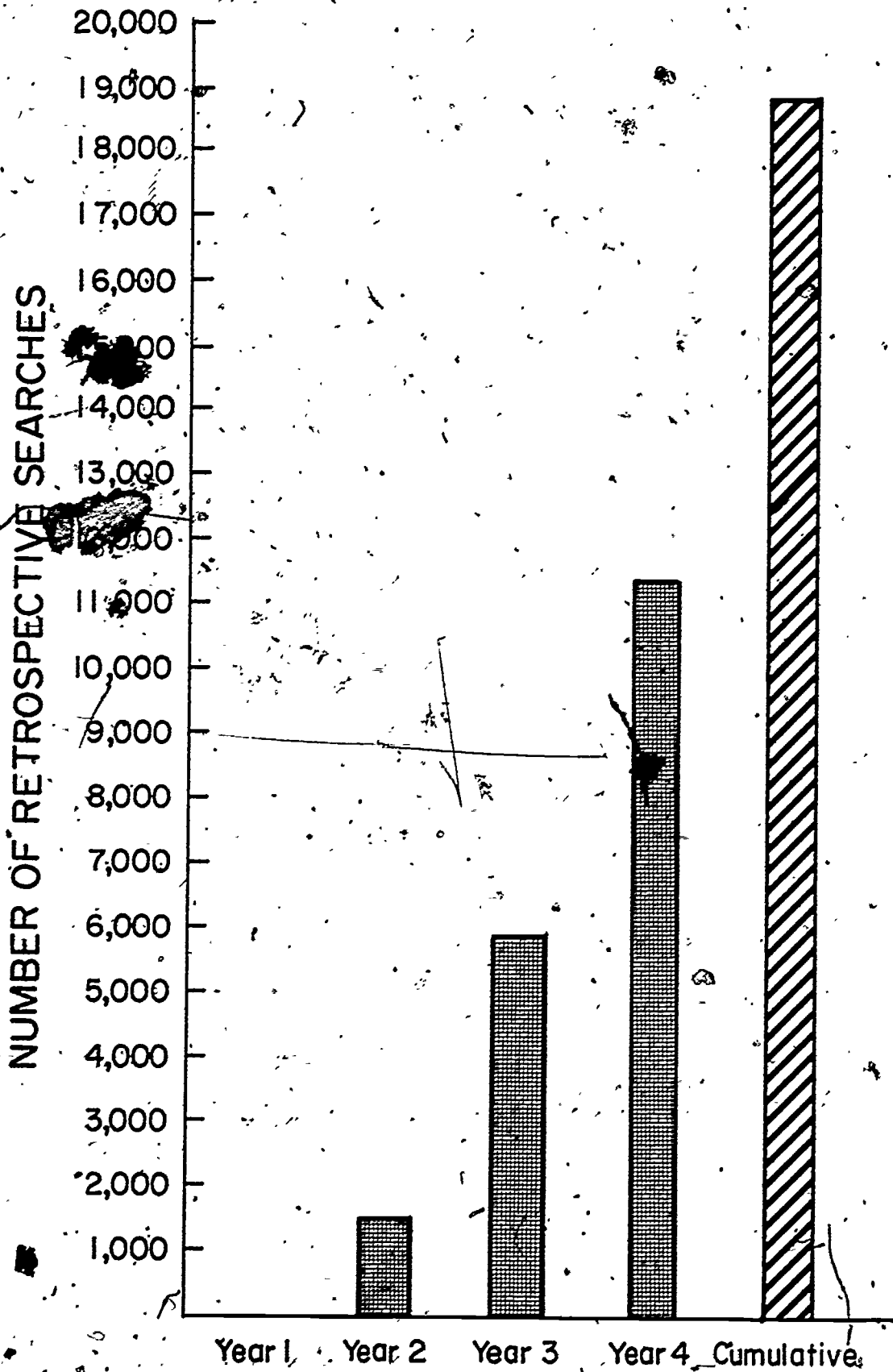
Figure 8. Growth in Retrospective Search Services
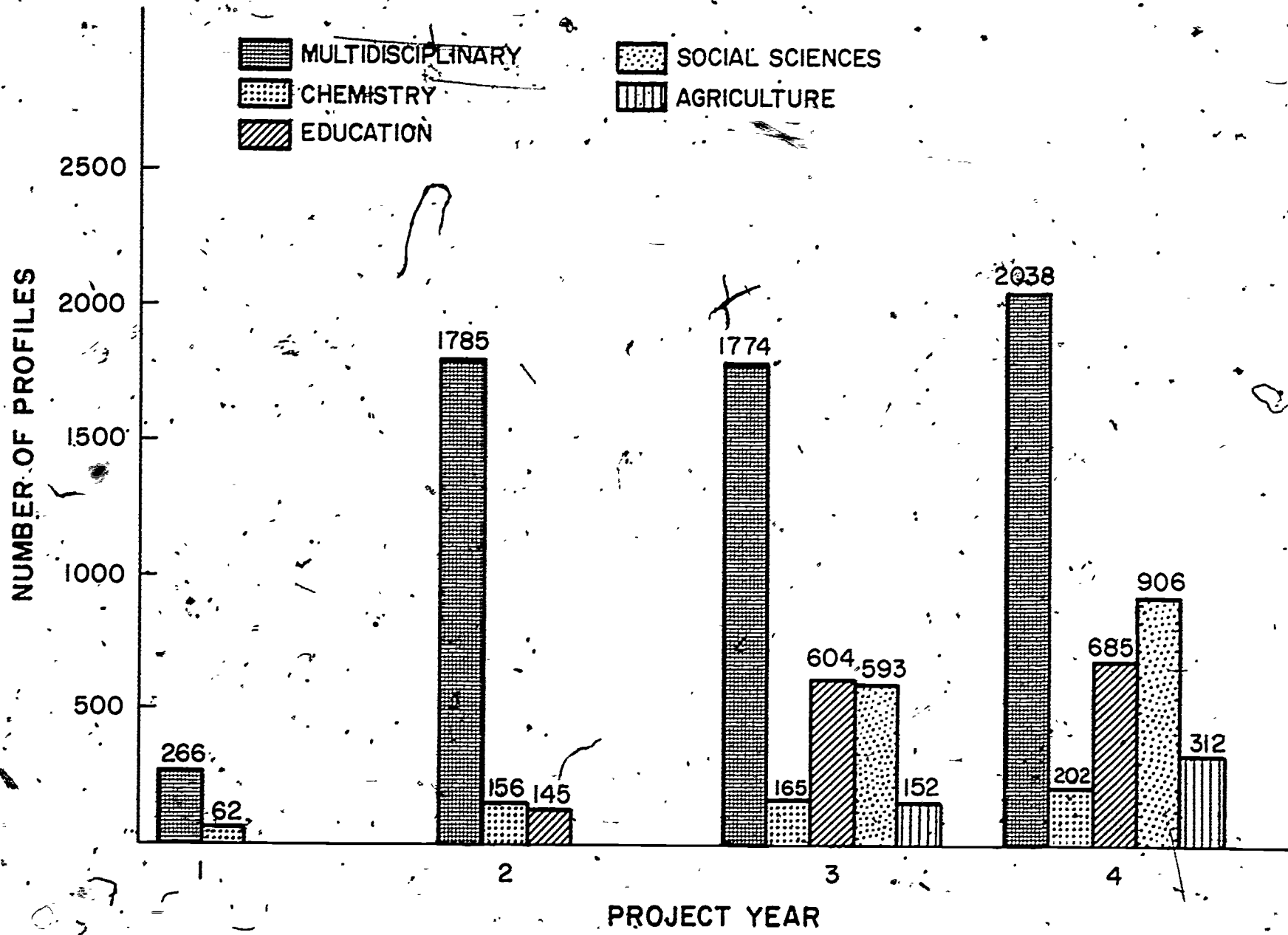
Figure 9. Profiles in the MIC Current Awareness Services

disciplines used the service even when there was only peripheral coverage of their fields, and the information they obtained was still useful. Social sciences is the next most broadly based service, education perhaps a close third. Chemistry and agriculture are both narrower disciplines.

In general, the demand for services is directly proportional to the broadness of the data base and, in some cases, how long a service has been offered.

All five current awareness services operate similarly when it comes to profiling. (See Section 2.) The number of citations retrieved by a search varies. In the past year, the average number retrieved per search was:

(1) multidisciplinary - 14 per week
(2) chemistry - 30 every two weeks
(3) education - 33 every month
(4) social sciences - 26 every week
(5) agriculture - 54 every month.

The total number of notifications sent out was more than 5.5 million, as shown in Table XV.

The details are below.

4.1.1 Multidisciplinary

The first MIC service, and still the most widely used, is Multidisciplinary Current Awareness. The broad scope of information covered 10,000 new items a week in a range of materials--conference papers, government reports, journal articles, and books--makes it useful in many disciplines. Fields covered include: aeronautics, astronomy engineering, mathematics, physics, information science, biological sciences, and other health sciences.

This service was the one most heavily used during all four project years (see Figure 9). More than 2,000 people are being kept up to date through it. Although it varied by only 64 over a three year period, there was a steady stream of new people using it each year. They are almost balanced however by those leaving the service because of:

1) graduation of students each quarter
2) transfer of profiles from Multidisciplinary to one of the other four current awareness services
3) faculty members leaving the campus
4) people no longer needing the service.

In addition, update sheets and copies of the individual profiles had been mailed out periodically during the first three years to all people using the service. These updates allowed the Information Specialists to

48

Table XV. Number of MIC Current Awareness Notifications Sent Out

SERVICE	Project Year				TOTAL
	1	2	3	4	
Multidisciplinary	37,381	790,757	1,233,551	1,591,936	3,653,62
Chemistry	14,139	83,356	102,041	140,914	340,45
Education	--	13,858	268,812	294,797	577,46
Social Sciences	--	--	208,979	496,755	705,73
Agriculture	--	--	80,840	158,992	239,83
TOTAL	51,520	887,971	1,894,223	2,683,394	5,517,10

59

screen out those people who are no longer interested in the service and to update the profiles of those who are. Approximately one-third of the users have some sort of change in their profile. The responses were a formal feedback mechanism that allowed MIC to improve the recall and precision of profiles.

However, the size of the service made such mechanism unwieldy to implement. It was discontinued and now a copy of all new and changed profiles are being sent to the patron as they occur. It is hoped that this would improve the user's awareness of what is in the profile and give him or her the opportunity to alter unsatisfactory search terms on a regular basis. The burden is now put on the Information Specialist responsible for each current awareness service to monitor the users, especially the low-hit and high-hit profiles.

OSU faculty have been the largest group of users of the MDS Current Awareness from its inception. However, Table XVI shows the steady increase in the number of graduate students using the service. They are currently as large a group of users as the faculty. They may be a larger group because many graduate assistants use the staff ID cards. This growth is most likely due to the influence of and the close relationship of faculty with graduate students. Also the nature of current awareness services is suitable only to those with longer-term interests. Faculty keeping informed in their field or graduate students working on theses or dissertations would be more interested in current awareness services than undergraduate students whose needs are usually limited to particular courses for that particular quarter. Few undergraduates use the service.

Because of the many people using the service and the many items to be searched, MIC changed the service from biweekly to weekly runs in the second project year. During the third and fourth years, the service was weekly with a separate mailing each month of the conference papers. Each user receives 64 separate and distinct searches during a 12-month period.

4.1.2 Chemistry

The Chemical Titles Current Awareness service was first offered by MIC during June 1971. At that time approximately 50 persons used the service. At the end of the project, 202 persons were receiving an average of 30 citations (notifications) every two weeks.

The chemistry service is unique in that the standard MIC software package is not used and the service itself was inherited and not initiated by MIC. However, the output from the system is a customized bibliography printed on MIC cards.

Table XVI. Analysis of Users of Multidisciplinary Current Awareness

		USER			
Project Year	Faculty	Graduate Students	Undergrad. Students	Staff	Other
1	87%	12%	< 1%	< 1%	0
2	57%	33%	3%	3%	4%
3	53%	41%	2%	3%	< 1%
4	48%	47%	2%	3%	< 1%

51

Searches on the Chemical Titles service (CT) from Chemical Abstracts Service (CAS) began during the 1967-1968 school year. This was prior to the formation of MIC. At that time they were administered by The University Libraries' Research and Development Division.

In February 1971, when the grant period began, MIC inherited the Chemical Titles System. This was kept intact in order to allow MIC staff programming efforts to be directed to establishing the new multidisciplinary services. No changes were made until August 1972, when the Chemical Titles output format from standard computer printout was converted to MIC notification cards.

MIC decided to retain the CAS search software because:

(1) a number of profiles were already written for the CAS system and differences between the CAS and MIC profile languages made conversions difficult.

(2) the nomenclature used in chemistry is unique in its use of punctuation, numerals, and meaningful prefixes, suffixes, and stems which cannot be searched in the MIC system.

The other major change to be made to the system during the project occurred in January 1973. At that time CAS changed the format of the CT tape from that which they had used since 1962 to the new standard distribution format (SDF). Rather than write new search software, MIC decided to convert the new SDF to the older format.

The Chemical Abstracts title search system differs considerably from the MIC search system. The MIC search system uses an inverted file approach. That is, each record of the data base is read and all of the searchable entries are isolated and built into a dictionary. Then the profiles are read and each word is located in the dictionary. In the CAS title search system, as many profiles as will fit are read into the computer memory. Then a single data base record is read and searched for the terms in the profiles. The search is essentially a character by character search down the title. It does, however, allow searching for any legal character string. The data elements which can be searched include the title words, the author name(s), and the title of the journal containing the article (or rather a CODEN or standard abbreviation of the title).

The chemistry search system allows three types of logic: OR, AND, and AND NOT. The logic is controlled in the profile language by dividing all of the terms to be searched into groups, or lists known as parameters. The items within a parameter are related by OR logic. After each term in a parameter has been searched, a logical result is obtained. Either

52

the parameter is satisfied (one or more of the terms are present) or it is not. When all of the parameters have been searched, the logical results are related by AND (or AND NOT) logic.

The chemists using the service like the combination of MIC card output and the flexibility of chemistry search system. However, in terms of computer time, it is an expensive system to run.

4.1.3 Education

The MIC Education Current Awareness, which was initiated in October 1972, is unique in that it is a decentralized service. It is a joint venture of MIC and the Education Library. The MIC Information Specialists and the Education Library's Reference Librarians do the profiles for the system. Further, MIC trained the librarians at the Center for Vocational and Technical Education (CVTE) also to do profiles for the Center's staff members.

Through the combined efforts of all concerned, Education Current Awareness has grown. In January 1973 there were 145 people using the service. Two years later there were 685 users. As the service grew in popularity, the proportion of graduate students using it also grew; graduate students were one-third of all users in January 1973, almost half by January 1974, and three-fifths by January 1975. Faculty use remained fairly constant and undergraduate use was negligible. (See Table XVII.) (The opposite was true for Education Retrospective. See Section 4.2.2.)

The interaction and training for others to do Education searches was learned by trial and error.

Staff members at the Education Library and CVTE were trained by the Information Specialists at MIC. Training was offered on an individualized basis. A computer-assisted instruction program to supplement the personalized training was written. Each trainee was assigned to an Information Specialist at MIC for further individualized training periods. Classroom lectures and in-service programs were also used to supplement individualized instruction. But for the most part, training was done on an individualized basis. During the entire project, all searches done outside MIC were monitored and reviewed by an information specialist at MIC. Continuing education programs also were regularly offered.

Searches in the Education Service are constructed, as they are in the other services, by using basic Boolean logic: the AND and OR logic and the BUT NOT logic, which is achieved by using a negative weight. Searching is done word by word. Searchable fields in the Education Service include: subject descriptors--major and minor, subject identifiers, authors (achieved by using the @ sign) and Key word in title (by using the + sign). The search uses a controlled vocabulary. The ERIC Thesaurus is the primary source used. The Thesaurus is excellent.

