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ABSTRACT

Volume one of the two-volume report on the operation of the Educational Information Network (EIN) gives the background, development, and results of the EIN project from its inception in July 1968 to December 1971. EIN attempted to promote the sharing of computing resources at colleges, universities, and educational service institutions across the nation by publishing descriptions of programs available at each member institution along with the name of an EIN representative at the institution in the EIN Software Catalog. The hoped-for result was that casual users would have their programs run at whatever computing facility had the appropriate program available rather than write their own. It was found that the volume of use never reached the desired level. Some of the reasons put forward for this failure were: the use of mail to transfer information and programs among members resulted in slow turn-around time; many members wanted to acquire programs for comparative or teaching purposes rather than to submit a job; it was difficult for the distant user to interact effectively with the computing facility. Chief among the suggestions offered to remediate these and other problems with the Network was the use of a cheap, high-speed electronic access system. (JY)

FINAL REPORT

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EIN HISTORY AND FINDINGS

Volume I of II Volumes

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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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T A B L E O F C O N T E N T S

Volume I of II Volumes

I. PRELIMINARY

Overview of Report

This document and its attached parts comprise a Final Report on the operation of the Educational Information Network (EIN) from the beginning of July 1968 to the end of December 1971. EIN is a project of the Interuniversity Communications Council, Inc. (EDUCOM), and was jointly funded by the United States Office of Education, the National Science Foundation, and EDUCOM during this period of time. Material in this report is divided into two volumes with two attachments.

EIN History and Findings (Volume 1)

This document is a report on the background, development and results of EIN. It gives the background and history of EIN, as well as the findings of the project, describing the forces that interacted to produce EIN's history and providing criteria that should be considered in evaluating this and other resource-sharing efforts.

EIN Publications (Volume II)

This document is a compilation of the important materials published by EIN throughout its history (not including the two attachments). It is meant to aid the reader in tracing the development of EIN's progress, and to guide and stimulate other publishing efforts.

The Documentation Standards Handbook for the EIN Software Catalog (Attachment)

This booklet describes the standards required for an entry in the *EIN Software Catalog*. This October 1970 edition of the Handbook differs from the June 1969 edition included in Volume II in that it includes standards for documenting remote access systems and whole facilities.

The EIN Software Catalog (Attachment)

This document is a list of the resources available through EIN as of 31 December 1971, the expiration date of the grant. It lists 175 entries from twenty-one institutions and is the most tangible statement of the work performed under the grant.

Acknowledgments

The acknowledgment section of a report is a vehicle for identifying people who have greatly aided the work being

described. Unfortunately, it is often too feeble a way of expressing the recognition that people deserve for the efforts they have made in behalf of the project. Despite an awareness of this possible shortcoming, it is necessary and correct that this report begin with such acknowledgments.

The people most immediately brought to mind as deserving recognition are the Technical Representatives, the official liaison between the member institutions and the EIN Office. These men and women were more than liaisons, however, in that they were responsible for the implementation of EIN at each member's location. Many of them expended considerable effort on EIN's behalf. Special mention should be made of the group of persons officially designated as leaders of the whole body of representatives: the EIN Executive Committee. The efforts of this committee in guiding and extending EIN, as well as the responsibilities of the Technical Representatives, are described in the body of this report.

Several individuals have been involved in fostering the development of EIN in a leadership capacity. General direction and counsel was ably provided by Dr. Jordan Baruch, former President of EDUCOM, and his successor, Mr. Henry Chauncey. Initial organizational work was performed by Dr. Thomas Keenan, who relinquished directorship of EIN as EIN reached a major milestone and began initiating service from the bases Dr. Keenan had established. Subsequent development of EIN's services has been administered by Mr. John LeGates.

Finally, a word should be spoken for the lesser known persons who ultimately performed the day-to-day routines of operating EIN. These include an excellent staff of technical editors, copy editors, production managers and secretaries. Without the continuing efforts of Mr. Richard Ferguson, Miss Jean Doty, Mr. Robert Schmidt, Mrs. Joanie Vigersky, Mrs. Laurie Manifold, Mrs. Nannette Feurzeig, Mr. Jonathan Herndon, Mr. Wayne Zafft, and Miss Leslie Whone, EIN's services would have been severely handicapped. These people are seldom mentioned as the authors of EIN's work, though they are often most responsible for its presentation.

II. INTRODUCTION

Summary

The Educational Information Network (EIN) is a project of the Interuniversity Communications Council, Inc. (EDUCOM). Jointly sponsored by the U.S. Office of Education, The National Science Foundation, and EDUCOM from July 1968 to December 1971, EIN is a resource-sharing network that facilitates the cooperative use of members' computer capabilities. Resources submitted to EIN are documented and publicized to make them available for use at the institution where they were developed and are operating. Both in membership and in resources, EIN has expanded and developed beyond original expectations. However, use of EIN consisted only of requests for copies of programs for transfer to the user computer rather than requests to use the programs at the originating site.

Background for this project was provided by the 1966 EDUCOM Summer Study on Information Networks which proposed the establishment of a national, multi-media educational network. EIN was one aspect of that proposal. Under the direction of Dr. Thomas Keenan, the first year of EIN operation saw the laying of the organizational foundations of EIN. The duties and interrelationships of the Technical Representatives, the EIN Council and the EIN Executive Committee were defined and a general call for membership was issued. In parallel with this, contact and evaluative investigations were begun with other resource-sharing networks to help guide EIN's efforts. A Directory of Information Networks was compiled and published as a result of this work. As the first year progressed, the documentation standards for programs submitted to EIN were defined and work was begun on the *EIN Software Catalog*.

The second year of operation saw the establishment of EIN as a resource-sharing network with the distribution of the *EIN Software Catalog*. Procedures for use of the network were established. Under the direction of Mr. John LeGates, EIN greatly expanded the resources available through the network. By the end of the year, remote access systems and whole facilities could be accessed through EIN. Efforts were also begun to meet the "unbundling" crisis that faced universities. EIN received a one-year extension on its original two-year grant in order to allow sufficient time for the network to become economically self-sufficient.

The third year of operation was devoted to reviewing and evaluating EIN to stimulate usage and interact with other resource-sharing networks. Several marketing surveys and efforts were undertaken, but EIN users continued to transfer the programs to the data. Work then shifted

to evaluating EIN's history and cooperatively aiding other resource-sharing activities.

Off-campus usage of computational resources is difficult, at best. Users want to have programs easily accessible for use and modification, with a rapid return of results. Neither of these is possible in the present configuration of EIN, since reliance was placed on the mail as the primary network usage vehicle. The difficulties of developing usage of EIN could not be overcome without major expenses for direct hard wire connections or massive advertising campaigns to reach potential users.

Further, few universities have channels for spending funds off-campus. With increasingly tight university budgets, even fewer had funds for such expenses. The tight budgetary situation of universities strongly diverted the attention and efforts of members away from cooperative ventures like EIN and toward local problems. This crisis prevented universities from giving EIN the amount of interest and usage it might otherwise have attracted.

These are the principal deficiencies of EIN, and the principal problems which should be considered in planning other resource-sharing efforts.

EIN produced the following:

- *a set of documentation standards that is in wide use throughout the academic community
- *a software catalog of four looseleaf volumes encompassing approximately 200 major items of software and several entire computer facilities
- *a cooperative administrative network which secured the commitment of major resources from its members.