53

Table XVII. Analysis of Users of MIC Education Current Awareness Service

	Faculty	Graduate Student	Undergraduate Student	Staff	Other
1-31-73	20%	32%	—	4%	44%
1-31-74	21%	46%	4%	12%	17%
1-31-75	24%	59%	1%	12%	(4%

54

64

The problem with the MIC Search system, specifically when used with the education data base, is its inability to search on the basis of adjacency and to distinguish between major and minor descriptors. Descriptors in the ERIC Thesaurus, made up of two or more words, therefore, cannot be searched as distinctive and integral descriptors.

With the MIC search system, descriptors are searched word by word. Notifications therefore will be generated if these words appear anywhere in the search field. They do not have to appear adjacently or as integral descriptors. The fact that descriptors cannot be searched in their integrity or adjacently, decreases relevancy and precision in searching.

Citations generated in the Education Service are printed on 3 x 5 notification cards. The complete bibliographic information needed to identify the reference is given on the card. MIC offers an individualized program in Library Instruction for its users. Searches are done on an individualized basis, through a personal interview or by phone. Part of the instructional program involves explaining how to read the notifications generated by a search. Each of the services offered at the MIC generate some type of individualized variation in the format of the notification card it prints. To overcome this problem of inconsistency and to simplify library instruction, each of the services has an instruction sheet or sheets explaining how to read the notification cards generated. These instruction sheets are included in the results of the search.

There is a good document delivery system for the items retrieved by the search, both the Resources in Education (RIE) and Current Index to Journals in Education (CIJE). RIE lists references to recently completed research-related reports and books in the field of education. For the most part, the reports are available on microfiche in the OSU Education Library and identified by an ED accession number supplied by ERIC. CIJE contains citations to articles from approximately 530-700 journals in the field of education. All citations are identified by an EJ accession number. Most journals are available in hard copy in the Education Library. The accession numbers, the ED's and EJ's, used in the ERIC publications RIE and CIJE make it possible for the user to look at an abstract of a document cited in the search service. The appropriate volume of RIE or CIJE (all available in hard copy in the Education Library) are coded by accession number for easy cross reference. After checking the abstract, the user can then decide on the relevancy of the citation. The accession identification number, thus, makes for an excellent quick reference system. Consequently, after users receive their education searches, they normally take them over to the Education Library to retrieve the information cited on the notification cards.

4.1.4 Social Sciences Information Service

The Social Sciences Information Service was initiated in April 1973. It was the first new data base added by MIC in the third project year. The demand for this information service grew steadily. Within a few months, the number of profiles had climbed to 352 and by the end of the third project year, there were 593 users. A year later, there was more than 900.

The growth of the services has continued during the fourth project year. There were 738 profiles at the end of the first quarter, 795 the second quarter, 763 in the third quarter, and 906 at the final quarter. The slight decline in the number of profiles during the third quarter can be partially attributed to the reduction in the campus population for the summer sessions. As expected, the use of the service increased during the fourth quarter, when students and faculty returned to campus.

There was a 53% increase in the number of users in the Social Sciences Service from the end of the third project year to the end of the fourth year. This is partly due to the inclusion of the new service in the regular promotional activities. The major factor, however, was the effort of the Information Specialists to locate and transfer those MDS profiles that were more appropriate to Social Sciences. Most of the profiles had to be revised in order to be transferred because the Multidisciplinary Service uses a controlled vocabulary and the Social Sciences does not. The natural language profiling for the Social Sciences Service requires greater awareness and utilization of synonyms, related terms and variant word endings. The Information Specialists also noted that many people who were using the Agriculture Current Awareness could benefit from the Social Sciences Service as well, such as faculty members and graduate students in the Department of Agricultural Economics and Rural Sociology. Much of the growth of the service can be attributed to this kind of special effort or the part of the Information Specialists and to word-of-mouth promotion or the part of people already using the service.

The growth of Social Sciences Service indicates that it has wide appeal in the campus community. The data base includes articles from approximately 1,000 social science journals covered by the ISI tape versions of the Social Sciences Citation Index and all new books listed by the Library of Congress on its MARC tapes. During the third project year, the number of notifications sent out was 208,979. There were 496,755 notifications during the fourth project year, an increase of 137%. The total number of notifications for the two years that the service has been offered was 705,734. The average number of notifications per profile was 26.

Again, the major use of this service is by faculty members and graduate students. They constituted 90% of the users of the service. (See Table XVIII.)

Table XVIII.   Analysis of Users of MIC Social Science Current Awareness

	Faculty	Graduate Student	Undergraduate Student	Staff	Other
4-13-73	50%	34%	8%	4%	4%
1-31-74	42%	48%	4%	5%	1%
1-31-75	39%	51%	4%	5%	1%

4.1.5 Agriculture Current Awareness

The Agriculture Service was used during the last two project years. The service, referred to as AGRO, is a monthly current awareness service which searched approximately 10,000 citations each month. Source of the information was The Bibliography of Agriculture, which included titles and authors of articles and reports received by the National Agricultural Library. The tapes were obtained from the National Agricultural Library, U.S. Department of Agriculture, through MacMillan information.

AGRO, like chemistry, is another discipline oriented data base. At the start, therefore, attempts were made to promote the service among certain groups at The College of Agriculture and Home Economics, the Department of Agronomy, The Ohio Agricultural and Research Center (OARDC), and the Agricultural Technical Institute (ATI) in Wooster. Some type of cooperative efforts were also made to promote the service through the Agriculture Library. The librarian regularly announced the service at Faculty meetings in the College and helped publicize it though his library through the various instructional handouts developed by MIC.

The efforts at promoting the service to various OSU groups was successful. OARDC had 51 patrons in the service and the ATI, 25. These are notable statistics especially when one realizes these two institutions are located 70 miles off campus. MIC information specialists made visits, lectures, and phone calls to both locations.

The AGRO, like Social Science, is a natural language search. A controlled vocabulary or Thesaurus is not used. Coding is facilitated and can be done as part of the interviewing process. It was not necessary to first take the vocabulary of the patron and then standardize it before coding a search request. Therefore, much time was saved by not looking up terms in a thesaurus. However, since no standardization was used in the vocabulary, the coder and interviewee both had to make allowances for word derivatives or inflections as they might appear in titles. Singulars and plurals of words had to be considered. Adjectives, adverbs, and synonyms also had to be considered. Since title words could appear in any of a number of various forms or stems, much truncation was utilized in the AGRO and Social Science services. Considerable caution and repetition in coding had to be utilized often times however in order to prevent false drops which resulted from poorly thought-out truncations. This was the most serious drawback of a natural language search. A truncation like TRANSPORT*, for vehicular transportation, would also give the transports of liquids and gases if the word were truncated after the stem TRANSPORT*.

The growth of AGRO service was steady: 150 users in January 1974 and 312 in January 1975.

In the first year AGRO was offered as a service each person using the service received approximately 100 notifications a month. The profiles were refined to insure that the information wanted by the user

was being received. As the information specialists became more familiar with the terminology, they were able to decrease the number of false drops. By the end of the second year, the average had dropped to 54 per user.

Again, the graduate students and faculty made heavy use of this current awareness service, as shown in Table XIX. Ninety-five percent of the use was by them. This is a phenomenon of current awareness services.

4.2 Retrospective

The major growth in providing services, especially in the fourth year of the project has been in retrospective literature searches, especially in the multidisciplinary and education fields. (See Figure 10.)

For example, in the Spring and Fall academic quarters of 1974, MIC did nearly 3,500 searches and 3,000 searches, respectively. The total of those two quarters alone is more than MIC did in the whole third project year.

Students are the majority users of this type service. See Table XX. Undergraduates, who make little use of current awareness services, constitute a fourth of the use of retrospective searches, especially in the middle of quarters when term papers are due. More than 4,000 have done such searches. And coming into MIC may have been their first touch of using library resources on a campus. Hopefully, it will be the first of many.

4.2.1 Multidisciplinary

The Multidisciplinary (MDS) Retrospective Service, the first retrospective service to be offered, was initiated in July 1972 during the second project year. It was available on a weekly basis and covered the literature of science, technology, and medicine from 1967 through 1971. The data base, which was updated every six months, included journal articles from PANDEX and Science Citation Index, technical reports (NTIS), and books in any area listed on the Library of Congress MARC tapes.

The number of people using the MDS Retrospective Service increased dramatically each year. During the first seven months the service was offered, there were 1,271 searches (including a record of 118 searches for one week) which generated 207,610 notifications. The number of searches run during the following year was 3,601, almost three times as many as the previous seven months. The number of notifications was 747,830, an average of 178 per search. During the fourth project year, there were 6,022 searches in the MDS Retrospective Service. More than one million notifications were generated, although the average number per search, 176.8, was almost the same as the previous year.

59

Table XIX. Analysis of Users of MIC Agriculture Current Awareness Services

	Faculty	Graduate Student	Undergraduate Student	Staff	Other
4-19-73	71%	29%			
1-31-74	38%	57%	4%	1%	
1-31-75	39%	56%	2%	3%	1%
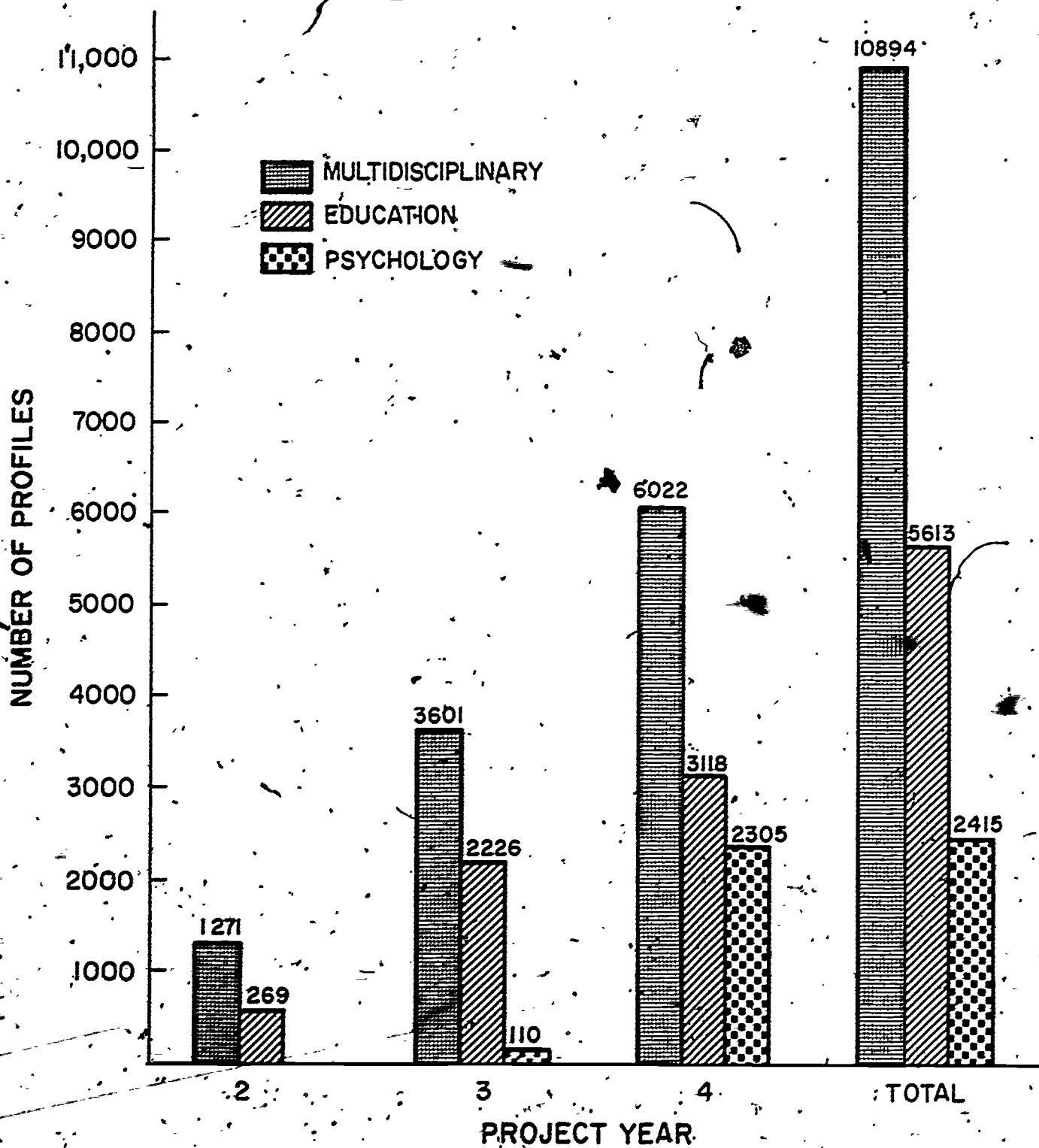
Figure 10. Profiles in the MIC Retrospective Search Services

61

Table XX.   Analysis of Users* of MIC Retrospective Services

	Faculty	Graduate Students	Undergraduate Students	Staff	Other	TOTAL*
Year 2	263(21%)	676(53%)	213(17%)	41(3%)	83(6%)	1276
Year 3	823(14%)	3184(56%)	1114(19%)	228(4%)	394(7%)	5743
Year 4	1524(14%)	6313(57%)	2790(25%)	375(3%)	147(1%)	11149
TOTAL	2610(14%)	10173(56%)	4117(23%)	644(4%)	624(3%)	18168

* Some users had more than one retrospective search done. The total
number of searches performed was 18,922, as shown in Figure 10.

The Multidisciplinary Service was the most heavily used of the three retrospective services offered during the fourth project year. As expected, most of the people using the MDS Retrospective Service were students. Although many students found out about MIC through others who had used the service or through MIC advertisements, many faculty members recommended or even required that their students use MIC services for term paper assignments. Thus, most MDS Retrospective searches for undergraduates were requested during the third and fourth weeks of the academic quarter, while requests of faculty members and graduate students were more spaced out over the quarter. An analysis of the users of the services is shown in Table XXI.

4.2.2 Education Retrospective Service

The Education Retrospective Service became operative at MIC in October of 1972, near the end of the second project year. Initially the retrospective data bank only consisted entirely of Resources in Education (RIE) citations. There were approximately 51,000 citations in the RIE data base. The period searched was from November 1966 through June 1972. At the end of the reporting project year, February 1, 1972 through January 31, 1973, 269 patrons had used the retrospective service and had received a total of 58,188 notifications.

During the third reporting project year, February 1, 1973 through January 31, 1974, the retrospective data base increased by 160% to 134,268 citations, and included:

(1) RIE - November 1966 through June 1973
(2) CIJE (Current Index to Journals in Education) - January 1969 through June 1973.

During the third year, two-fifths of all retrospective searches performed were in Education. The total number of notifications sent out in the Education Retrospective Service for that year was 523,257.

In the fourth reporting year the ERIC retrospective data base increased to approximately 190,055 by April 1975 and included:

(1) RIE - November 1966 through December 1974
(2) CIJE - January 1969 through December 1974.

At the end of the fourth project year 3118 retrospective searches were run in the Education Service, an increase of 892 searches (40%) over the previous year. A grand total of 5613 searches were run for Education during the three years it was offered. Most of the Users were graduate students. See Table XXII.