EIN also produced the following knowledge:

- *usage of remote programs with the mail as a medium of exchange is not a viable mode of operation
- *there is considerable interest in software available away from home
- *institutions are very interested in resource sharing. They will commit the time of senior personnel. They will also make their resources available to other institutions.
- *documentation suitable to allow remote usage appears to be possible (this is indicated, not proven).

*the indication that high-speed electronic network is administratively feasible, and not the contrary. Such connection eliminates all the reasons which caused EIN not to be used.

EIN: Concepts and Issues

Philosophy and Benefits

Before entering into a detailed narration of the history of EIN, it would be appropriate to examine the philosophy behind EIN; why and how EIN was conceived and created. This not only provides a measure for judging EIN on its own terms, but also casts light on the situation of university computing. Finally, many of the successes and failures of EIN can be traced to the concepts and viewpoints that led to its creation.

It was recognized that, on a national scale, there existed a wide discrepancy between the needs and resources immediately available to universities. Many universities were discovering a growing need for divergent and sophisticated computing resources. They were hard-pressed to meet this need in the present and would be pressed even more in the future. Correspondingly, several institutions had installed and developed extensive facilities that were not being used to their full capacity. In many cases, it was necessary to obtain more total resources than immediately necessary in order to also obtain some desired minimum of specialized resources. This underutilization is the further result of advanced planning: anticipating future needs and providing for their alleviation now. This left these installations with a surplus capacity, or at least the option of extending service outside the parent organization.

There are at least two means of solving this problem. One is to set up some electronic interconnection between participating sites and nullify the effects of distance. This is the solution proposed in *EDUNET* as described below. The second, more modest method is to establish some vehicle to serve as a transfer media for available resources. This is the mode that EIN uses.

Resource-sharing networks have usually functioned by transferring the actual program code to the requestor. This has several disadvantages. As Dr. Harry Rowell of Carnegie-Mellon University has observed:

> Consider a center such as COSMIC, which does not relate totally to universities, but which from time to time offers products other universities can use. This facility was established on the principle "If you stack the material up high enough and long enough, then people will start beating a path to your doorstep, gathering it, and carrying it off in wheelbarrows." They did then they brought it back in trucks because COSMIC created more junk than anyone could take away. It took us some years to clean out the problems. We would receive a package that looked great, looked neat, and had nice documentation, but just would not work when you gave it to somebody else. We began to remember that people tamper with their own systems; they install their own special functions, their own special routines. They write a program and wrap it around that routine. They send this program to us, and we send it to somebody else; but unfortunately the program did not include the special routine or the tampered-with function. Even if the documentation we received was great, it was incomplete. (*Behavioral Science*, Sept. 71, p. 498).

He later points out that these comments are equally true of the other major computer resource-sharing efforts: PAL, DECUS, USE, SHARE, etc.

It is clear that attempting to duplicate programs at new sites is an inefficient and difficult way of proceeding; and one that becomes more inefficient each time a program is requested. In light of the almost critical shortage of technically competent personnel, duplication is even more unjustifiable. The solution seemed clear: use the resource where it was developed and supported. This not only ensured that the program was in a compatible environment but also bypassed the problem of verifying code, a problem that had proven nearly insurmountable when it was attempted at all.

In this method of operation, EIN functions as a pointer to available software, providing information necessary to enable users to make responsible judgments about the programs which may be of interest. This may be regarded as an attempt to incorporate the features of a physically-connected network but without the cost and technology embodied in the electronic network. It offers the twin advantages of being able to complete a job where it can be done most efficiently and of offering services beyond what is locally available or supportable.

Two of the other benefits of EIN relate to the selection of a major publication as the vehicle of information exchange. Authors of programs published in the Catalog receive recognition and acknowledgment for their work in much the same manner as a scholarly journal. General readers are kept informed of the current work and developments in their particular area of concern. As it turned out, these benefits did not always apply, since many of the entries in the Catalog were standard program packages, such as statistical routines.

Difficulties

EIN's mode of operation suffers from several disadvantages. First, it assumes that the software is supported at the site where it was developed. However, many programs are forgotten as soon as they are completed and are not maintained. The documentation process does not always screen these out. Another difficulty is system changes or up-gradings that render programs incorrectly documented. These problems are common to all resource-sharing efforts.

A more serious difficulty is that the EIN user cannot easily interact with the program. This biases EIN to persons who want to run data using specific programs as they exist, rather than using the program as a teaching example or as a model for their own coding. It is also biased towards the one-time user, since multiple runs on the same data, incorporating intermediate results into the process are not easily done through EIN. There is also the difficulty of having to send data to the resource university, have it handled and processed, and returned. The turnaround time is expected to be long and there are more foreign hands on your cards than if you did the job locally.

The anticipated EIN user was a faculty member who, while he had data and some notion of the results he wanted, did not know a great deal about computers and programming. EIN would not attempt to teach him the use of computers; merely enable him to perform his desired task. Thus, EIN was not geared to the sophisticated computer programmer, though these were the people that comprised the first level of interaction of EIN and the universities. This meant that the sophisticated user, who often does wish to alter and adapt programs, found it next to impossible to do so in EIN. He was expected to act on behalf of EIN, though he was not the primary beneficiary of the labors of EIN.

It is doubtful that extensive consideration was given to the particular point of intersection in the university that EIN would contact. The computer center was the

natural home for EIN in the university since it is the only centralized point complementary to EIN's purposes that has access to the various disciplines. This means that EIN is interdisciplinary in scope (at least as interdisciplinary as the computer centers are). It did not seem feasible to attempt to approach all of the disciplines separately. EIN, however, did not ignore disciplinary lines. Several of the marketing thrusts of EIN were directed toward specific disciplines (as reported below) and the Catalog itself divided abstracts of programs into the various disciplinary interests.

These then were the biases inherent in the structure of EIN. Their effect upon the course of EIN's development can be clearly discussed in retrospect as will be seen by examining the history presented below. But, as is usually the case, the outcome was not entirely predictable.

III. BACKGROUND

Boulder Conference: Summer Study on Information Networks

The history of EIN begins at least three years prior to the date on which EIN's funding commenced. In August of 1965, an EDUCOM Task Force on Information Networks, chaired by Dr. George W. Brown of the Graduate School of Business Administration, University of California at Los Angeles, held its initial meetings. The task force's purpose was to evaluate the mushrooming number and variety of recommendations for university-oriented information networks, consider their feasibility and estimate how rapidly new technological developments could be applied. The task force included computer scientists, educational TV specialists, librarians and others. They developed a conviction that the establishment of an educational information network should be seriously considered. A suggestion for a summer study on information networks was presented to the EDUCOM Board of Trustees by the task force in December 1965. The task force:

> suggested that one or more networks be established in the near future to provide facilities which will further network applications currently feasible, to provide field operations within which the problems may be identified and solved, and to provide a basis for growth, which may well take place in directions not now anticipated. (*EDUNET*, p. 10).

The summer study would provide an opportunity to broadly consider the problems and opportunities that were arising. A joint grant from the National Science Foundation, National Library of Medicine, U.S. Office of Education, and the Public Health Service secured the study's finances, incidentally indicating the breadth of support for such a study.