Table XXI. Analysis of Users of MIC Multidisciplinary
            Retrospective Service

	Faculty	Graduate Students	Undergraduate Students	Staff	Other
Year 2	22%	56%	19%	2%	1%
Year 3	15%	57%	24%	2%	2%
Year 4	15%	51%	30%	3%	1%
TOTAL	16%	54%	27%	2%	1%

Table XXII. Analysis of Users of MIC Education Retrospective Service

	Faculty	Graduate Students	Undergraduate Students	Staff	Other
Year 2	13%	39%	4%	7%	37%
Year 3	13%	53%	11%	7%	16%
Year 4	13%	66%	14%	5%	2%
TOTAL	13%	60%	12%	6%	9%

4.2.3 Psychology Retrospective Service

In January 1974, MIC began the Psychology Retrospective Service. This service was eagerly awaited by both the users and the information specialists. It helped satisfy a need for a retrospective search service that was wholly useful in the social sciences.

During the project, 2415 bibliographies (an average of 48 users for each of the 50 mailings) were produced. The largest number of profiles in a Psychology Retro run was 105 in the April 25, 1974 mailing. The smallest number of profiles in a run was 12 on September 5, 1974, which was during the quarter break.

The following list summarizes the user population of Psychology Retrospective Service during 1974 and 1975.

Faculty	287	12%
Graduate Students	1369	57%
Undergraduate Students	653	27%
Staff	72	3%
Other	34	1%
	2415 users	

The Psychology Retrospective service provides references to literature which has been abstracted, reviewed, or cited in Psychological Abstracts. These references include books, chapters in books, conference proceedings, dissertations, and journal articles.

Although the Psychology Retrospective Service scanned 130,629 citations, the average number of citations printed per profile was 125.

In the Psychology Retrospective Service, the MIC notification card is identified at both top and bottom as being from the Psychology Service. The main section of the card is printed with standard citation information (author, title, and source information) and two lines of index terms. The abstract location in Psychological Abstracts is printed on the notification card stub. Thus the user can easily examine abstracts to verify the importance of the document prior to securing it.

In addition to the MIC Information Specialists, the librarians in the Education Library have coded Psychology Retrospective profiles since the beginning of the service. The Education Library houses the psychology collection of the OSU Libraries, and the librarians in that library had prepared Education profiles since October 1972. As a result of profile preparation in the Education Library, the users of that library might more readily accept computerized index searching as a standard feature of university library service. The profiles prepared in the Education Library are merged with the MIC prepared profiles prior to the Psychology Retrospective Service computer runs. Approximately 12% of the Psychology Retrospective profiles have been written in the Education Library.

Profile terms which can be used in user profiles for this data base include keyword from title, keyword from index term, index term number, and author name.

To prepare a profile for the Psychology Retrospective Service, the Information Specialist uses a thesaurus of Psychological Index Terms and a word frequency list. The thesaurus was prepared by the MIC staff programmers using a magnetic tape copy of the Psychological Abstracts thesaurus tape. This thesaurus includes index term numbers which are not included in the Thesaurus of Psychological Index Terms, 1974, published by the American Psychological Association. These term numbers are used by the Information Specialist to specify a specific term rather than searching the component words of the group. This technique provides greater precision in the Psychology Retrospective Search results than possible in both the Education Services which also uses a thesaurus.

The word frequency list assists the Information Specialists in predicting the recall capabilities of requested words. Also, the Information Specialist will code the low frequency word of a word pair before the high frequency word in the pair. The low frequency word is coded first for two reasons:(1) to be more economical in computer utilization and (2) to eliminate saturation on a term which will happen when terms having a frequency greater than 10,000 are searched first.

The results are effective and efficient searches of the literature.

4.3 Document Delivery

The MIC Document Delivery System includes: (1) making the notification card informative enough so that a user, if he or she desires, can obtain the document directly from the library, and (2) providing a first page service for those who want MIC to find the document and make a copy of the abstract.

The MIC Current Awareness and Retrospective Search services generate notices of journal articles, technical notes, books, conference papers, government reports, and reports. Some of these items are in the collection at the Main Library and many are in the collections of the 23 Departmental Libraries. Some items are hard copies, some are on microfiche. Some are available on campus, some have to be ordered, and some have to be borrowed through Interlibrary Loan.

To close the information loop, a relevant document has to be obtained somehow.

4.3.1 Library Resources

Approximately 3.4 million volumes, representing more than a million unique titles, are in the collection of The OSU Libraries. The Libraries

also subscribe to 25,000 journals. The journals and books are either in the Main Library, or in any one of 23 departmental libraries and ten office libraries, or in the Undergraduate Libraries.

The collection is tied together by an automated circulation system for books and by a card file in the Central Serial Record of the Librar-ies, Serials Division, for journals. You can call the circulation system, find out if a book is in the OSU collection and charge it out over the phone. You can call CSR to check on journal holdings.

Backing up the OSU Libraries resources is the Interlibrary Loan Office, which will process requests for materials that are not in the OSU collections but that are in the collections of other libraries.

In order to help smooth the interface between MIC services and the library resources, MIC redesigned the notification card. Each notifi-cation now specifies at the top of the card whether the item in question is a journal article, government report, conference paper, or book. Explanations of the cards are included with all retrospective searches. It explains what is on the cards and where to go for copies of the document.

For example, microfiche copies of RIE (Research in Education) doc-uments are available in the OSU Education Library. If an RIE document is selected by the MIC education current awareness or retrospective search service, the stub of the notification states that a copy is available in Room 060 in Arps Hall, the location of the Education Library.

The bibliographic information is complete enough in all services for a user to find the items himself or herself. MIC has also held seminars with other library departments to explain the service and the cards.

To check if a book is in the OSU Collection, the stub tells the patron to call 422-3900, the telephone number of the automated Library Circulation System.

As a result of the demand for government reports generated by the MIC services, the OSU Libraries placed an order for SCIM (Selected Cate-gories in Microfiche) from NTIS (National Technical Information Service).

The selected categories include all PB and AD documents in:

(1) Chemistry
(2) Civil, Structural and Marine Engineering.
(3) Communication Systems
(4) Computers, Control Theory, Information Theory
(5) Earth Sciences
(6) Economics, Business and Commerce
(7) Energy Conversion (non-Propulsive)
(8) Environmental Pollution and Control
(9) Industrial and Mechanical Engineering

68

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(10) Management Practice and Research
(11) Materials Science
(12) Nuclear Science and Technology
(13) Physics
(14) Transportation
(15) Library and Information Sciences
(16) Building Technology.

4.3.2 MIC First Page Service

. Further, MIC offers its own first page service for those people
using the MIC Multidisciplinary Current Awareness Service. If a user
sends in the stub from a notification card, MIC will try to locate the
journal on campus and make a photocopy of the first page of the article.
(The stub was designed to be the order form.) This first page usually
contains an abstract of the article. If there is no abstract, then the
opening paragraphs will give a summary of the article's contents. If the
request is for a government report, MIC makes a photocopy of the page on
which the abstract appears in Government Report Announcements.

During the project, MIC filled almost 7500 requests for first page
photocopies from the OSU collection. (See Figure 11.) A dime is charged
for each first page. The furnishing of copies is an optional feature of
the multidisciplinary current awareness service. Many patrons go directly
to the library to make copies since there is enough information on the
notification card for patrons to find the journal themselves. The copy
service is a convenience only.

The requestor can use a first page as an interim step before deciding
on whether he or she wants a complete copy of the article. -

The demand for first pages went down yearly. This probably shows
that MIC has made the notification easy enough for a patron to find the
item directly.

MIC implemented the Journal Library Location Table (LIBLOC) to make
it easy to locate a journal. It is constructed so that MIC can print
the location of the cited journal on the stub of the current awareness
notification cards. This facilitates the first page service and also
aids many users in going directly to a department library to locate an
article.

MIC staff members have found MIC cards in journals at the citation
on the notification and have seen graduate students with MIC cards in
the bookstacks, trying to find the cited reference.

MIC tries at least three times to find the requested item, if it is
in the OSU collection. As can be seen in Figure 11, 40% of the requests

69.

79.
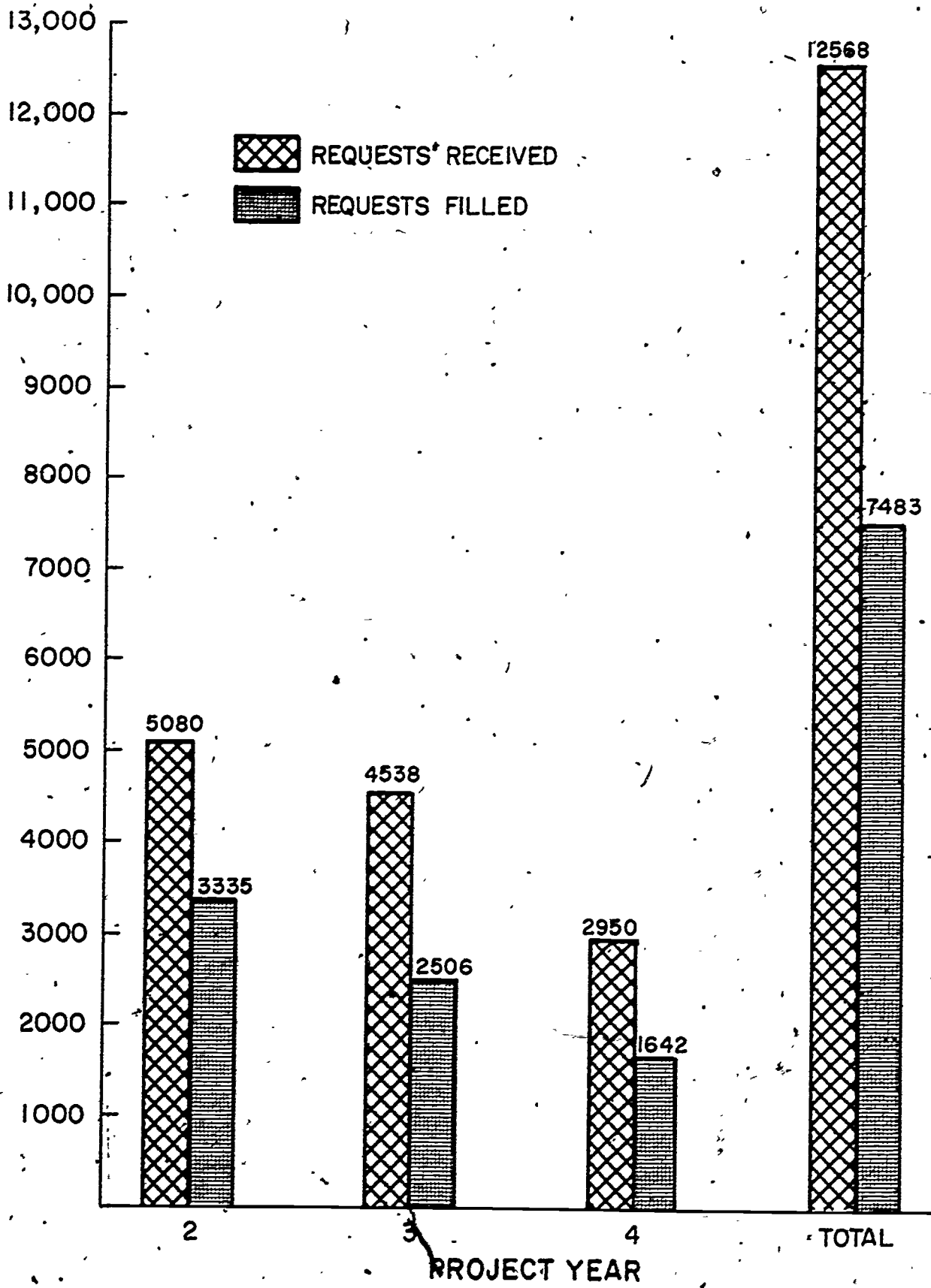
Fig. 11. First Page Service

are for items either not in the collection or in issues that have been "borrowed."

4.4 Other Reference Services

Because MIC is an integral part of Public Services of the OSU Libraries and the MIC Information Specialists are reference librarians, MIC provides reference services other than computer-based ones.

These services range from telling people how to use the card catalog at a department library to recommending to graduate students that they contact the Research Consultant at the Main Library to help them with their dissertations. At times, because MIC actively advertises for people to use its services, the first contact an incoming student has with the whole Library system is MIC. In these cases, MIC explains the library system, including the decentralized collections and centralized automated circulation system.

In one morning, for example, MIC Information Specialists told different patrons that the Black Studies Library has information about Malcolm X, that the Reference Department and the History Graduate Library would have information on the population trends along the Chinese side of the Sino-Soviet border, and that the History Graduate Library and the Health Sciences Library could help locate information on the history of Medicine in Ethiopia.

Two of the MIC information specialists had been reference librarians in the Education Library and one had worked as a cataloger in the Technical Services Division. All are familiar with the OSU Collection and resources.

In these ways, MIC is helping to make the OSU collection as accessible as possible to patrons.

SECTION 5.0 SYSTEMS AND PROGRAMMING

The major programming activity at MIC has been to adopt, develop and maintain information storage and retrieval software to maximize the utility of the machine-readable bibliographic data bases. A unique MIC search system was developed in-house. It is based on what we learned from other systems.

Initial efforts along these lines centered on the adoption of a search software supplied by CCM Information Corporation. When this system proved too slow for projected volume, MIC decided to modify a search software previously developed by the Technical Information Dissemination Bureau (TIDB) of the State University of New York at Buffalo. The difference between the two is basically that the CCM software employs a character by character search strategy, while the TIDB software employs an inverted file approach.

Modification of the inverted file search software was successful and it now serves as the nucleus of the various MIC bibliographic retrieval systems. The major changes made by MIC reflected the difference in data base formats and the nature of the operating environment. Very few changes were made with respect to search algorithm. A number of new programs were added to the system either to satisfy users' requirements or to improve the system's capability.

During the first project year, the modified, vastly improved search software served as the MIC Multidisciplinary Current Awareness Search System. The system proved to be economical and reliable.

Consequently, during the subsequent project years, system development efforts have been concentrated on the extension of the MIC Current Awareness Search System to support the multidisciplinary retrospective search system, and the disciplinary search systems. In addition, changes and refinements were made to some operational programs and procedures to improve system efficiency. A catalog of service requests and changes is included as Appendix C to provide a sequence of events and development activities during the four-year project.

The unique MIC search system is briefly described in this section. Back-up details are in MIC's three annual reports.

5.1 The Operating Search System

The MIC bibliographic search system consists of ten application programs and several IBM supplied utility programs, the nucleus being composed of only five application programs. They are, by logic order and sequence: (1) PROMAIN, (2) WORDGEN, (3) INVERT; (4) MATCH, and (5) MICPRINT. These five programs are more or less environment independent, and may be adapted together with other user environment dependent programs for a bibliographic information search system. (See Section 2 for an overview of the system and Figure 4 for a schematic layout of the programs.)

5.1.1 Retrieval Modes

The system gives five different types of information retrieval. The five searchable data elements are:

(1) Author index - twelve characters in length, preceded by a unique identifier '@'. Author names take the following form:

       @HSU JH
       @EATON R
       @HEINEMAN L

If the total number of characters for an author index, including identifier and initial or initials, is greater than twelve, the last name is automatically truncated to eight characters in length.

(2) Thesaurus term - twelve characters in length, generated from a standard MIC Thesaurus.

(3) Title word index - a maximum length of twelve characters, preceded by a special symbol '+'. Any word from a title automatically becomes a title index, if it is not a word in the stoplist nor converted into a Thesaurus term.

(4) Journal coden abbreviation - from the ISI and Pandex tapes, identified by a special character '$' preceding the abbreviation. Currently, there are two sources of abbreviations in the data base: the ISI title abbreviation, which is eleven characters long, and the standard Pandex Coden, which is five characters long. Examples are:

       $CHDDA
       $EEECA
       $DEVELOP MED
       $AUST J CHEM

(5) LC call number or classification - from the MARC tapes. This element is also preceded by a special character '$', and followed by a string of no more than eleven characters. The numbers take the following form:

       JC491.M285
       JK2274.A3W6

If an index word is available, the Thesaurus word, not the title word, should be used. The Thesaurus word has priority over the title word because a title word is automatically converted into an index word during the data base generation process. For example, COMPUTER is a Thesaurus term that takes care of words like COMPUTERS, COMPUTER-BASED, COMPUTERI-ZATION, as well as COMPUTER.

as long as the length of the term does not exceed the maximum of twelve characters. Though the truncation option may be applied to all of the five different search modes, only right hand truncation is permitted.

5.2 File and Data Structure

MIC decided to use the Pandex format as the internal standard format for all vendor-supplied data tapes because it is flexible and most of the data bases were already in Pandex format. Except for the leading sixteen positions, which are used to identify the type and status of a record, the Pandex format is of variable length type with field identification tag for each data element.

The searchable data base consists of two files: an inverted word file and a direct access article file.

The inverted word-article file consists of an index and a collection of data records. Each record is designed to fill a single track of the IBM 3336 disk pack, and the index also fits on a single track. The track index is an array of 12 character words; the word entry in each position in the index is the last significant word stored on the corresponding track. The index also includes a constant specifying the total number of tracks occupied by the file.

Each data record consists of a 4 byte binary integer specifying the total number of words stored on the track and a buffer area containing the words and information about the articles in which they appear. The buffer is divided into two sections, the first containing the words and the locations of the beginning of each article list in the second section and the second containing a list of all article numbers in which each word appears.

Figure 12 shows a simplified example of this data structure. This sample track contains data about four words, <u>search</u>, <u>simple</u>, <u>simplified</u> and <u>system</u>. The first word on the next track, <u>systems</u>, is stored at the end of the word list for later reference. The word <u>search</u> appeared in articles 35 and 476; its article list begins at the bottom of the buffer (the displacement (28) stored with the word refers to the location of the first article number in which the word appeared). Similarly the article list for the word <u>simple</u> appears in positions 26 through 24 in the buffer, and indicating that this word appeared in articles 4, 108, and 211.

Records of the direct access article file are stored and accessed on the basis of their physical hardware address in the storage device, the IBM 3336 disk pack. The data structure of an article record is of horizontal position-oriented fixed length type. Records contain a fixed set of data elements, of which slight variation does exit for different data bases.

76

84

5.1.2 Term Weighting

Term weights are three-digit numerical values assigned to search terms that indicate their relative significance to the user's area of interest. The factor of weighting a search term augments the logic of the expression and increases the precision ratio.

The total significance value of a document is calculated in the following formula. Each word or word group from the profile which appears in the description of an article has its term weight saved in a table of matched weights for the article. If these weights are $(W_1, W_2, \ldots W_n)$ then the total significance value (TSV) for the term is

$$TSV = \frac{(W_1 \ W_2 \ \ldots \ W_n)}{(W_1 \ W_2 \ \ldots W_n) + (1 - W_1)(1 - W_2) \ldots (1 - W_n)}$$

The TSV value of a document must exceed the threshold, which is coded into each individual profile, to have the document selected by the system. Weighting can be simplified as shown in Figure 3.

5.1.3 Search Logic

A successful and meaningful search is not only dependent upon the presence of particular search terms but also the satisfaction of certain logic relationships. These relationships are expressed in three different forms, AND, OR, and NOT, as follows:

(1) AND Logic - retrieves an item only if one of the following conditions is met:

(a) All terms in a group are matched and the term weight is either equal to or above the threshold value,

(b) Two or more terms or groups of terms are matched, and the computed significance value is either equal to or above the threshold value of the profile.

(2) OR Logic - implicitly embedded for each search between word groups regardless of the number of words in a group.

(3) NOT Logic - causes items containing a term or group of terms that has a weight of zero to be rejected. The NOT logic, once used, applies to the terms in an entire profile or question.

5.1.4 Truncation

Truncation is used to facilitate retrieval of terms containing term fragments that are common to two or more different forms of a term. Truncation is denoted by an asterisk (*). One or more "*" may be used

75

85

COUNT   4

BUFFER   part 1 — word: SEARCH   disp: 28

                            SIMPLE   26)

                            SIMPLIFIED   23

                            SYSTEM   22

                            SYSTEMS   20

            part 2   (21)   41

                       (22)   40

                       (23)   52

                       (24)   211

                       (25)   108

                       (26)   4

                       (27)   476

                       (28)   35

Figure 12. Sample of Inverted File Record Structure

77

5.3 System Requirements and Constraints

The <u>Hardware Requirement</u> for running the MIC system is an IBM 360/50 or 370/145 or larger. It may run on smaller models if modified to DOS (minimum machine of 256K or a VS system). The system runs in 150K partition or region. In addition, the following is needed:

<u>Tape Drives</u>: A minimum of 2 (800 or 1600BPI). It must have the same density as the supplier.

<u>Disk Drives</u>: Probably one besides the system packs but could share space on existing packs especially for Current Awareness use only. The program written for 3330 could be modified.

<u>Disk Space</u>: 1) Programs: Estimated as 80 tracks of 3330.

2) Article and Inverted Files: Estimated as 150 tracks for inverted file and 500 tracks for 10,000 articles. Article Files may be temporary files for Current Awareness.

3) Sysda Space for Temporary Files (sorts, etc.): A system with 300 cylinders of sysda space is more than adequate if the article and inverted files are on a separate disk.

<u>Card Reader</u>: One.

<u>Line Printer</u>: One.

The <u>Language Requirements</u> are PL/1 Level F (probably could be re-written to Level D), Assembler Level F (core modules should run under OS or DOS), and Cobol Level U (i.e., ANSI COBOL).

The <u>File</u> storage media requirements are tapes and 3336 disk packs. The inverted files are designed for these packs.

5.4 System Studies, Investigations, and Special Projects

During the four years of project life, a number of studies, investigations, and special projects were undertaken. Some of them are described below.

5.4.1 RIE to LCS

One of the major facilities available at The Ohio State University is its Library Control System (LCS) which allows on-line access to the University Libraries' collection for availability, location, and circulation purposes. In fact, since this facility allows direct mailing of materials to patrons with campus addresses, patrons are able to use it to provide their own document delivery system for most of the monographs and journals available in the OSU Libraries.

Since the Education Library subscribes to the ERIC microfiche and MIC subscribes to the Research in Education (RIE) tape, it was felt that the Libraries could serve its patrons better if the microfiche could be located and circulated through the LCS system. A program was written to select the microfiche items from the RIE tape and convert them to the LCS format. The converted records are then added to the LCS master file for circulation purposes.

5.4.2 MIC User Directory

In an effort to provide better patron services, a user directory system was designed and experimented. The system furnishes a set of three reports that give information such as classification of users by service, type, and department, a tabulation of a number of unique center users over time, and a historic record of user activities indicating dates of joining and terminating MIC's services. Four programs were written to perform the various system functions. A COBOL program (CRETPROF) creates the initial MIC user directory master file on disk. The file is index sequentially organized to facilitate random update. A PL/1 program (DIRECTORY) is used to subsequently maintain the user directory with every production run statistics. Another PL/1 program (DIRLIST) is used to print out various status reports. Finally, a COBOL program (MICUSER) is used to screen, sort, and print the user classification report by service, type, and department.

5.4.3 Post Processor

Because of the characteristics of the basic MIC system, it tends to be a high recall system. (Recall is the ratio of the number of relevant documents retrieved to the number of relevant documents in the data base. The characteristics are (1) individual words are searched--uniterm search concept--and the additional information contained in the syntax and semantics of phrases is lost, (2) an authority list (thesaurus) that tends to convert many words to the same subject heading is used, and (3) the combination of multiple sources into a common multidisciplinary data base results in the same word having multiple meanings.

Most users seem to appreciate this high recall. Fortunately, for most customers the precision is also high enough to satisfy them. However, a secondary profiling system was developed for the customer who finds the precision unacceptably low. (Precision is the ratio of the number of relevant documents retrieved to the total number of documents retrieved.)

The prime factors of consideration in the design of the secondary search system were:

(1) The project must require a minimum of changes to the existing software.

(2) It should not affect the output produced by the existing system for customers who do not need this new facility.

(3) It should allow searches that could not be performed in the primary search system, (for example, searches for phrases or strings containing special characters).

The post-processor was thus to eliminate false drops from the output of the regular MIC system by re-searching each notification for special conditions which cannot be tested by the original search program (MATCH). These extra conditions include spatial relationships and the ability to search for co-occurrence of a word with a character string which is not a word in the definition originally used. For example, you can require Term A to precede or follow Term B or to be immediately adjacent to each other. You can search for the phrase "Vitamin C" or the word "C" occurring with "Vitamin".

The program performs as required. Only one change was made to the original decision table describing its operation. The specifications were written soon after the first MIC services were available but before many of the difficulties inherent in the less familiar data bases became clear.

Therefore, the program works well with data bases which are indexed solely on the title or thesaurus words obtained from the title. Unfortunately, many of our current probelms involve false drops from intellectually added descriptor terms. These do not have the spatial relationships necessary for analysis by the program. Also in many cases not all of these added descriptors fit in the notification record and thus cannot be detected at all.

The most common example of a situation which the program cannot handle is the indexing of a report in NTIS on a study of ocean currents under the term "Computer System" because the data was analyzed by computer.

In summary, the program solves the problems it was designed to solve, but not the newer problems. In many cases, experience has provided information specialists with alternate ways to solve the original problems without introducing the post-processor and its much more complicated profiling language.

5.4.4 Cost and Statistical Information Research

In order to provide a timely and accurate reporting system on the cost and performance of various search systems, a computerized cost and statistical information system was designed and implemented.

The information profile was defined in terms of various information needs for decision making. System variables and resolution level on various activities were determined. The relationship among the system's elements in terms of producing the desired information was studied.

80

89

5.4.5 MIC On-Line Search Module

An on-line demonstration version of the MIC search software has been installed at the University's Instruction and Research Computer Center. Consequently, this may lead to a number of benefits and possibilities. This software package:

(1) can be used as a research or quick demonstration model, either in batch-mode or on-line, under TSO (Time-sharing operation) system.

(2) offers opportunities for students to use the system in class work.

(3) gives possibilities for on-line profile development with TSO and CAI (Computer-Assisted Instruction).

(4) can produce software refinement through continuous testing in a large computer system environment.

(5) gives an on-campus backup system for the MIC search software.

The implementation of the MIC search system at IRCC consisted of two stages:

Stage 1 - a normal MDS data base tape of 2926 citation records was created. The records were selectively chosen from four different sources of tapes: Pandex Journal, ISI Journal, NTIS, and MARC II tapes. From this normal MDS data base, an article file and an inverted word list file were generated on disk as direct files, which serve as two major data sets used by the search system. In addition, the following supporting system data sets were created on the 3330 disk module.

(1) a library location file
(2) a Stopword list
(3) a statistical record
(4) a parameter file
(5) an experimental user profile

Stage 2 - All the major programs were compiled and the executable object modules were cataloged in the system's user library. A procedure was then cataloged to execute the required sequence of programs for the search.

Basic to the system is a reports generator that accepts detailed descriptions of the budgetary data, operating statistics, costs, and inter-relationship of all components in the system, and then computes the required cost information as system output.

SECTION 6.0 OPERATIONS

After the systems have been designed and debugged, the data bases have come in on schedule, the new and updated profiles have been coded, and there is a stock of cards on hand, then the searches can be run at the University Systems computer center.

In all, around a thousand production jobs are run each year to provide the service. These include conversion runs for the data bases, updates of the profile runs, tape merges, the searches, and updates of the LIBLOC table.

Then the cards generated by the system have to be mailed. In four years, nine million cards were mailed out and packaged in 340,000 envelopes.

Operations also include managing the data bases and the tape library and monitoring computer time.

6.1 Input

MIC's magnetic tape library has expanded continuously with the growth of MIC services. The approximately 1000 tapes now maintained include approximately 400 tapes devoted to storing profiles, and citation and output files from MIC's search runs, 179 tapes in use by programmers, and 233 blank inventory tapes.

In addition, MIC has 19 disk packs that are used to store the inverted files and the article files for the retrospective and current awareness services, the program library, and the LIBLOC (Library Location file.

6.1.1 Current Awareness

MIC receives ten data base tapes from several sources, as itemized below, for its current awareness services:

(1) MacMillan Information:
  PANDEX Current Index to Scientific and Technical Literature
  RIE (Research in Education)
  CIJE (Current Index to Journals in Education)
  NTIS (National Technical Information Service) Government Reports
  Bibliography of Agriculture
  Current Programs (conference papers)

(2) Institute for Scientific Information:
  ISI Source Index tapes
    SSCI (Social Science Citation Index)
    SCI (Science Citation Index)

(3) Chemical Abstracts:
Chem Titles tapes

(4) Ohio College Library Center:
MARC tapes.

The incoming tapes are inventoried. The ISI and MARC tapes are processed by the appropriate conversion program to convert them to a PANDEX format. The rest are preprocessed before they are searched.

In addition, programs are set up each week to edit the profiles and queries prior to the running of the search programs. Profile maintenance programs are run on a weekly basis to update the multidisciplinary current awareness profile tape, bi-weekly for social sciences profile tape and monthly for education and agriculture profile tapes.

Then, the production runs that generate the notification cards are set up and run. The MIC Multidisciplinary Current Awareness Service is run and mailed every week. Each weekly data base includes PANDEX, ISI Source Index, and MARC tapes; an NTIS tape is included every other week; the conference papers tape is run once a month. Social Sciences and Chemical Titles Current Awareness Services are run every two weeks. Education and Agricultural Current Awareness searches are run once a month.

6.1.2 Retrospective

The multidisciplinary and education are generated from the current awareness tapes and are updated every six months. MIC receives Psychological Abstracts directly from the American Psychological Association to run the retrospective search service.

6.1.2.1 Multidisciplinary Retrospective Data Base

At the end of the four-year project, the multidisciplinary retrospective data base contained more than 2.3 million citations covering a period of seven years, from 1968 to 1974. The data base is divided into 33 segments. Each segment contains one article file and one corresponding inverted word file with pointers to the addresses of article records. The article and inverted word files reside on separate disk packs for processing efficiency sake. The majority of the segments represent three months of materials.

6.1.2.2 Education Retrospective Data Base

During the fourth project year the Education data base was expanded by the addition of new segments to include material from 1966 (the

84

92

inception of the ERIC System) to December 1974. The data base at the end of the project year contained 172,867 citations, both <u>Resources in Education</u> and <u>Current Index to Journals in Education</u>.

The data base is divided into 13 article files and 13 inverted word files. Each file represents either six-month or twelve-month of materials dependent upon the volume of publication for the period.

6.1.2.3 Psychology Retrospective Data Base

The Psychology data base at the end of the fourth project year contained 169,157 citations covering a period of 1967 through 1974. Psychological Abstracts has rebuilt its back data base to improve the retrieval from subject headings. This involved making the old subject headings match more closely with the new Thesaurus. Therefore, all of the segments of this data base were replaced with new versions.

The data base is organized into eight article files and eight inverted word files. Each pair of files, article and inverted word files, represent a year of materials.

6.2 Computer Time

The computer time is monitored to make sure production costs are being kept in line. There are several contributing factors that affect the computer time required for the MIC search system. The following are the five most significant ones:

1) Number of terms to be searched
2) The frequency of a word that causes a hit
3) The number of citations in a data base
4) The number of hits retrieved
5) The computer job mix in core at the time of running the search

In a production environment, such as MIC's Weekly Current Awareness Search Run, the run time estimates shown in Table XXIII can be used as a guide. The estimates are based on:

1) Using an IBM 370/145 with maximum core
2) A search data base consisting of 3000 to 12000 citations weekly
3) About 1700 profiles.