The EDUCOM Summer Study on Information Networks was held in July of 1966 at the University of Colorado in Boulder. Approximately 180 participants from educational, governmental and industrial organizations met and assessed the desirability and configurations of an educational communications system. Participants represented a wide spectrum of professional activities including "libraries and library sciences, computer sciences, closed-circuit and broadcast radio and TV, communications engineering, audiovisual methods, educational research, health sciences, medical records, clinical operations, hospital administration, university administration, continuing education, computer-assisted instruction, documentation, data bases for information retrieval, science information systems and selective dissemination of information." (*EDUNET*, p. 11). Their assessment involved an identification of educational needs, a survey of feasible

applications, a study of the organizational relationships implied by communications systems and an estimate of the scale, schedules, budgets and arrangements needed for the establishment of a useful educational network. These were published in a book by Brown, Miller and Keenan, titled *EDUNET*.

EDUNET

While the Summer Study did not specify in detail the hardware and software needed, the conviction developed that EDUCOM should set its goal as the establishment of a national multimedia educational communications network (EDUNET). The scope of this network is indicated by an outline of the network suggested by Alexander, et al. (*EDUNET*, p. 244-5).

Proposal for an EDUCOM Network

I. Introduction
   - A. Needs to be served:
     1. Bulk communication (lots of it, cheap, and cost included in overhead);
     2. Well planned system for service and growth.
   - B. Capability of proposed network:
     1. Communication services (teletype, CRT or voice, tape transfer at high rate, video-audio);
     2. Information services (access to member services, storage, directory, monitoring, switching).
   - C. Benefits anticipated:
     Improved efficiency and effectiveness in teaching, research, administration, services to government, industry, professions, and the public.
   - D. Time schedule:
     Completing proposal including arrangements with initial participants, funding, and initiating network operations.

II. Network use by type of application
   - A. Bibliographical service—interrogation and retrieval of established files;
   - B. Building of automated files by groups on network;
   - C. Computer-aided learning—development, research and demonstration, and teaching with specialized groups;
   - D. Interchange use of computer programs (on-line directory of programs available, emphasis placed on built-in instruction on how to use programs and assimilation of users' comment file);

E. On-line debugging and computation;
F. Data transfer (e.g., magnetic tape, telemetering, machine-machine);
G. Two-way communications, person to person;
   1. Message,
   2. Voice,
   3. Audio-video.

III. Other ways of viewing use of network
   A. National goals—mission:
      1. Health,
      2. Education,
      3. Economic growth,
      4. Defense.
   B. People to be served—described by roles:
      1. Student,
      2. Instructor (and teaching assistant),
      3. Author for instruction,
      4. Scholar researcher,
      5. Practitioner,
      6. Academic administrator,
      7. Facilities administrator,
      8. Public.
   C. Disciplines:
      1. Physical sciences and engineering
      2. Biological sciences
      3. Social sciences
      4. Humanities.

These services were examined and alternative methods of providing them were explored.

It was recognized that such an ambitious operation would necessarily begin slowly and gather momentum only with substantial effort. The Study laid the groundwork for the proposal of a "kernel network" of approximately twenty universities that would begin to develop EDUNET. This development was expected to occur in three phases:

Phase I: May 1967—June 1968. Establishment of the EDUNET organization, selection of staff, specification of plans, standards and operation.

Phase IIA: July 1968—December 1968. Installation and testing of narrow-band pilot communications channels in the kernel network.

Phase IIB: January 1969—June 1969. Extension of narrow-band network to EDUCOM members and planning of wide-band pilot network.

Phase IIIA: July 1969—December 1969. Installation and testing of wide-band EDUNET.

Phase IIIB: January 1970—June 1970. Extension of wide-band network to all EDUCOM members.

The Plans for EIN

As part of this multimedia network, development of a national computer network was deemed fruitful and complementary. Many of the issues explored related to such a computer netwcrk and it seemed a reasonable portion of EDUNET to begin implementing. Accordingly, a proposal was submitted to the National Science Foundation for the establishment of the Educational Information Network (EIN). This proposal intended:

1. To bring into being a cooperative network of remote-access, time-shared, and multi-programmed computers [the Educational Information Network (EIN)] in a significant number of geographically distributed institutions.
2. To find early practical solutions to problems of interconnection and use of diverse netted equipment.
3. To further the development of a cooperative community of developers, testers, and users of computer software.
4. To begin the development of shared libraries of proven and documented computer programs. (Original proposal, p. 1).

This proposal was the first phase of a four part plan for the development of a full capacity educational information network. Phase I was to establish an operating network with the facilities then available and thus promote sharing of the programs and data files on the most optimum hardware available to the network. This would involve establishing some initial consensus among the various centers, specifying the initial mode of operation. A directory of resources would be published. Telephone and telegraph service would be used to establish communications channels between the facilities. Self-evaluative procedures would be established and actual data would be gathered on the volume and nature of the network usage.

Phase II (early in 1968) would see the expansion of the participation in the original network. Specialized equipment such as interfacing equipment, automatic calling units, optical character readers, voice response units, and specialized computing equipment would be added to the network.

Phase III, to begin in January 1969, would extend the achievements of Phase II by installing message-switching equipment and an on-line directory so that requests for a particular service could be routed easily and automatically to the appropriate facility.

Phase IV, the culmination of EIN, would begin in January 1970. Large scale dedicated equipment, including computers, optical character readers, microwave and satellite communications facilities, and large scale electronic storage units would be made operational in EIN.

As ambitious as the overall plan was, the activities involved in Phase I were no less ambitious. Initial agreements on the eleven areas listed below were to be obtained from the computer center directors of the twenty participating installations.

1. A commitment to provide the modems required to attach their computing equipment to the dial telephone network.
2. A commitment to assure availability of their computing equipment under specified conditions to authorized users of EIN.
3. A system by which EIN users will become authorized and will receive code identification giving them access to the network.
4. An accounting system to be used to distribute the cost of usage to the proper user.
5. A commitment by participants to make selected programs and data files resident in their system available for remote use.
6. Standards for documentation of programs and data files.
7. Design of a directory of programs and files available through EIN so that users will be able to easily use the network.
8. A system to record usage and other factors used in planning future development of the network.
9. A minimum set of common practices, documented and with deviations noted.
10. A commitment to make such modifications in their operating systems as will be needed to interact with the network.
11. A system of charging so that users will be responsible for all costs including the cost associated with the Educational Information Network itself.

In addition, the following six tasks were to have been begun:

1. The adaption of computers for electrical interconnection via common-carrier channels.
2. The establishment and maintenance of a network library of protocols, agreements, conventions, standards and formats.

3. The preparation and maintenance at each participating institution of a directory of services and facilities offered for external use and documentation of such services and facilities as were of interest.
4. The preparation and maintenance at each participating institution of programs to monitor local operations and provide information about availability to remote nodes.
5. The preparation and maintenance at each participating institution of programs to monitor remote usage of local operations and to gather data needed for modelling and accounting purposes.
6. The preparation, maintenance and dissemination of a network-wide directory of programs and data resources.

Even broader tasks were outlined as requiring attention from EIN.

EIN as Amended

An amendment to the proposal, dated January 17, 1968, reflects a shift in emphasis on the part of the parties interested in EIN. In this document important changes in the university computer centers' situations are pointed out. Many of the universities were establishing time-sharing systems. EDUCOM could assume a growing body of experience with dialable access systems instead of having to start from total inexperience. In addition, it was noted that the staff of these centers were hard-pressed to keep up with the installation, operation and maintenance of these new systems. This led to the recommendation that EDUCOM assume more responsibility for establishing compatible interfaces in EIN, rather than leaving it up to the individual members to adapt themselves to the network.