Table XXIII. Computer Run Time Estimates

JOB NAME	JOB DESCRIPTION	RUN FREQUENCY	RUN TIME ESTIMATES IN MINUTES					
			CPU		WALL		PRINTING	
			Min	Max	Min	Max	Min	Max
MICPROF	Composed of 'PROMAIN'	Weekly	2	4	10	20	10	15
MICMDS	Composed of 'WORDGEN', 'INVERT', 'MATCH' and 'MICPRINT'	Weekly	40	120	70	180	150	360

6.3 Output

In the last two years of the grant, approximately 1900 computer jobs were run. This number included data format conversions, profile editing and maintenance, retrospective and current awareness searches, library location maintenance, and tape merges.

A printed listing of run statistics was produced during each run. Among the totals generated are total citation records run, total "hits" produced, total of profiles or queries for which no hits were produced, total number of notifications printed, and the total number of users included in the run, and statistics by data base classification. Both manual and computer-generated statistics were compiled.

In addition, the more than 9 million notification cards that resulted from the year's production runs were sorted into sets after every production run, screened, and mailed to the patrons who used the eight MIC services.

All the computer jobs were run at The University Systems Computer Center of The Ohio State University.

SECTION 7.0·MARKETING

Up to here, we've presented the makings of a system--the data bases to be searched, services to be used (and they were), computer programs to be designed, written and installed, and operating procedures to be developed--and showed how the system fit together and produced more than 300,000 bibliographies and 9 million notifications. But that is far from the whole story.

The necessary link that turned the makings of a system on paper into a successful, large-scale operation was marketing. The staff members at MIC looked at the problem of how to market computer-based information services at both the theoretical and practical levels.

It is not as easy to tabulate these efforts as it is to count cards printed. These marketing efforts include intangibles such as a pleasant way of answering a phone to welcoming people coming into the office to realizing when you've blown a search and without being asked, redoing it and turning the whole thing into a learning experience for the user and the information specialist.

The efforts build on each other. Our major marketing efforts in the second and third years paid off in the fourth year, where we provided more services than we had in the preceding years. In the first years, we had to introduce a new concept and a new operation on campus. At the end of the four year period both were getting known by word-of-mouth. The nature of the MIC services, active dissemination of the information, also added to it.

7.1 Advertising and Public Relations Program

When classes are in session, MIC advertises its services in The Ohio State Daily Lantern, the campus newspaper with a circulation that reaches 60,000 faculty, staff, and students at OSU.

In addition, a special flyer and brochure were designed and printed. (See Figure 13 for a sample of a flyer that was used in 1973.) Six-thousand copies of the flyer have been distributed to:

a) all dormitories on campus
b) two Student Union Buildings
c) 100 academic departments, mainly in the health sciences, hard sciences, engineering, and social sciences
d) graduate school office
e) library bulletin boards.

In addition, 1000 copies of a brochure designed to reach the students, faculty and staff on the Columbus campus were written and printed. These were distributed to:

M·I·C

MAY BE

THE
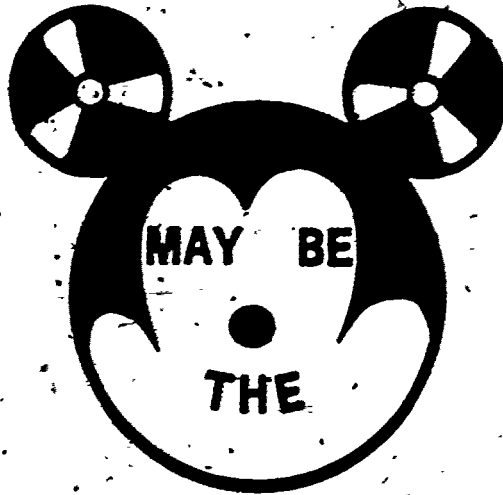
K·E·Y

TO YOUR INFORMATION NEEDS

FREE
LITERATURE SEARCHES
FOR
STUDENTS, FACULTY, STAFF
422-3480

MECHANIZED INFORMATION CENTER
THE OHIO STATE UNIVERSITY LIBRARIES

10 LAZENBY HALL   1827 NEIL AVE.

FIGURE 13. MIC FLYER

(3) a telephone solicitation program, which utilized the common practice of person-to-person telephone solicitation of potential users.

Even though the specific MIC service was available to users free of charge, the three promotional approaches are ones that could be replicated by most other SDI services, including those for which fees are asked. Since, for this study, all three promotional approaches resulted in approximately the same degree of satisfaction among users, the choice of the specific program to be employed can be defined in terms of relative costs and, to an extent, market penetration. On these bases, the blitz and telephone solicitation programs appear to be the most efficient means of promoting information services to faculty in an academic environment. In certain situations, the blitz program would be preferable to the telephone solicitation, for example, in promoting information services to students who do not normally have personal telephones or offices. (Details are in MIC's annual reports*.)

7.2.2 User Attitudes

The attempt to distinguish between classes of adopters (Pioneer, Early, and Late) and between adopters and non-adopters on the basis of their value orientations and professional backgrounds was relatively unsuccessful. Initially, MIC had hoped that the predictor variables would serve as useful surrogates for identification of those individuals most apt to adopt an innovative information service. The two best variables for discrimination seem to be prior knowledge of computerized literature services and positive predisposition toward information services. This result appears rather tautological. However, it indicates rather clearly that those who are aware of, and value, information services are most apt to avail themselves of the service when it is offered.

In considering the fundamental sameness between adopter classes, it is useful to consider the relative homogeneity among faculty members in the sciences and engineering. It is doubtful that professors in the humanities would respond similarly. But whether the different responses would subsequently be associated with differential times of adoption remains an unanswered empirical question.

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* See also "Promotion of Information Services: An Evaluation of Alternative Approaches," Louis Stern (Professor of Marketing at OSU and a faculty associate of MIC) et al, Journal of the American Society for Information Science, Volume 24, Number 3, May-June 1973, pp. 171-179.

An individual's centrality, as measured by peer nominations, seems
to be a better predictor of adoption than the attitude, demographic, and
professional variables. For all sociometric networks examined in this
study, the adopter category mean nominations were greater than those of
the non-adopter category, and four of the six means were significantly
greater. Surprisingly, the smallest absolute difference between means
was for the innovation network. From this it is apparent that subjects
in this study were not able to determine who is or is not apt to innovate.
They were able, however, to identify individuals who are central along
other dimensions and these dimensions associated with adoption.

Also evident was a trend for Early adopters to be more central than
either Pioneers or Late adopters. This finding, while not statistically
significant, does suggest the marginality of Pioneers and Late adopters.

By examining an individual's centrality in the context of his peer's
adoption tendencies, we were able to demonstrate the extent of group in-
fluence. Individuals in high adoption departments received more peer
nominations than individuals in either the low or moderate adoption
context departments.

The level of interaction and hence the flow of information relevant
to adoption was no doubt greater in high adoption departments. Thus, in
the final analysis, it would seem that the most important factor in deter-
mining the adoption or non-adoption of the innovative information service
was, among the subjects, the existence of supportive reference groups.
In general, a supportive reference group not only encourages behavior
congruent with its norms but facilitates the exchange of information
between members. Unfortunately, from our data there is no means of deter-
mining the relative supportiveness of the group a priori.

In sum, the research suggests that the adoption of an innovation
among professionals has very little to do with differential values or
demographic characteristics but is, to a great extent, dependent on the
structure and normative character of the group. These findings should,
though, be re-examined for low adoptive potential innovations where
approval and communication may or may not be over-shadowed by the person-
al orientations and characteristics of the adopter.

SECTION 8.0 CONCLUSIONS AND OBSERVATIONS

Well, what exactly did we learn during the four years?

First, we learned that a large-scale operation like MIC can help large numbers of people to cope with large amounts of information.

- Second, we learned something about the information habits of an academic community:

(1) both current awareness and retrospective services are needed
(2) graduate students, in particular, need both kinds of services
(3) faculty members make much more use of current awareness than retro-spective services
(4) undergraduate students make good use of retrospective services and practically none of current awareness.
(5) It takes active marketing efforts to reach all these users.

Third, we learned something about an academic information center that provides computer-based information services:

(1) It should be part of the Libraries operation. Both the Libraries and information center are in the business of providing information ser-vices. They both support the teaching and research functions in all disciplines. To be successful, the center's operation must be inte-grated into the Libraries. The brunt of the document delivery system of such a center falls on the library, either the item is already part of the collection or it must be borrowed through Interlibrary Loan. Whether the procedures are handled by an existing library function or by an independent center, it is the library resources that are being tapped.

(2) Being part of an on-site operation, it can tailor its services to the local people coming in for service.

(3) The interview with the user becomes a chance to introduce library re-sources in general to the overall advantage of the user and the library.

Fourth, we learned that there is a place for the type of batch services that we offer.

(1) large numbers of people can be handled effectively and efficiently, especially for current awareness services
(2) generally, the searches, both current awareness and retrospective, are less expensive to run off-line and batch, given a certain min-imum number of profiles.
(3) the card output is very convenient for users. If the item is not relevant, you just toss the card; if the output is relevant, you can build your own catalog of pertinent documents.
(4) it offers a broadened coverage of general fields so that you search more types of material.

There are some disadvantages:

(1) in general, there is less involvement with the search by the user who is the true subject specialist in the field.
(2) there is no interactive capability to go up and back with the system and look at items on line to refine a search.
(3) sometimes it is better to have more restrictive data bases that are deep, instead of broad, in a field.

Fifth, we learned that another benefit of having the outside funding from NSF to support the service is buy time for such centers to get off the ground. There are always budget problems facing libraries and universities. Unless there is sufficient time for an operation to become established, it is vulnerable to being cut off prematurely, when in direct competition with other most established operations.

Sixth, we learned that there is another problem that also has to be solved before an academic information center can be successful. And that is its relationships with the rest of the library system. We not only had to sell our services to the user, we also had to sell our operation to the rest of the system. The funding from NSF that made our services possible also somewhat insulated MIC for four years from the normal economic pressures exerted on the University and the Libraries. After the NSF support ended, all of us at the Libraries were in the same financial boat. We will have to continue to show the rest of the system that we are also an integral part of it and deserve continued support. That we have tried to do and will continue to do so.

APPENDICES

A. Fourth Year Activities

B. Market Penetration

C. Programs and Procedures

APPENDIX A   FOURTH YEAR ACTIVITIES

To complete the documented record of MIC's activities, Appendix A contains, for the fourth year, the same type of tables and figures that we published in separate annual reports for the first three years.