This shift was further reflected in the specification of four steps needing completion:

1. Establish a common framework for remote access.
2. Document and distribute descriptions of remote access systems and supporting software.
3. Develop techniques and equipment to make remote access systems available to as many kinds of remote terminals as possible.
4. Establish a system such that each individual network user has an immediate personal contact with the network.

In essence, these tasks are identical to the previous ones. The emphasis, however, is much more low-key, much more on making full use of what is available, rather than developing more.

Involved in this work is the compiling of a directory of hardware, software, and, possibly, data banks. These directories were to be used by the executive director of EIN as a focus for the development of common practices. The director would be guided by a council composed of technically competent people from the participating institutions. The council would have an executive committee to serve the director as a policy advisory board.

The original EIN proposal was, therefore, a challenging complement to EDUNET. It laid down the foundation for much of EIN's later development, at least on a conceptual level. However, because of its ambitiousness and because of national policy decisions, it was not funded. EDUCOM, thereupon, began to reexamine its planning for EIN and to revise its proposal for funding.

IV. HISTORY OF EIN

EIN As Revised: The Original Grant

A modified proposal for the establishment of the Educational Information Network was submitted to the U.S. Office of Education and the National Science Foundation on April 19, 1968. This proposal took as its statement of purpose:

> The purpose of this project is to establish and administer a system through which computational capabilities existing in colleges and universities will be made accessable to users in other colleges and universities. To accomplish this it will be necessary to study and critically evaluate existing and proposed networks. It will further be important to establish working relations with developing networks so as to foster compatability, avoid duplication of services and discover capabilities that can be made more widely accessable. The immediate products of this project will be reports on the successes and failures of existing networks and a regularly maintained catalog of the capabilities that can be accessed through EIN.

The development of a full capacity national computer network was expected as the eventual outcome of EIN, but it was recognized that this would involve long-term planning and coordination. To ensure efficient network operation and to aid in future planning for a full scale network, great emphasis was placed on the review and evaluation of existing networks. Joint relationships with other networks would be undertaken wherever mutually beneficial, also toward this end.

Initially, EIN would consist of a catalog of resources available within the participating institutions. The network would be an organizational and administrative concept, rather than a physical entity. That is, it would establish the administrative procedures necessary for resource sharing. This includes providing such information as standards, formats, general instructions, operating procedures and accounting information to all of the participants. Network usage would be aided by the identification of Resource and User nodes, and the training of university staff in the use of EIN. Resource descriptions would be standardized, collected, verified and published. Test of the network would be made when EIN was operational. It was envisioned that EIN would be composed of twenty members by the end of its second year of operation.

These then were the main tasks of EIN. The direction of EIN would be guided by an advisory council containing representatives from the nodes. This project was funded to begin June 1, 1968, with funds provided by the U.S. Office of Education and the National Science Foundation for two years.

History of EIN

The First Year

In the first year of EIN operation, the emphasis was on beginning the studies of other networks and preparing the organizational structure of EIN. Initial planning for EIN assumed that it would concentrate on a small number of resource and user institutions, working intensively with them to develop network operation and usage. It was expected that EIN would have twenty members by the end of its first two years of operation. Considerable emphasis was given to the study and evaluation of existing and planned networks to guide the development of EIN. By the end of the first year, the survey of networks was completed and the development of EIN's organizational structure and mode of operation was well underway.

The First Quarter: 1 July 1968 to 30 September 1968

The first tasks of EIN were evaluation of other networks and development of the EIN Network. These involved visits to, conversations with, and information-gathering from various institutions across the country. Visits concerning EIN development were made to the Triangle Universities Computer Center (Duke University, North Carolina State University, and University of North Carolina), Texas A & M, University of California at Los Angeles, Educational Testing Service, and the University of Pennsylvania. In addition, conversations were held with responsible persons at Harvard University, University of Pittsburgh, Cleveland State University, University of Georgia, Pennsylvania State University, University of Texas, University of Maryland, and the Massachusetts Institute of Technology. The EDUCOM membership list was examined and information was compiled for the University of California at Davis, University of Connecticut, University of New Hampshire, Cornell University, Pennsylvania State University, Washington State University, University of Florida, Idaho State University, Michigan State University, University of Massachusetts, Ohio State University, University of Michigan and the IBM Cambridge Scientific Center. This and the further efforts described below insured the representation of diverse opinions in EIN from the start.

In order to develop lines of communication with other networks, the EIN staff began attending conferences, making presentations on EIN and EDUCOM, and finding out the problems and status of other resource development and resource-sharing efforts. A further value of attending conferences was that it enabled contacts to be made with a great number of people, both formally through presentations and informally in day-to-day discussions. The EIN staff made good use of the

opportunities available through this medium, as will be recognized by looking at the number and variety of reports on conferences attended that are included here.

Meetings were attended or held with Computation Planning, Inc. concerning project CUES, the Associated Universities, Inc. concerning project NEARS, Mitre Corporation, Lincoln Laboratories, Project MAC at MIT, the New England Colleges and Universities Regional Computing Program (NERComp) and the ACM's annual meeting in Las Vegas, Nevada, August 27–29. Dr. Keenan addressed the Park City, Utah Conference on Undergraduate Education in the Computer Sciences on September 9, 1968, at the request of the conference director, Dr. William Viavant, speaking on EDUCOM and its plans for remote computer services.

Compiling the directory of networks was recognized as cross-pollinating the planning for EIN. An initial literature search identified 85 reported networking activities. Several of these were noted as having a clear relationship to the development of EIN: Triangle Universities, University of Florida, University of Georgia, Pennsylvania State University, University of Pennsylvania, Princeton University, and University of California at Los Angeles. Indeed, all of these institutions but one was approached or visited concerning EIN; and in the one exception (Princeton University), a visit was made to Educational Testing Service, which has ties with Princeton.

Special concern was placed on following the development of the regional computer services sponsored by the National Science Foundation. Service was to be provided to 76 other colleges and 27 other sites (mainly secondary schools) through the following universities:

Carnegie-Mellon University
Cornell University
Dartmouth College
Illinois Institute of Technology
University of Iowa
Oregon State University
Purdue University
St. Anselm's College
The Southern Regional Education Board
Stanford University

Other resource-sharing services were also noted. These included plans being developed by the State University of New York (SUNY) at Buffalo, SUNY at Binghamton, University of Wisconsin, and even such small institutions as Franklin & Marshall College, Oberlin College, and the University of Dayton (for the Dayton-Miami Valley Consortium). Major potential resources were being considered by the Advanced Research Projects Agency of the Department of Defense, MICIS

(University of Michigan, Michigan State University and Wayne State University) and the New England Colleges and Universities Regional Computer Program (NERCOMP) representing 66 New England institutions.

In the first few months of EIN's existence, meetings were held and correspondence conducted with many of the organizations named above. This work on the directory of networks clearly broadened the range of possibilities and models open to study by the EIN staff. By the end of the fourth month of the EIN grant, initial study of the situation had proceeded well enough to indicate to the EIN investigators that they needed to revise some of the earlier plans and concepts, both for the directory and the network itself.

Research for the directory had compiled a sizeable list of the networks being planned or implemented across the country. However, the comprehensiveness of the information gathered could not be assumed. There was no published summary material on the majority of networks, and there was no index to the material in existence. There was no central list of the networks themselves. Information about networks was generally available only by personal contact with key individuals, and the networks were usually discovered by chance. This is equally true today.

The operational status of many of the networks was not clear from the literature. Some of the reported activities such as airline reservation systems were partially proprietary while others such as various police networks are not open to public examination. Although the initial approach to the directory tried to be comprehensive, it was recognized that greater selectivity would be needed if superficiality were to be avoided.

It was found that the bulk of the existing computer networks resembled "star" networks, with a central element providing the main resource and exercising much of the control of the network. Many of the evolving networks (ARPA and MICIS, for example) consist of nodes at equal levels of capability, and require cooperation between the nodes. Since the latter networks present additional problems in means of accessing resources, in data formatting, and in access to stored data, it was felt that they deserved particular attention as they evolved. Material continued to be gathered on all of the reported networks but the staff began to plan on limiting the study to multi-computer, multi-institutional, educational-related networks. This need for a process of selecting networks for study had not been anticipated, and meant that the directory could not be drafted at the end of 1968, as originally expected.

Planning for the EIN resource-sharing operation was also revised in this first quarter-year of operation. In talking with institutions, each of them was found to have valuable computational facilities composed of computer programs and sizable equipment installations that would be of interest to people at other institutions. Moreover, a cooperative attitude on the part of the responsible people was noted. These people were quite willing to work with EIN in the development of a national network. However, there were unanticipated problems.

The responsibility for user packages was found to be widely diffused on a campus. Responsibility for system programming had been concentrated in the computer centers while individual users and projects were responsible for writing, maintaining and documenting the programs that they specifically used. As a result, the user packages that EIN was to catalog may have been centrally located, but the knowledge and documentation for those programs was as scattered as the users themselves. This was probably because the users wished to maintain control over the programs they needed; and the computer centers were fully occupied developing and implementing the systems programs that enabled the center to function.

For EIN, this meant that the task of collecting and documenting useful program packages from users was more difficult than expected. This task is one of the most crucial aspects of network operation, since it is concerned with the source of the programs themselves. In addition, use of computer programs at a distance seemed to call for technical specialists at each of the participating campuses to assist the outside user and to represent the local user of EIN at the location where the program is running.

It was decided to issue an open call for membership to all EDUCOM members, rather than concentrating on a small group of institutions. Each participating institution would be asked to nominate a person to act as Technical Representative to EIN. This person would begin to collect program information necessary to establish EIN, as well as serving in the technical capacities specified above. A general call was issued so that these Technical Representatives could have as much time as possible to centralize program documentation while the EIN staff furthered relations with other resource-sharing efforts and developed detailed planning for EIN.

The General Call for EIN Council Nominations specified the organization of EIN and the corresponding responsibilities

of the Technical Representatives, and provided an initial model of the standards for program documentation. The benefits EIN brought to members were outlined as:

*Program Availability
*Variety of Computer Configurations
*Program Package Availability and Quality Assurance
*Expanded Service Offerings
*Computer Service Availability (to those without developed installations)
*Standard Program Documentation
*Formalized Information Dissemination
*Comparative Institutional Profiles
*Mutual Problem Solving
*Reserve Computer Power
*Billing Simplicity Through EDUCOM's Internal Accounting System

Each participating institution was to nominate a representative to be responsible for EIN activity. These representatives composed the EIN Council, which provided guidance to the EIN program. From the Council, an Executive Committee was to be selected to represent the Council in the development of EIN. The Council would meet yearly; the Executive Committee would meet three times a year at EIN expense.

The Executive Committee was given four major functions: that of representation of the EIN Council's desires to the EIN staff, providing leadership to both the Council members and the EIN staff in helping define the developing role of EIN, advising on the administration of EIN, and reviewing the activities of EIN to ensure the establishment and maintenance of quality standards.

The functional roles of the EIN representative were defined as representation of EIN in his institution and his institution in EIN; integration of EIN plans with institutional requirements; supervision and coordination of activities needed for active participation in EIN; and monitoring the progress of EIN and of the institution's use of EIN.

Participating institutions were responsible for supporting the EIN representative in his activities of gathering documentation for EIN, verification of computer programs, submitting of descriptions for cataloging and using the Network. The institutions agreed to provide the resources needed to catalog available software, process the requests for service from other EIN members, and submit the records or forms needed for EIN to function efficiently.

The Second Quarter: 1 October 1968 to 31 December 1968

The compiling of information on networks and the study of these networks was viewed as the next major task confronting the EIN staff. This was to provide the foundation for implementing EIN's service, acting as a guide to the experiences and expertise available. A simple survey form was prepared and distributed to EDUCOM members. The institutions were asked to provide information in an unstructured form concerning their current and planned computer network activities. Responses to this survey, together with information collected from reports in published literature, were collected into a preliminary directory of networks. The characterization of the networks identified continued to be a problem that defied solution.

The completeness of the preliminary directory was not guaranteed since the information necessarily needed to be corrected and added to on a continuing basis, and since the investigators continued to accept a description of any system that the submittor called a network. With the data that had been collected and the limited experience of most computer network activities, characterizations seemed artificial. One distinction that did appear to be significant was between networks that are based on one computer , although small computers may be attached as terminals, and networks that are fundamentally multi-computer. Most of the networks were of the first kind; e.g., Triangle Universities Computer Center or the National Science Foundation regional networks. The only known examples of the second kind were the ARPA Network and the MERIT Network, both of which were still in the process of being established. Both EIN and the New England Regional Computer Program (NERComP) planned for multi-computer systems eventually, though both began without computer-to-computer communication.

An extensive group of meetings were attended and people interviewed to continue the study of networks and the development of EIN. These included:

*NSF Meeting of ten regional network projects	10/7 –10/8
*EDUCOM Council Meeting in Boston	10/15–10/16
*Argonne University Associates (Charles Yost)	10/23
*MERIT (University of Michigan, Michigan State University & Wayne State University)	11/12
*Morel Conference in Michigan	11/19–11/20
*McCall Information Science, Inc. (Jeffrey Norton)	11/26
*National Research Council (Commission on Comparative Pathology)	11/29
*Mathematical Association of America (Alfred Wilcox)	12/3

*Illinois Institute of Technology Regional Meeting	12/6–12/7
*Fall Joint Computer Conference	12/9–12/11
*Stanford University	12/12
*New England Regional Computer Program (Roger Gaunt)	various

Attendance at these meetings was also an attempt to ensure the inclusion within EIN of institutions that have major computational resources. Interest in EIN was not lacking in this and other quarters. By the end of the second quarter of EIN's operation and three months after the General Call for EIN Nomination, thirty-four institutions had officially joined EIN. Many other institutions had requested information on EIN or had informally stated that they were in the process of appointing an EIN representative. An organizational meeting for the EIN representatives was planned for January 1969.

Consideration was begun on the publication of a directory of computational capabilities available through EIN: the *EIN Software Catalog*. During the visits and correspondence, documentation of computer programs was solicited. Initially at least, there did not seem to be any problem in obtaining the material requested. The material itself presented other problems. It had several distinguishing characteristics:

1. It was voluminous;
2. It usually assumed that the reader was familiar with local rules and nomenclature;
3. It assumed that the reader was within easy communicating distance;
4. It was incomplete, especially for programs held outside the central computing facilities.