THOUSANDS
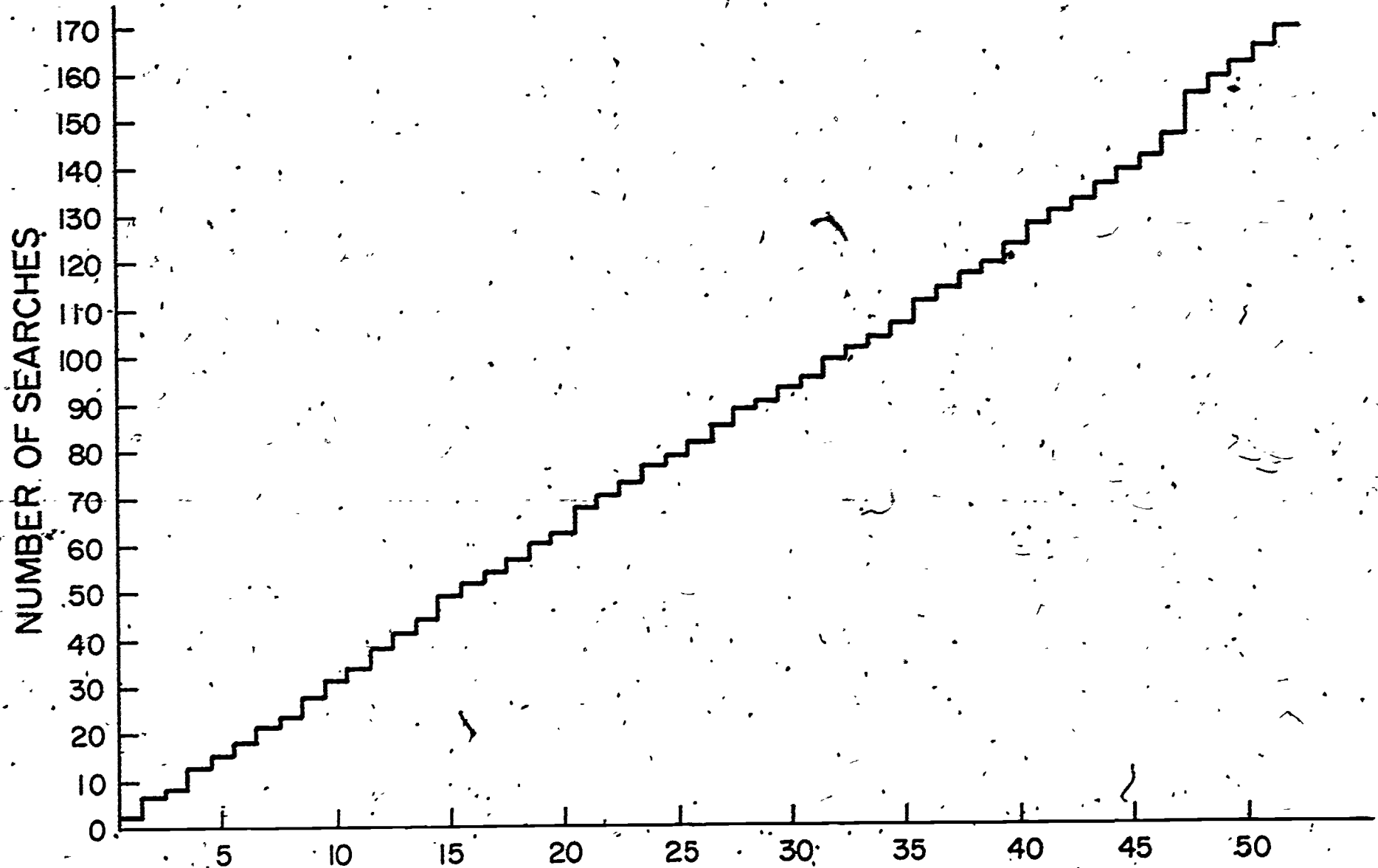
NUMBER OF SEARCHES

WEEK OF FOURTH PROJECT YEAR
FEBRUARY 1974 – JANUARY 1973

Figure A-1.   Cumulative Number of Searches

Figure A-3. Cumulative Retrospective Queries

Figure A-3. Cumulative Retrospective Queries

108
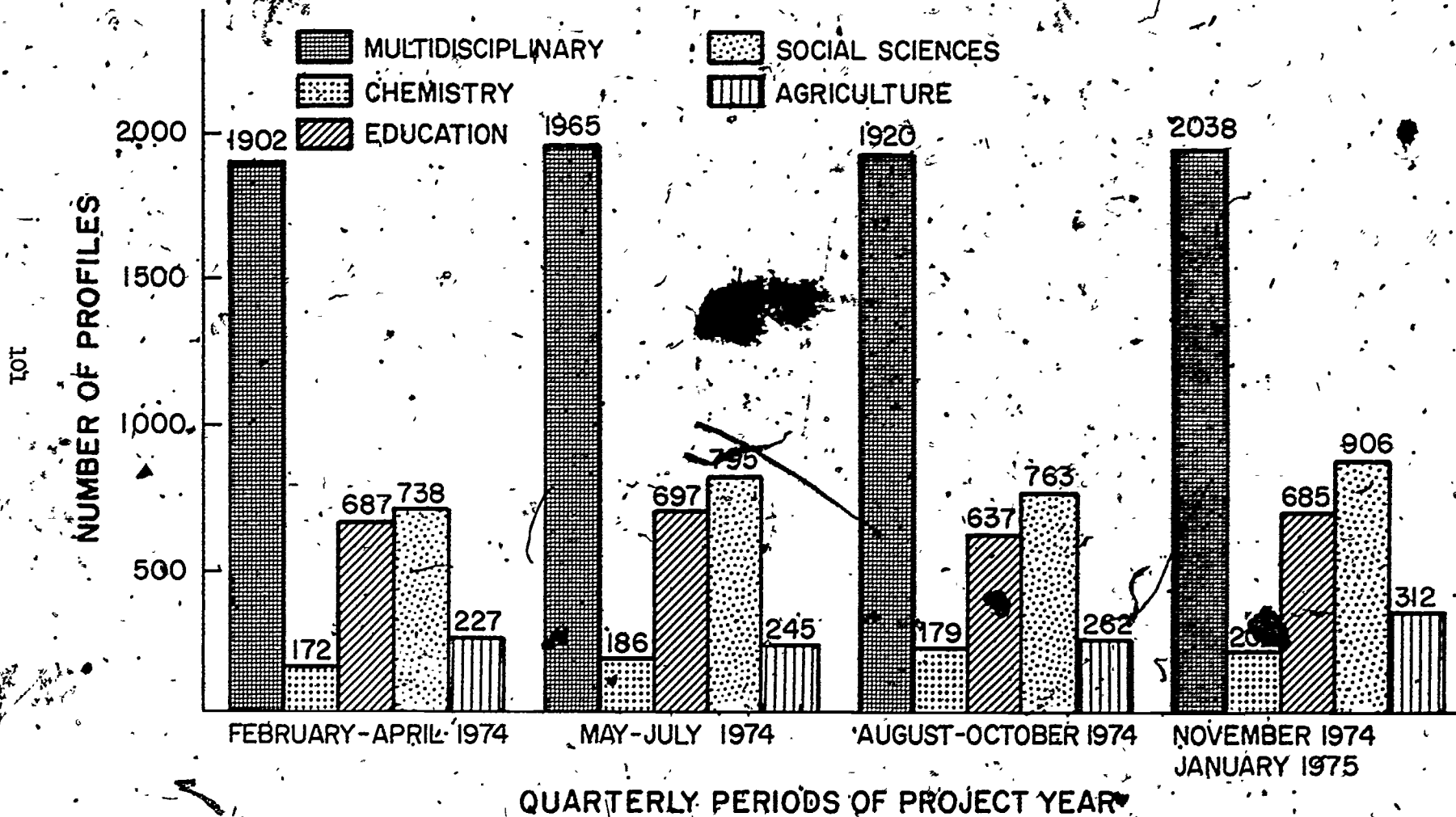
Figure A-4. Profiles in the MIC Current Awareness Services - Fourth Project Year
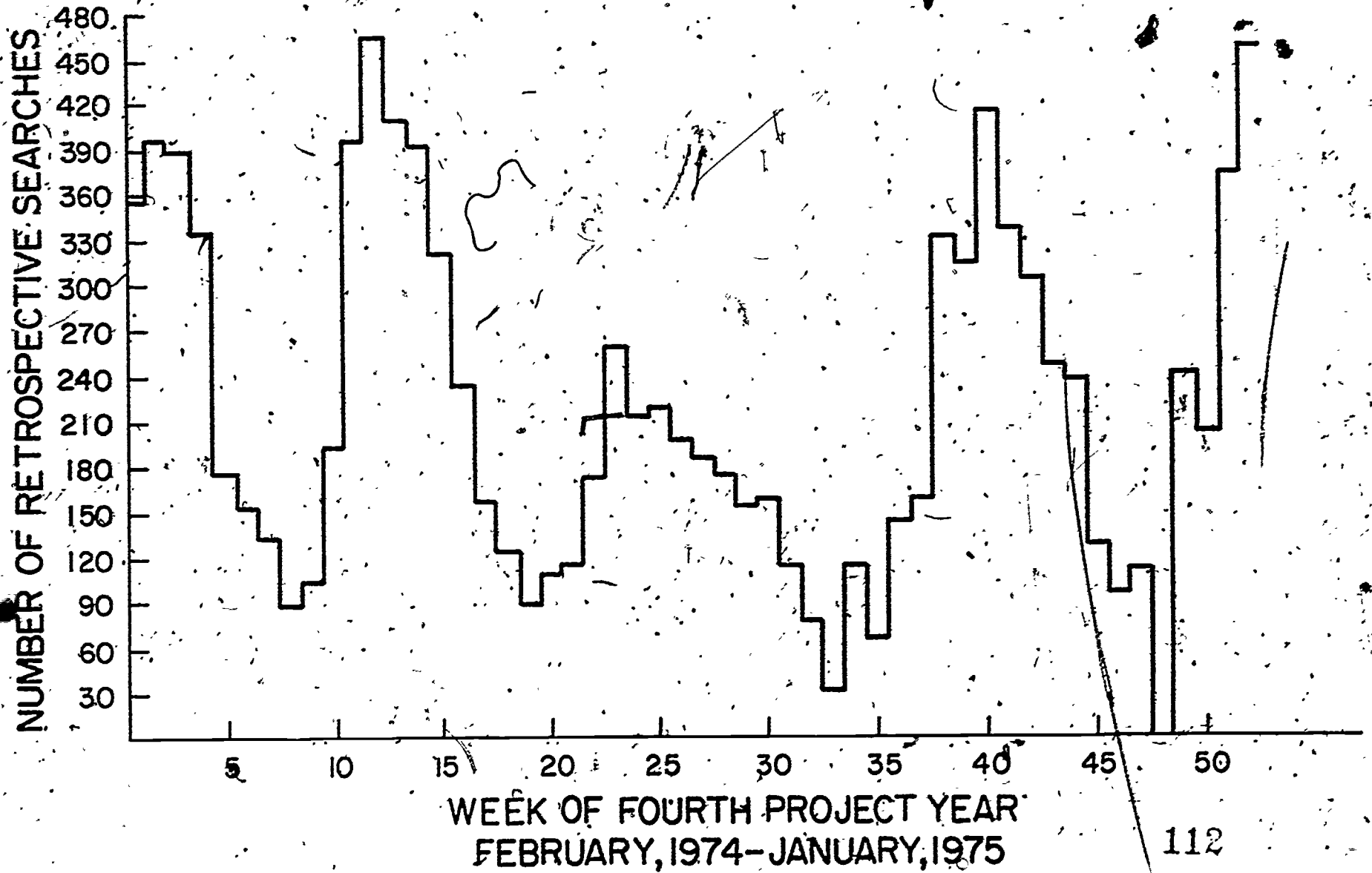
Figure A-5. Retrospective queries, weekly
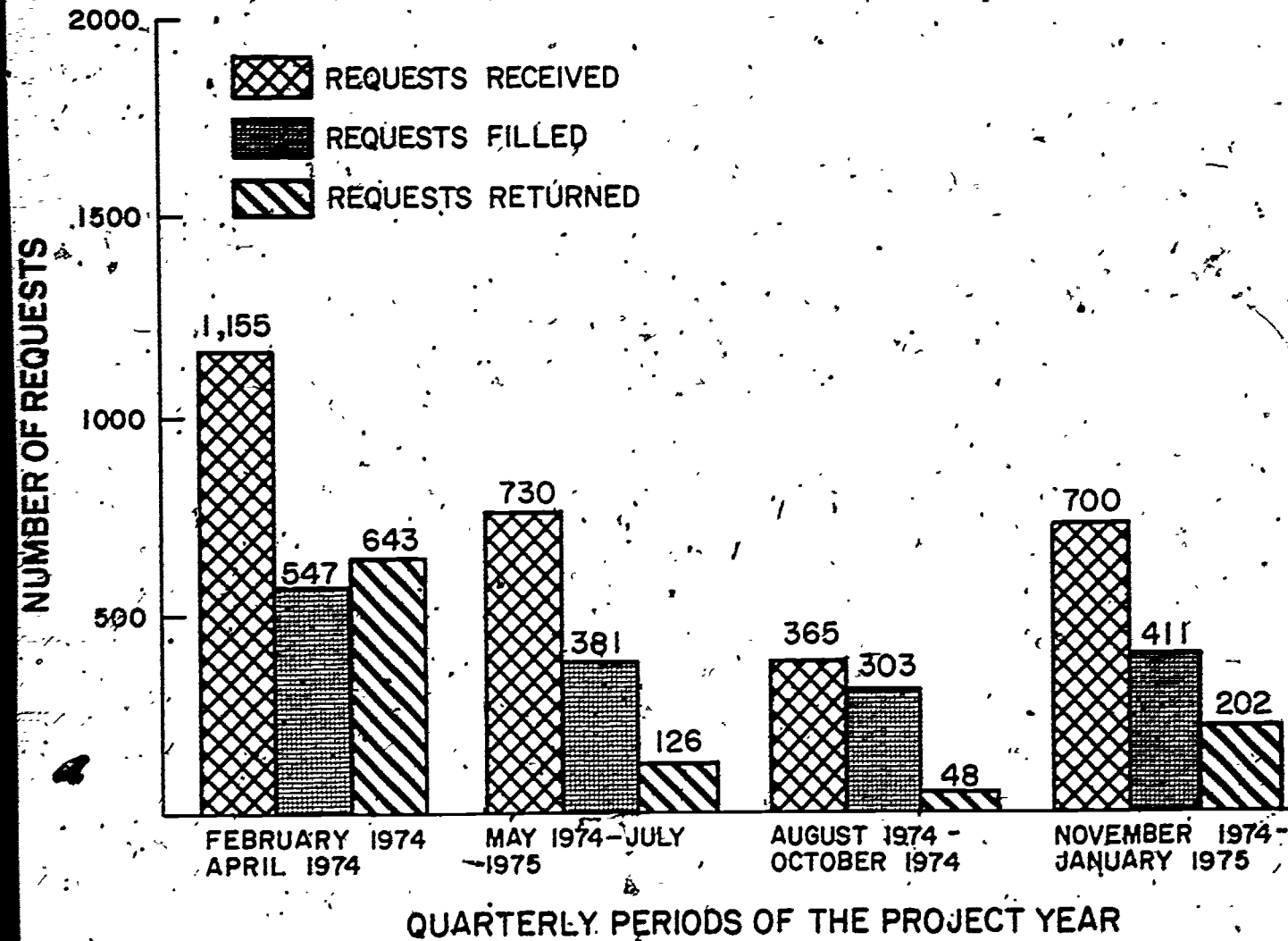
Figure A-6. First Page Service (Fourth Year)
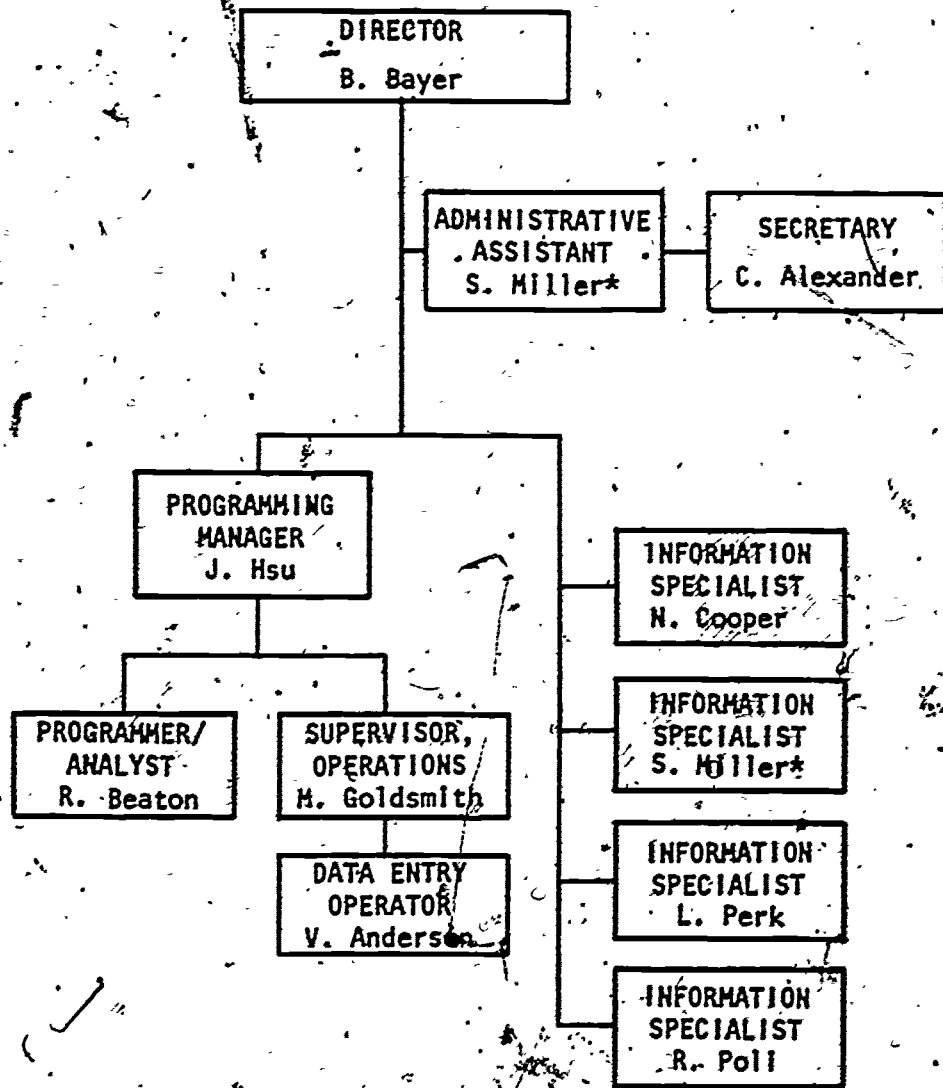
FIGURE A-7. INTERNAL ORGANIZATION OF MIC AT THE END OF THE FOURTH YEAR.

* 50% each position

Table A-I.
Average of Hits per Run in Current Awareness in 4th Year

	QUARTER				
	1	2	3	4	Average
Multidisciplinary.	16	13	12	15	14
Chemistry	31	29	31	27	30
Education	32	34	35	30	33
Social Sciences	23	31	27	21	26
Agriculture	57	54	57	47	54

105

115

Table A-II.
Pandex Citations

| | Citations | |
Time Period	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	50,293	50,293
May 1, 1974 - July 31, 1974	42,542	92,835
August 1, 1974 - October 31, 1974	69,259	162,094
November 1, 1974 - January 31, 1975	3,777	165,871

116

Table A-III.
ISI Citations (Unduplicated by Pandex)

	Citations	
Time Period	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	14,723	14,723
May 1, 1974 - July 31, 1974	18,076	32,799
August 1, 1974 - October 31, 1974	19,240	52,039
November 1, 1974 - January 31, 1975	74,288	126,327

Table A-14.
Conference Papers Citations

	Citations	
Time Period	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	26,620	26,620
May 1, 1974 - July 31, 1974	26,019	52,639
August 1, 1974 - October 31, 1974	22,747	75,386
November 1, 1974 - January 31, 1975	21,656	97,042

Table A-V.
NTIS Citations

| | Citations | |
Time Period	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	18,174	18,174
May 1, 1974 - July 31, 1974	19,150	37,324
August 1, 1974 - October 31, 1974	18,639	55,963
November 1, 1974 - January 31, 1975	9,230	65,193

Table A-VI.
MARC Citations

Time Period	Citations	
	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	17,609	17,609
May 1, 1974 - July 39, 1974	26,326	43,935
August 1, 1974 - October 31, 1974	15,248	59,183
November 1, 1974 - January 31, 1975	19,506	78,689

120

Table A-VII.
Conference Papers Citations

	Citations	
Time Period	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	26,620	26,620
May 1, 1974 - July 31, 1974	26,019	52,639
August 1, 1974 - October 31, 1974	22,747	75,386
November 1, 1974 - January 31, 1974	21,656	97,042

Table A-VIII.
Citations in the Chemistry Current Awareness Data Base

| Time Period | Citations | |
	Number for Period	Cumulative
February 1, 1974 - April 30, 1974	17,609	17,609
May 1, 1974 - July 31, 1974	26,326	43,935
August 1, 1974 - October 31, 1974	15,248	59,183
November 1, 1974 - January 31, 1975	19,506	78,689

122

Table A-IX.
Citations in the Education Current Awareness Data Base

| | Citations | | |
Time Period	RIE	CIJE	TOTAL
February 1, 1974 - April 30, 1974	3,800	4,936	8,736
May 1, 1974 - July 31, 1974	3,424	4,985	8,409
August 1, 1974 - October 31, 1974	3,572	5,141	8,713
November 1, 1974 - January 31, 1975	3,742	4,731	8,473
Fourth Year TOTALS	14,538	19,793	34,331

123

Table A-X.