Discussions were begun with the EIN representatives to encourage the originators of programs to prepare and submit for publication catalog entries similar to models that were being developed. The EIN staff wished to avoid the redocumentation of programs by EIN, since this raised problems of manpower and verification. However, there did not seem to be many ways of convincing the originators of programs to redocument their work, since they were not responsible to the computer center or to the Technical Representative, in many cases.

The Third Quarter: 1 January 1969 to 31 March 1969

The third quarter saw the firming up of many of the tasks of EIN. Preliminary results began to appear and significant problems facing the network began to be delineated.

On January 10, 1969, between fifty and sixty EIN Technical Representatives attended an organizational meeting in Boston.

The basic and common problems of documenting the individual capabilities available in EIN, accounting for services, and billing were discussed. An interim Steering Committee was formed under the chairmanship of Dr. Thomas Keenan, the Executive Director of EIN. This committee was to correlate the desires of the various EIN members and to recommend operational procedures that should be adopted.

The ten members of the Steering Committee were grouped into three subcommittees:

Billing and Accounting:

Dr. Daniel Bernitt	The Pennsylvania State University
Dr. David J. Blackwell	Educational Testing Service
Dr. Thomas Hulbert	Northeastern University

Documentation and User Matching:

Mr. Howard Bedell	University of Georgia (COSMIC)
Dr. Lorraine Borman	Northwestern University
Mr. Merlin W. Wahlstrom	Ontario Institute for Studies in Education

Organization:

Dr. Demos Eitzer	City University of New York
Dr. E. P. Miles, Jr.	Florida State University
Dr. Edward F. Staiano	Bucknell University
Dr. James G. Miller	Cleveland State University

The Steering Committee met on February 27, 1969 to develop guidelines for the operation of EIN. Much of the discussion centered on the type of organization needed to support the network and the problems of reviewing program documentation and program uses. It was agreed that an Executive Committe of six members should be elected at the next Technical Representatives Meeting, in April. The Steering Committee also suggested a possible structure for the EIN operation, composed of various subcommittees of which the chairman would be on the Executive Committee.

The Steering Committee felt that it was very important to establish a system of "refereeing" of programs that are published in EIN. It proposed that the institutions submitting the program provide access and time without charge to the referee for his tests of the program. The Executive Director of EIN was instructed to begin compiling a list of qualified people who would review the programs and their documentation before publication.

Consideration was also given to the type of program that EIN would publicize. Strong recommendations were made that EIN should not be restricted to stand-alone applications programs, but should also publish complex programs and systems. However, the standards for documentation of these

systems were not specified. Initial consideration was given to the criteria that EIN should use in deciding on the publication of such systems. The criterion proposed was that these systems be published when they provide unique capabilities to the network and when the documentation includes sample problems.

Program documentation for publication in the EIN Catalog continued to be collected. Visits were made to Northwestern University to collect samples of their programs because of the comprehensiveness of their documentation. Additional visits were planned to other institutions. This procedure seemed to be necessary since EIN began to encounter reluctance on the part of institutions to submit their writeups in response to a request by mail. It was felt that this situation would improve with the distribution of the publications (specified below) that were produced at this time.

In response to an earlier request from EIN, ten institutions sent the titles of 267 potentially interesting programs to EIN. These were classified, printed and distributed to the Technical Representatives as the *EIN Program Mix*. It was felt that this list would enable the Technical Representatives to assess the user interest at their institutions, encourage them to submit documentation of their own, and provide feedback for the EIN staff on the program areas where the greatest potential needs existed.

In conjunction with the Program Mix, a draft version of the *Documentation Standards Handbook* was prepared and distributed for comments. This handbook contained a model catalog entry to guide the various members in preparing their programs for inclusion in EIN.

Preparation of catalog entries was begun. The documentation collected at Northwestern University (40 programs) was revised to conform to the drafted standards. This preparation proceeded more slowly than expected, so that by the end of the third quarter, only seven of the catalog entries had been completed. As the documentation standards became more widely known and accepted, it was expected that the effort needed to prepare Catalog entries would lessen. Initial distribution of the catalog was set for June.

A "Directory of Information Network and Network Activities (Preliminary Version)" was printed and distributed in February 1969 for comments, corrections and additions. As it later turned out, this was the last significant effort placed on this aspect of the study of networking. While the EIN staff has continued to be in contact with and to be evaluative of other

networks and of networking in general, no attempt was made to update and expand the preliminary version of the directory after it appeared. The task of developing and expanding the Educational Information Network overshadowed the work on the directory.

The EIN staff did continue their meetings with organizations involved in computer networks. During this third quarter, their visits included:

*Indiana Regional Computer Network at Purdue University
*Southern Regional Education Board Meeting at Xavier University in New Orleans
*Stanford Research Institute (Dr. Douglas Englebart)
*University of California at Los Angeles
*Tulane University
*Northwestern University

The Stanford Research Institute Program became of particular interest later when Dr. Englebart's group was selected to be the ARPA Network Information Center. This operation was viewed as functioning in much the same manner as EIN but for the ARPA contractors.

The Fourth Quarter: 1 April 1969 to 30 June 1969

On April 14, 1969, one day before the Spring Council of EDUCOM, the EIN Technical Representatives met in Boulder, Colorado to consider the recommendations of the Steering Committee. They reviewed and adopted its report. A six-member Executive Committee was elected, with Dr. Keenan, the Executive Director of EIN, as an *ex officio* member and chairman. The members were:

Dr. Daniel Bernitt	Pennsylvania State University
Dr. Lorraine Borman	Northwestern University
Dr. Demos Eitzer	The City University of New York
Dr. Thomas Hulbert	Northeastern University
Dr. E. P. Miles, Jr.	The Florida State University
Dr. Edward Staiano	Bucknell University

The following three subcommittees were established:

Validation and Documentation: Dr. L. Borman, Chairwoman
Billing and Accounting: Dr. D. Bernitt, Chairman
Operations: Dr. E. Staiano, Chairman

Partially in response to the need to attract users and to avoid putting any unnecessary barrier in the

way of the user, it was proposed that some kind of "balance of payments" system could be developed so that credit rather than cash could be used for some of the anticipated off-campus use. This proposal was sent to the Subcommittee on Billing and Accounting for further development.

The Technical Representatives expressed a desire to have the entries for publication reviewed by qualified persons prior to printing. They wished the Catalog to be handled as a professional and scholarly publication and directed the Executive Director to take the steps necessary to ensure this. In addition, it was proposed that the various scholarly journals be notified when items of interest appeared in EIN. These journals would be asked to print notices of the EIN listings in a manner similar to the bibliographic listings found in their other articles.

The need for users was recognized as critical to the continued existence of EIN. Consideration was given to the possible ways of making use of EIN easier and more attractive. This "user orientation" developed early in EIN; indeed, even before the Catalog had been published. EIN was unusual in that it attempted to serve an unsophisticated user, one who was not knowledgeable about computers. Other networks were geared towards persons versed in computer usage. A user-orientation also was apparent in the proposed documentation standards, which were hailed as the first serious attempt at writing program documentation for nonprogrammers.

The most important task before EIN was the publication of the Catalog. In connection with this, the first edition of the *Documentation Standards Handbook for the EIN Software Catalog* was published in June 1969. The preparation of entries for the Catalog continued throughout the spring and into the summer. Unfortunately, this effort continued to fall behind schedule, so that publication of the catalog had to be postponed until August. The format of the Catalog, however, was specified for the first time.

It was decided that the Catalog would be divided into four basic sections:

*Description of Participating Facilities
*Index of Programs
*Functional Abstracts of Programs
*Catalog Entries.

Backup documentation, consisting of all the technical descriptions of the program and its environment, would be collected and made available on request for a reasonable price.

By the end of the first year, substantial programs had been made. A preliminary network directory had been published and

distributed. While the original plans for EIN proved to be in need of revision, the shifts had been made smoothly and initial work had been done in setting up the organizational structure of EIN. An Executive Committee was selected and operational guidelines established.

Documentation standards for the catalog entries were drafted, adopted, and printed. Preparation for the first catalog entries was begun, though the work proceeded at a slower pace than anticipated.

Thus, EIN was almost ready to begin servicing requests for programs after its first year of existence. The work had been delayed by the need to meet problems as they arose but the progress was substantial.

The Second Year

The first year of EIN was characterized by its focus on the study of networks and networking, and the development of the organization of EIN. The second year of EIN's existence was characterized by the setting up of the EIN resource-sharing network and the effort to overcome the internal and external problems that were identified. Several of the perceived problems were overcome, several never materialized and several proved to be inherent in the structure and barn concept of EIN.

Fifth Quarter: 1 July 1969 to 30 September 1969

During the summer months as the initial distribution date for the Catalog approached, detailed plans were drawn up for the operating procedures and forms needed for network usage. Account Initiation Forms and Job Run Forms were designed and printed by September. The Account Initiation Form is an official notification of intention to use a program listed in EIN by another member. The initiating institution fills in the form, sends it to the central office which approves and records it and then forwards it to the resource having the desired program. In this way, a permanent account is established between two organizations. The Job Run Form is used as a direct means of communication between the requester and the resource.

The EIN accounting system was set up to require that some form of credit be established prior to network use. The credit could be initiated by a cash deposit, by purchase order, or by making available to the network an amount of computing power with a value of up to $1000. The latter method could only be used by those members who had submitted one or more programs to the Catalog. This flexibility

was meant to encourage maximum use of the network, so that a minimum of cash would have to be transferred. An overhead charge of 20% was to be added to all transactions as a source of income for EIN.

The potential user of EIN would be expected to have his Technical Representative establish a credit with EIN sufficient to cover the intended use prior to the actual submittal of any work. Each user would then establish an account for each resource he intended to use by filling out the Account Initiation Form. Work would be ordered by submitting a Job Run Form directly to the resource EIN Technical Representative. At the end of each month, the Technical Representatives would receive an account statement, listing the individual institution's credit with the Network, the charges against the accounts, and the amount remaining in the account. A separate invoice for each user would also be provided.

Publication of the *EIN Software Catalog* took place in August of 1969. The initial catalog contained writeups for twelve programs. Supplements appeared on a monthly schedule, with Updates appearing as needed. By the end of September, the Catalog contained twenty-three entries. Publication of the Catalog marked the beginning of the actual EIN Network operation. The next two years were given to expanding the EIN resource-sharing effort, encouraging its growth, and evaluating its progress. The Catalog embodied the first concrete evidence of EIN as a resource-sharing network.

The writeups and other information were organized into the following Catalog sections:

1. Preface material, containing information on EIN, the use of the network and the procedure for submitting programs for inclusion in EIN;

2. Facilities section, describing the system configuration and pricing algorithm in general terms for each of the institutions listing programs in EIN;

3. Abstracts section, containing identifying material (Source, Authors, Availability, Contact, etc.) and a Functional Abstract for all of the programs appropriate to specified discipline areas (Administrative, Behavioral Sciences, Operations Research, etc.);

4. Index Section, indexing programs by EIN Number, Descriptive Title and Key Word;

5. Entries Section, containing the complete EIN writeup for the resource, including identifying material, Functional

Abstract, User Instructions, Sample Input and Output, and Cost Estimate.

The first four sections comprised Volume One of the EIN Catalog; Volumes Two through Four consist of the Entries Section. This division of material enabled EIN to provide brief and general information on the entries in Volume One, with fuller usage information readily available in the remaining volumes.

A film titled "Educational Information Network" explaining the nature and workings of EIN was made with the help of the Department of Instructional Communications at Northeastern University. Originally available on 1/2-, 1-, and 2-inch SONY video tape, requests soon obliged EIN to prepare two copies on 16mm sound film.

Also at this time, the end of September, Dr. Thomas A. Keenan, the Executive Director of EIN since its inception, resigned to take a post in the Office of Computing Activities, National Science Foundation. He was replaced as Executive Director by Dr. Jordan Baruch, President of EDUCOM, and as Manager of Operations by Mr. John C. LeGates. Mr. LeGates assumed the position of Executive Director of EIN at the end of 1969. Dean Demos Eitzer became chairman of the Executive Committee.

The Sixth Quarter: 1 October 1969 to 31 December 1969

On 14 October, at the EDUCOM Fall Council at Notre Dame, the initiation of the EIN service was announced by presentation, memo, letter and press release. The development of EIN was presented and discussed at a workshop session of Technical Representatives held in conjunction with the Council. This session explained the applications of the service and the administrative procedures for using it to the Technical Representatives and other interested persons.

EIN continued to be strengthened in several directions. The membership of EIN grew from 51 in October to 66 by the end of December with several additional inquiries, including two from Europe. At the initiation of service, there were 31 programs in the Catalog from two institutions. By the end of December this had grown to 49 programs from seven institutions. The film "Educational Information Network" continued its wide circulation, including a showing at the Fall Joint Computer Conference sponsored by AFIPS.

Publicity about EIN was spread in ways other than the film. The existence and distribution of the Catalog served this added purpose as did the EDUCOM Fall Council meeting. Memos on EIN were distributed to the EIN members and to

other EDUCOM members for publication. A page dedicated to EIN was added as a regular feature to the EDUCOM *Bulletin*. This page included space for significant news items, lists of programs and members in EIN, and changes in operating procedures. The *Bulletin* is distributed to a mailing list of approximately 20,000, greatly increasing the regular audience of EIN. Press Releases were distributed on significant occasions; e.g., on the initiation of service and announcing the personnel changes and significant new programs. The *Documentation Standards Handbook* was made available without charge to all requesters, and received wide circulation. They were strongly complimented for their quality. At least a dozen institutions adopted them for internal usage.

The distribution of the *Documentation Standards Handbook* served an additional function. The effort of redocumenting programs continued to be a problem. It was estimated that about 15 man-hours per program were needed to prepare writeups conforming to the EIN standards. This involved researching and rewriting the abstract, obtaining sample input and output cases and their cost estimates, and filling in missing information such as author's name and affiliation. This slowed down the production effort and added to the EIN expense. To increase the rate of redocumentation, a staff of technical editors was selected to perform these tasks. It was hoped that as the documentation standards became more widely used, more entries conforming to the standards would be submitted to EIN.