Citations in the Social Sciences Current Awareness Data Base

| | Citations | | |
Time Period	Journal Articles	Books	TOTALS
February 1, 1974 - April 30, 1974	10,542	14,284	24,826
May 1, 1975 - July 31, 1974	12,694	27,519	40,213
August 1, 1974 - October 31, 1974	15,487	21,305	36,792
November 1, 1974 - January 31, 1975	9,680	11,989	21,669
FOURTH YEAR TOTALS	48,403	75,097	123,500

124

Table A-XI.
Citations in Agriculture Current Awareness Data Base

Time Period	Citations	Cumulative
February 1, 1974 - April 30, 1974	26,101	26,101
May 1, 1974 - July 31, 1974	28,008	54,109
August 1, 1974 - October 31, 1974	29,970	84,079
November 1, 1974 - January 31, 1975	30,426	114,505

125

Table A-XII.
Citations in Multidisciplinary Retrospective Data Bases

Update Date	Coverage	Citations	Searchable Words	Distinct Words
February 1974	1968 - 9/1973	1,918,987	10,242,280	1,537,684
April 1974	1968 - 12/1973	2,075,344	20,635,572	1,639,579
July 1974	1968 - 3/1974	2,241,098	22,153,131	1,742,592
November 1974	1968 - 6/1974	2,362,409	25,248,593	1,809,726

126.

Table A-XIII.
Citations in the Education Retrospective Data Base

Update Date	Coverage	Citations	Searchable Words	Distinctive Words
February 1974	RIE 1965 - 1973 CIJE 1969 - 1973	151,536	3,753,729	143,996
August 1974	RIE 1965 -6/1974 CIJE 1969 -6/1974	172,867	4,270,495	n.a.
April 1975	RIE 1965 -12/1974 CIJE 1969 -12/1974	190,055	4,703,945	n.a.

n.a. - not available

Table A-XIV.
Citations in the Psychology Retrospective Data Base

	Coverage	Citations	Searchable Words	Distinctive Words
January 1974	1967 - 1973	139,629	4,079,539	153,827
April 1975	1967 - 1974	169,157	4,595,294	180,547

123

APPENDIX B   USERS OF MIC CURRENT AWARENESS SERVICES BY DEPARTMENT

129

REPORT OF MIC UTILIZATION BY DEPARTMENT
PROJECT YEAR 1974

DEPARTMENT	MDS	CHEM	ERIC	SSIS	AGRI	TOTAL
UNDERGRADUATE COLLEGES						
UNIVERSITY COLLEGE						
UNIVERSITY COLLEGE ADMINISTRATION	8	0	9	7	5	29
COLLEGE SUBTOTAL	8	0	9	7	5	29
COLLEGE OF THE ARTS						
ART, DIVISION OF						
ART EDUCATION	2	0	1	3	0	6
INDUSTRIAL DESIGN	0	0	0	1	0	1
HISTORY OF ART, DIVISION OF	4	0	0	0	0	4
MUSIC, SCHOOL OF	0	0	0	0	0	0
THEATRE	3	0	3	4	0	10
COLLEGE SUBTOTAL	2	0	1	3	0	6
	11	0	5	11	0	27
COLLEGE OF BIOLOGICAL SCIENCES						
DEPARTMENT NOT SPECIFIED	4	0	10	0	1	15
BIOCHEMISTRY	22	6	0	0	0	28
BIOPHYSICS	24	2	0	0	0	26
ENTOMOLOGY	65	1	0	1	23	90
GENETICS	29	0	0	0	5	34
MICROBIOLOGY	85	2	0	0	3	90
BOTANY	33	3	0	0	10	46
ZOOLOGY	123	0	0	2	17	142
CENTER FOR LAKE ERIE AREA RESEARCH	1	0	0	0	0	1
COLLEGE SUBTOTAL	386	14	10	3	59	472
COLLEGE OF HUMANITIES						
BLACK STUDIES	0	0	4	2	0	6
CLASSICS	1	0	0	3	0	4
EAST ASIAN LANGUAGES AND LITERATURES	1	0	0	0	0	1
ENGLISH	1	0	1	3	0	4
GERMAN	0	0	1	9	0	10
HISTORY	2	0	1	0	0	0
LINGUISTICS	0	0	1	18	0	21
PHILOSOPHY	0	0	0	1	0	1
ROMANCE LANGUAGES AND LITERATURES	0	0	0	1	0	1
SLAVIC LANGUAGES AND LITERATURES	0	0	1	0	0	1
COLLEGE SUBTOTAL	5	0	7	33	0	45
COLLEGE OF MATHEMATICS AND PHYSICAL SCIENCES						
ASTRONOMY	6	1	0	0	2	9
CHEMISTRY	94	119	0	0	0	213
GEODETIC SCIENCE	18	0	0	1	0	19
GEOLOGY AND MINERALOGY	16	1	0	0	0	17
MATHEMATICS	21	0	4	1	0	26
PHYSICS	22	1	0	2	0	25
STATISTICS	2	0	0	2	0	4

REPORT OF MIC UTILIZATION BY DEPARTMENT
PROJECT YEAR 1974

DEPARTMENT	MDS	CHEM	ERIC	SSIS	AGRI	TOTAL
COLLEGE SUBTOTAL	179	122	4	6	2	313
COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES						
ANTHROPOLOGY	18	0	0	19	0	37
ECONOMICS	3	0	0	18	2	23
GEOGRAPHY	13	0	0	24	0	37
JOURNALISM, SCHOOL OF	3	0	2	12	0	17
POLITICAL SCIENCE	6	0	0	32	1	39
PSYCHOLOGY	24	0	15	82	1	122
SOCIOLOGY	6	0	4	39	0	49
COMMUNICATION	14	0	8	46	0	68
COLLEGE SUBTOTAL	87	0	29	272	4	392
TECHNICAL INSTITUTE						
AGRICULTURE TECHNICAL INSTITUTE	0	1	5	0	0	6
COLLEGE SUBTOTAL	0	1	5	0	0	6
UNDERGRADUATE PROFESSIONAL COLLEGES						
COLLEGE OF ADMINISTRATIVE SCIENCE						
ADMINISTRATIVE SCIENCE ADMINISTRATION	4	0	3	12	0	19
ACCOUNTING, ACADEMIC FACULTY OF	2	0	0	4	0	6
FINANCE, ACADEMIC FACULTY OF	1	0	0	7	0	8
LABOR AND HUMAN RESOURCES, ACADEMIC FACULTY OF	4	0	0	4	0	8
MANAGEMENT SCIENCE, ACADEMIC FACULTY OF	4	0	0	10	0	14
MARKETING, ACADEMIC FACULTY OF	9	0	2	23	1	35
PUBLIC ADMINISTRATION, SCHOOL OF	4	0	0	14	0	18
SOCIAL WORK, SCHOOL OF	5	0	4	17	0	26
COLLEGE SUBTOTAL	30	0	9	91	1	131
COLLEGE OF AGRICULTURE AND HOME ECONOMICS						
AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY	34	0	2	26	28	90
AGRICULTURAL EDUCATION	7	0	22	7	7	43
AGRICULTURAL ENGINEERING	20	0	3	1	5	29
AGRONOMY	70	2	0	4	45	121
ANIMAL SCIENCE	19	0	0	1	15	35
DAIRY SCIENCE	23	3	0	0	12	38
FOOD SCIENCE AND NUTRITION	18	3	0	0	12	33
HOME ECONOMICS, SCHOOL OF	34	0	43	45	2	124
HORTICULTURE	55	3	1	4	41	104
NATURAL RESOURCES, SCHOOL OF	28	0	2	7	9	46
PLANT PATHOLOGY	26	1	0	0	11	38
POULTRY SCIENCE						
COLLEGE SUBTOTAL	355	12	73	95	201	736

2

131

REPORT OF MIC UTILIZATION BY DEPARTMENT
PROJECT YEAR 1974

DEPARTMENT	MDS	CHEM	ERIC	SSIS	AGRI	TOTAL
COLLEGE OF EDUCATION						
DEPARTMENT NOT SPECIFIED	4	0	122	6	0	132
CURRICULUM AND FOUNDATIONS, ACADEMIC FACULTY OF	2	0	9	3	0	14
EARLY AND MIDDLE CHILDHOOD EDUC, ACADEMIC FACULTY OF	0	0	4	0	0	4
EDUCATIONAL ADMINISTRATION, ACADEMIC FACULTY OF	13	0	45	44	1	103
EDUCATIONAL DEVELOPMENT, ACADEMIC FACULTY OF	2	0	4	3	0	9
EXCEPTIONAL CHILDREN, ACADEMIC FACULTY OF	1	0	22	2	0	25
HUMANITIES EDUCATION, ACADEMIC FACULTY OF	0	0	25	3	0	28
INDUSTRIAL TECHNOLOGY, ACADEMIC FACULTY OF	3	0	10	3	0	16
SCIENCE AND MATHEMATICS EDUCATION, ACADEMIC FACULTY OF	1	0	17	2	0	20
SPECIAL SERVICES, ACADEMIC FACULTY OF	0	0	6	0	0	6
VOCATIONAL-TECHNICAL EDUCATION, ACADEMIC FACULTY OF	0	0	14	0	0	14
HEALTH, PHYSICAL EDUCATION, AND RECREATION, SCHOOL OF	12	0	23	11	0	46
COLLEGE SUBTOTAL	38	0	301	77	1	417
COLLEGE OF ENGINEERING						
AERONAUTICAL AND ASTRONAUTICAL ENGINEERING	9	0	0	0	0	9
ARCHITECTURE, SCHOOL OF	11	0	2	12	0	25
AVIATION	2	0	0	0	0	2
CERAMIC ENGINEERING	4	0	0	0	0	4
CHEMICAL ENGINEERING	21	11	0	1	1	34
CIVIL ENGINEERING	33	0	0	3	1	37
COMPUTER AND INFORMATION SCIENCE	40	0	0	5	0	45
ELECTRICAL ENGINEERING	42	0	0	0	0	42
ENGINEERING EXPERIMENTAL STATION	0	0	0	0	0	1
ENGINEERING GRAPHICS	3	0	0	0	0	3
ENGINEERING MECHANICS	7	0	0	0	0	7
INDUSTRIAL AND SYSTEMS ENGINEERING	21	0	0	4	0	25
MECHANICAL ENGINEERING	46	1	1	1	0	49
METALLURGICAL ENGINEERING	32	7	0	1	0	40
PHOTOGRAPHY AND CINEMA	1	0	0	3	0	4
WELDING ENGINEERING	13	0	0	2	0	13
COLLEGE SUBTOTAL	285	20	4	29	2	340
COLLEGE OF PHARMACY						
PHARMACY ADMINISTRATION	56	16	4	1	0	77
COLLEGE SUBTOTAL	56	16	4	1	0	77
GRADUATE PROFESSIONAL COLLEGES						
COLLEGE OF DENTISTRY						
DENTISTRY ADMINISTRATION	9	0	0	0	0	9
COLLEGE SUBTOTAL	9	0	0	0	0	9
COLLEGE OF LAW						
LAW ADMINISTRATION	4	0	0	5	0	9
COLLEGE SUBTOTAL	4	0	0	5	0	9

3

132

DEPARTMENT	MDS	CHEM	ERIC	SSIS	AGRI	TOTAL
COLLEGE OF MEDICINE						
ALLIED MEDICAL PROFESSIONS, SCHOOL OF	8	0	3	8	0	19
ANATOMY	32	0	1	1	0	34
ANESTHESIOLOGY	0	0	0	0	0	0
MEDICAL MICROBIOLOGY	1	0	0	0	0	1
MEDICINE	23	0	3	7	0	33
NURSING, SCHOOL OF	14	0	2	14	0	30
OBSTETRICS AND GYNECOLOGY	0	0	0	0	0	0
OPHTHALMOLOGY	0	0	0	0	0	0
OTOLARYNGOLOGY	0	0	0	0	0	0
PATHOLOGY	22	3	0	0	1	26
PEDIATRICS	10	0	0	2	0	12
PHARMACOLOGY	18	0	0	0	0	18
PHYSICAL MEDICINE	0	0	0	0	0	0
PHYSIOLOGICAL CHEMISTRY	25	6	0	0	0	31
PHYSIOLOGY	20	4	0	0	0	24
PREVENTIVE MEDICINE	19	0	2	8	0	29
PSYCHIATRY	3	0	0	2	0	5
RADIOLOGY	0	0	0	1	0	1
SURGERY	4	0	0	0	0	4
COLLEGE SUBTOTAL	199	13	11	43	1	267
COLLEGE OF OPTOMETRY						
OPTOMETRY ADMINISTRATION	5	0	1	1	0	7
COLLEGE SUBTOTAL	5	0	1	1	0	7
COLLEGE OF VETERINARY MEDICINE						
VETERINARY MEDICINE ADMINISTRATION	2	0	0	0	0	2
VETERINARY ANATOMY	3	0	0	0	3	6
VETERINARY CLINICAL SCIENCES	16	0	0	0	5	21
VETERINARY EDUCATIONAL RESOURCES	1	0	0	1		2
VETERINARY PATHOBIOLOGY	8	0	0	1	3	12
VETERINARY PHYSIOLOGY AND PHARMACOLOGY	4	0	0	0	1	5
VETERINARY PREVENTIVE MEDICINE	4	0	0	1	0	5
COLLEGE SUBTOTAL	38	0	0	2	13	53

GRADUATE SCHOOL

GRADUATE SCHOOL						
HERSHOR CENTER FOR EDUCATION IN NATIONAL SECURITY	0	0	2	2	0	4
CENTER FOR VOCATIONAL EDUCATION	31	0	54	20	1	106
POLAR STUDIES, INSTITUTE OF	3	0	0	0	1	4
COLLEGE SUBTOTAL	34	0	56	22	2	114

ADMINISTRATIVE OFFICES

4

133

DEPARTMENT	MDS	CHEM	ERIC	SSIS	AGRI	TOTAL
GENERAL ADMINISTRATION						
DEPARTMENT NOT SPECIFIED	3	0	0	5	0	8
COLLEGE SUBTOTAL	3	0	0	5	0	8
OFFICE OF ACADEMIC AFFAIRS						
INSTRUCTION AND RESEARCH COMPUTER CENTER	6	0	0	1	0	7
RESEARCH FOUNDATION	4	0	0	4	0	8
ACADEMY FOR CONTEMPORARY PROBLEMS	0	0	1	1	0	2
COLLEGE SUBTOTAL	10	0	1	6	0	17
OFFICE OF EDUCATIONAL SERVICES						
CONTINUING EDUCATION	0	0	0	1	0	1
LIBRARY	54	3	28	84	5	174
MILITARY SCIENCE	0	0	0	0	0	0
AIR FORCE AEROSPACE STUDIES	0	0	0	1	0	1
NAVAL SCIENCE	0	0	0	1	0	1
COLLEGE SUBTOTAL	54	3	28	87	5	177
OFFICE OF HEALTH SCIENCES						
NISONGER CENTER	1	0	18	4	0	23
COLLEGE SUBTOTAL	1	0	18	4	0	23
OFFICE OF BUSINESS AND ADMINISTRATION						
REGISTRATION SERVICES	1	0	0	0	0	1
COLLEGE SUBTOTAL	1	0	0	0	0	1
SERVICES AND AUXILIARIES						
GENERAL STAFF						
DEPARTMENT NOT SPECIFIED	15	0	20	39	1	75
COLLEGE SUBTOTAL	15	0	20	39	1	75
RESIDENCE AND DINING HALLS						
RESIDENCE AND DINING HALLS	1	0	0	0	0	1
COLLEGE SUBTOTAL	1	0	0	0	0	1
OTHER AUXILIARY ENTERPRISES						
ATHLETICS	1	0	0	1	0	2
COLLEGE SUBTOTAL	1	0	0	1	0	2
COOPERATIVE EXTENSION SERVICE						
ALL FISCAL UNITS	3	0	1	0	0	4
COLLEGE SUBTOTAL	3	0	1	0	0	4
UNIVERSITY HOSPITALS						
UNIVERSITY HOSPITALS	20	4	3	4	0	31
COLLEGE SUBTOTAL	20	4	3	4	0	31

REPORT OF MIC UTILIZATION BY DEPARTMENT
PROJECT YEAR 1974

DEPARTMENT	MDS	CHEM	ERIC	SSIS	AGRI	TOTAL
SPECIAL HANDLING CODES						
SPECIAL HANDLING CODES						
SPECIAL HANDLING						
COLLEGE SUBTOTAL	12	0	64	22	5	103
	12	0	64	22	5	103
UNIDENTIFIED DEPARTMENT CODES						
PATRON DEPARTMENT COULD NOT BE IDENTIFIED						
COLLEGE SUBTOTAL	0	0	0	0	0	0
PAYING PATRONS						
WRIGHT STATE UNIVERSITY						
WRIGHT STATE UNIVERSITY						
COLLEGE SUBTOTAL	46	28	0	4	0	78
	46	28	0	4	0	78
PAYING PATRONS						
PAYING PATRONS						
COLLEGE SUBTOTAL	3	2	4	6	0	15
	3	2	4	6	0	15
TOTAL	1899	235	667	876	302	3979

135

APPENDIX C   PROGRAMS AND PROCEDURES

In this section, all the programs that were written and all the procedures that were established during the four project years are described and listed.

PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCRIPTION
MIC001	ISIPDX	This program consists of three steps:
		(1) It sorts the ISI tape by trailer record key within article number within journal title abbreviation.
		(2) It reformats the sorted tape to PANDEX format after eliminating overlaps with Pandex coverage.
		(3) It extracts the title terms and creates the indexed term fields after checking against the thesaurus tape, and a stop word list.
MIC002	MARCPDX	This program converts MARC II format for monographs into PANDEX format. It also creates indexed term fields from author, title, and added entries, after checking against the thesaurus file.
MIC003	WORDGEN	The word record generation program accepts as input any data base in PANDEX format. The outputs are: a word record file containing every significant title word, author name, indexed term and journal coden in the input file accompanied by the document number in which the article appears; A random access article file containing title, author, and citation information stored by document number; and a retrospective article file. Used for both MDS current and retrospective search systems.
MIC004	INVERT	This program accepts as input the sorted version of the word record file as generated by WORDGEN. The output of INVERT is the inverted word-article file consisting of an index and a collection of data records.

| PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCRIPTION
MIC005	MATCH	This program reads the profile, matches profile words against words in the inverted file; reads the article file for data on articles containing matching words; and creates a hit file containing both user and hit article data.
MIC006	MICPRINT	This program is designed to print MDS search systems output for a hit file. It retrieves randomly the journal location information from the journal disk file for each valid hit, and generates system processing statistics at the end. The program also has many optional features that enhance the flexibility of the application of the program. It can be used to select ███ specific data base, or one ██ific print format. Used for M██ current and Retro systems, and Chem Title system.
MIC007	PROMAIN	This program accepts as input the sorted user profile maintenance cards and the existing profile tape. The output is the updated profile tape file. It may also generate listings of either updated profiles or all profiles from the master file.
MIC008	UPDTLIB	This program is designed to update randomly the journal location disk file and to generate a maintenance report.
MIC009	████STLIB	This program prints a complete journal library location report for internal use.
MIC010	ERGEN	Word record generation program for ERIC formatted tapes. The outputs are: a word record file containing author names and every significant word from the title, the descriptors and the identifiers, accompained by the document number of the article; and a random access article file containing citation information stored by document number. Used for ERIC search system,

129

PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCRIPTION
MIC011	WGENR	Word record generation program for ISI formatted tapes. The outputs are: a word record file containing author names, ISI journal abbreviation, and every significant word from the title accompanied by a document number of the citation; and a random access article file containing citation information stored by document number. Used for Retro data base generation from ISI backlog tapes.
MIC012	NTISGEN	Word record generation program for NTIS formatted tapes. The outputs are: a word record file containing author names and every significant word from the title and the asterisked descriptors accompanied by a document number of the article; and a random access article file containing citation information stored by document number. Used for Retro data base generation from NTIS backlog tapes.
MIC013	FREQUENCY	Print word frequency list from sorted word file.
MIC014	THESAUR	Thesaurus look-up program for word records generated by NTISGEN and WGENR.
MIC015	MICNOTIF	Prints notification cards from disciplinary search systems. Used for all disciplinary data base system output.
MIC016	IITRIOUT	Converts IITRI search system output to MIC search system output.
MIC017	SDFTOCT	Converts the standard distribution format to Chem Title format.
MIC018	NOTINFIL	Generates exception reports from the library location file for LIBLOC maintenance.

130

PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCRIPTION
MIC019	PXDUMP	Produces a formatted dump of Pandex format tapes.
MIC020	PRINTPX	Same as PXDUMP but output format is compressed.
MIC021	SELECT	Selects individual records from Pandex format data sets to produce new data sets with known content.
MIC022	ZEROALL	Zero's the count field of the LIBLOC file.
MIC023	PXSPOOL	Copies Pandex format data sets converting them from the undefined format to variable block span for more compact tape storage.
MIC024	NAMES	Provides an alphabetical list of users with their profile numbers and addresses.
MIC025	CODENS	Prints a listing of the current journals covered by Pandex and verfies that they are in LIBLOC.
MIC026	LABELS	Prints mailing labels for all MIC customers from the profile tape.
MIC027	BLK3330	Given an LRECL and KEYLEN calculates all blocking factors on the 3330 disk and presents them as a histogram of percent of the disk space utilized.
MIC028	PRNTHIT	Produces a pseudo-formatted dump of the hit file including fields not printed on the notification card. Used for debugging programs.

PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCRIPTION
MIC029	CRETLIB	Create an indexed sequential file for library location reference from card input.
MIC030	CRETPROF	Create an initial indexed sequential user directory file as an index directory for the cost information system.
MIC031	CTFMT	Convert the output from the Chemical Titles search to the format used to print MIC cards.
MIC032	CTSEARCH	Accepts as input the Chemical Titles data base (in 1970 format) and the Chemical Titles profiles and performs the actual search to produce citations.
MIC033	HFD	This program reads the statistics file that MIC print generates for each production run and prints a statistical summary of the number of notifications printed.
MIC034	ACCUM	Builds word frequency tape from sorted word files.
MIC035	ADNUMBS	Displays the document number for NTIS data with the corresponding physical record number.
MIC036	CAINPX I	Converts CAIN tapes from National Library of Agriculture to Pandex format for input to MIC Searches.
MIC037	CTPROF	This program accepts as input the sorted user profile maintenance cards and the existing profile tape for the Chemical Titles Search System. The output is the updated profile tape file. It also generates listing of the updates profiles and an action summary report.
MIC038	DIRECTORY	This program is used to print the MIC user directory status report from the user directory system data base.
MIC039	MICARD	This program reads model MIC notification cards from IBM cards and mass produces them. It is used to generate internal forms and samples used in making literature masters.

132

PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCIPTION
MIC040	HITPERS	Selects and constructs a personalized bibliographl. file from the MIC search system hit file. An index generation program called WIC, can be used to create a KWIC index from the converted hit citations for a user.
MIC041	ISAMLD	A general program used to copy an indexed sequential file to a sequential file or back. Used for backups or to produce listings of indexed sequential files ordered on a field other than the ISAM key.
MIC022A	JOURACT	This program uses the library location file to produce a report at the frequency with which each journal has generates notifications. It can be used to zero the counters or to zero the yearly counter after adding the yearly value to a cumulative counter. This program replaces ZEROALL.
MIC042	FORMS	This program is used to produce generalized data recording forms on normal computer paper. It is controlled by card input.
MIC043	MICPLUS	A program product of Cullinane Corp. used to store, update, and retrieve MIC source program.
MIC044	MICUSER	This program is used to print the MIC user classification report from the user directory data base.
MIC045	MONSTATS	This program reads the statistics tapes generated by MICPRINT and produces a summary report for any given time period eg. month, quarter, or year.
MIC046	MOUNT	This program is used to synchronize the mounting of disk packs with the production job streams.
MIC047	NTISPP	This program preprocesses the MacMillan NTIS and Pandex tapes to remove the thesaurus terms assigned by MacMillan (using a dynamic thesaurus) and assign New thesaurus terms from the MIC thesaurus.
MIC048	NTISPXI	This program converts the NTIS tape from the US Dept. of Commerce to Pandex format for input to the MIC search system.

133

PROGRAM NUMBER	PROGRAM NAME	PROGRAM DESCRIPTION
MIC049	ORDER	This program prints the ordering information for Current Programs conferences.
MIC050	PAGEN	A wordgen program for data base tapes in Psychological Abstracts format. Generates the word files and Article files for the MIC search system.
MIC051	PATHES	Prints the Psychological Abstracts Thesaurus in a format most usable by MIC.
MIC052	PHASEZ	The experimental post processor module. Used to eliminate false drops from the normal search.
MIC053	PROWORD	Generates a listing of every word used in the profiles for a given service with frequency counts and an optional list of profiles using the word. Used to improve profiling techniques.
MIC054	RIELCS	Converts the ERIC RIE tape to the format used to update the OSU Library Circulation System. This allows adding of the ERIC microfiche to the ciculation system since they do circulate.
MIC055	SSIPDX	Converts the Social Science Citation Index from ISI to Pandex format for input to the MIC search system.
MIC056	STATCOST	This is a comprehensive program designed for storing, processing, and printing the MIC statistics and cost data monthly and quarterly.

143

C.2 Procedures

C.2.1 Source Program Library

The problem of maintaining the source program library for the MIC
system had been handled in various ways primarily by using IBM supplied
utility programs to maintain the source code on partitioned data sets on
MIC's disks. This was inefficient because it required large quantities
of disk space which could not be accessed during the day shift. It also
required a major effort to back up the library and keep it compressed.

The acquisition of the program PANVALET, Pansophic Systems, Inc.,
by University Systems increased interest in a better source library.
Unfortunately, PANVALET proved to be more complex than was needed for a
system the size of MIC. Instead, MIC acquired a copy of PLUS, Gulliane
Corp., a program purchased by University Systems several years earlier.
PLUS originally required a large amount of operator intervention. However, changes were made in the source code of PLUS to allow almost total
flexibility in updating and compiling any combination of programs in the
system without operator intervention. PLUS stores the program library
on tape rather than disk, thus removing the need for on-line disk space.
The use of tapes rather than disk is not overly expensive with a library
the size of MIC's.

C.2.2 Automatic Mounting of Multiple Disk Packs

In many cases a given job required more disk packs than there are
disk drives. Fortunately no single job step of the MIC's search runs
requires more than three of the packs. To quickly and simply run these
jobs, the operating system must be set so that the operating system can
call for those disks it needs on the drives that are available.

The usual procedure for mounting disks involves use of the MOUNT
command. The Operator's Guide publication from IBM points out that the
MOUNT command is used to force a volume (i.e., disk or tape) to remain
mounted and available and thus eliminates the mounting and dismounting
messages. Since the usual procedure for mounting a disk uses the MOUNT
command, special action must be taken to allow the system to mount the
required packs.

A procedure for automatic mounting of disk packs was thus established
and included in all the retrospective production runs, which require multiple disk packs.

LETTERS

Fee-Based Service Misunderstood

We couldn't agree more with [...] and Nancy Kingman about inform[at]ing companies being their own w[...] [Commentary on The Special Libra[ries ...] Based Service Interface, *Special L[...]* (no. 9):320- 322 (Sep 1977)] It is diffi[cult to go for]ward, and sometimes impossible to re[...] credibility with a client who has [...] results from another's service With [...] number of unemployed librarians be[...] something to do, it behooves [...] services to stick together, not to [...] competition but to make sure that [...] does the client and therefore [...] dustry - not suffer, but also that [...] leagues, who may not be aware of all [...] falls of running a business, be given [...] facts on the problems which it entails

We have been fortunate in having [the op]portunity to have helped over 200 [special li].brarians extend their range of ser[vices to their] patrons over the past six years. If only [more li]brarians would see fee-based ser[vices as an] extension instead of a threat, the wh[ole] profession would indeed gain in stature.

Sue Rugge
Georgia [...]gan
Information [...]mited
Berkeley, Calif 94[7]0[3]

Representative Sample

In the review of our book, *Handb[ook of Li]brary Regulations*, which appears on p[age ...] of your September issue, Malc[olm ...] Hamilton notes correctly that separating li[b]raries by type creates some ambiguity. He is not the first to take issue with the sample of special librarians selected for the *Handbook* yet I submit that a population which consists of the presidents and presidents-elect of all the Chapters of SLA does indeed constitute a bona fide sample of special library leaders. For the purists among us, let me note that in a [s]ub[se]quent survey taken in 1976, also of the presidents and presidents-elect of the Chapters, 25% of the respondents were special librarians in branches of academic or public li braries. In my book, these business, art medical, etc librarians are not the less "special" for being noncorporate.

Second, it is stated in the review that "only public libraries, it appears, were selected so that a representative sampling of institutions

[...]th even here [...] indicate the [differ...] [...]ge and small [public ... the M ...] that a report [...] by size, as de[scribed...] [...]est, high, low, [...] [...] 2, "Results [...] [...] 2, 3, 4, 5, 7, [...] [...] A1, A2, A3, [...] are textual [...] on page 20; [Small publi...libra] sample, have [shorter...M..] Friday, but not [appr...] and on Sun[day ...] ...versed; fewer [small ...] large." There [are...] pages 26 and [...] le to afford a [...] re survey, so [...] lysis, hours of [...] means of noti[...] lations as the [more...] are in depth. It [did n...] by size ARL, [state...] gh the last has [some...] [I shall...] our survey to [tradi...ul ulti...] to omit rules [regulating ...] computerized [retrieval system ...] on the fact [that few librar...] data bases at [the time of our ...] [...]matic "regula[tions were into ...] Such "regu[lations ... ...] and remain [perhaps the ...] before our [profes...] and see no [reason to ha...] w, that servic[ing the new ...] les deserved [separate and...] ive treatment.

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