New submissions to EIN were encouraged by all of the above publicity. Also, a nonperiodical list of the programs available for possible publication in EIN was to be distributed to help stimulate interest. Visits or telephone calls were begun to those members who were slow in documentation on programs they had promised to submit to EIN.

EIN continued the task of establishing a suitable environment of working relationships with other networks. During this period, discussions were held with the Special Interest Group on University Computer Centers of the ACM, The Office of Computer Information at the Bureau of Standards, Argonne National Laboratories, the Middle Atlantic Educational and Research Center, and the Cooperative Venture in College Curriculum Development.

Late in 1969, IBM announced its "unbundling" policy, whereby the charges for the software and support for its systems were separated from the hardware package. Other major companies soon follow suit. This decision seemed to have particular impact on university computing because of the general financial difficulties of universities and because

academic computing served a more diverse market than software. EIN was thought to be in a position where it could help in these difficulties. With its precommitted set of resources and prefunctioning software-sharing network, EIN offered a partial solution. The administration of EIN decided to see if it could find further means of alleviating this crisis.

The Executive Committee met in December to consider several important items. Membership in EIN was expanded by the following decisions:

> Any organization could join EIN through a legitimate affiliation that it had with an institution eligible for membership. It then interfaced with EIN through this member.
>
> Any organization may use EIN by working through a legitimate EIN member. This was done, however, at the discretion of the member. This applied to both nonprofit and profit-making organizations.

One partial response to the unbundling crisis, as well as an extension of the service offered through EIN, was the decision to include writeups on systems software and remote access systems in the Catalog. The Executive Director was directed to look into the standards that would be needed for documentation.

The Executive Committee, in response to several requests, decided to alter the procedure for establishing credit. An additional phrase was added to the Account Initiation Form, guaranteeing payment for jobs. Members were thereby released from the burden of making a deposit to guarantee payment.

The most significant problem throughout this period was the lack of usage. There were two deposits of cash and no transactions through the Network. This inhibited the testing and debugging of the administrative procedures of the Network. More seriously, it led to the projected problem of a cash flow crisis when the federal grant ran out in June 1970. The explanation for the lack of usage was felt to be the slow start-up that all resource-sharing efforts experienced. It seemed very likely that the Network had the potential to grow into a position of self-sufficiency, based on income from transactions and from a membership fee. The problem was to find a way to sustain EIN during the period between termination of the grant and self-sufficiency. It was decided to apply for an extension of the grant for an additional period, and to also check into alternative funding arrangements.

The Seventh Quarter: 1 January 1970 to 31 March 1970

Two activities stand out in this quarter: the EIN response to "unbundling" and the submission of a proposal to the U.S. Office of Education and the National Science Foundation for the extension of EIN's operation for one year from June 30, 1970.

EIN decided to make a significant effort to help respond to the problems of academic institutions concerning unbundling. Consultation was begun with the Special Interest Group on University Computing Centers (SIGUCC) of the ACM, which was planning a special conference on the impact of this policy change on various users. This conference was held in Atlanta, Georgia on February 16 and 17, 1970. EIN made a major presentation to academic computer center directors on its operation and plans for handling the unbundling problem. The conference was chaired by Dr. E.P. Miles, Jr., who had only recently been replaced by Dr. R.G. Selfridge as a member of the EIN Executive Committee. Executive Director LeGates, Chairman of the Executive Committee Demos Eitzer and Committee Member Lorraine Borman addressed the group during the presentation. Thomas Keenan, the first Executive Director of EIN, was the official recorder for the material to be published in the conference proceedings.

Basically, the EIN "solution" was to continue with an expanded software catalog and to add to it a section that would list newly unbundled software that was available through EIN members. Listings would give the manufacturer, the title, a line of description if necessary, and the name of the institution which had the program. It would not constitute a promise to run the program or a guarantee of its condition, but would serve as an index to the software available across the nation.

Herein lay a second stimulus for specifying the documentation standards for remote access systems and systems software, and these were developed during this period. Since these systems could not be documented concisely enough for any catalog, the standards were relaxed and heavy reliance was placed on references. This often made the documentation task easier for major systems than for specific programs. EIN also volunteered to maintain a copy of all references to aid in the task of answering requests. The preface material in the Catalog, describing the services EIN offered and the ways to use them, was altered accordingly, There were no entries of this type published in the Catalog, but two institutions reported that they had begun working on them. It should be noted that these standards enabled EIN to provide a much greater offering of resources to its members. Not only was the number of programs available for inclusion in EIN increased, but, more importantly, EIN began to approach the possibility of developing a true national network providing remote-access usage. Such a network

was recognized as providing capabilities and economics not available elsewhere.

The second phase of EIN's response to unbundling involved increasing the total pool of software available for documentation. This was to be done both by including remote access systems as discussed, and by conducting a membership drive. Membership growth had not been lacking, having reached 77 by the end of the quarter.

The other facets of EIN continued their development. Demand required the acquisition of a third copy of the film on EIN. The Catalog grew to 61 programs. The rate at which programs were edited had increased to nearly twenty per month. However, this was not directly reflected in an increase in the size of the Catalog since a new step was added to the publication process. Beginning in March, all entries were sent back to the submitting institution for a final review immediately prior to printing. This slowed down the rate of inclusion of writeups in the Catalog, but also increased the quality of the entries and reduced the number of corrections.

The Catalog was further strengthened by the addition of a keyword index to the other indices already present. This was to be updated periodically, though not monthly. A list of the programs being prepared for inclusion in EIN was circulated to all the Technical Representatives to aid them in evaluating user interest.

Two test transactions through the Network were initiated during this time to help analyze and improve the administrative procedures of EIN. The tests were successful in that the procedures functioned smoothly. As a means of resource-sharing, they pointed to the problem of turnaround time, having taken nearly a month for the runs to be completed. This was unacceptably long for the general user community. The difficulty was that turnaround times of this magnitude were built into EIN by its reliance on the mail as a transfer vehicle. The EIN staff began looking for ways to speed up the processing of jobs as much as possible.

Several more institutions made deposits in the credit pool. There were no other instances of legitimate EIN use. However, several illegitimate transactions were reported. These consisted of users dealing with the resources outside of the network to secure free decks of EIN programs. In some cases, persons contacted the EIN office to obtain a copy of a program for teaching or general modelling purposes rather than desiring to run actual data with the programs. EIN members generally honored requests such as these since

they represented useful and cost- aving work being done by the Catalog.

In response to the projected position of EIN at the end of the original USOE and NSF grant period, a proposal for refunding of EIN was submitted to these agencies at this time. As part of this proposal, EIN examined the reasons why there had been no use of the Network up until then. There were several alternative explanations, some of which arose again later. The three reasons that were generally viewed as most significant were the following.

1. The Catalog was too small: Publication of the Catalog had only recently begun and there were less than 100 entries in it. Efforts were made to increase the rate of Catalog growth. But someone looking at the Catalog would not experience enough successful finds to have it be one of his standard references. It was felt that there was some unspecified "critical size" that would have to be reached before users would automatically browse through the Catalog when they needed a program.

2. The Network was too young: This represented the twin problems of public relations and habits. EIN had received wide publicity, even though the Network service was less than one year old. However, there were still many users who had heard little or nothing of EIN. Closely related to this was the fact that all resource-sharing networks, indeed all new ventures, had a slow starting up period. This was generally viewed as being from one to three years. During this time, persons who knew of EIN would need to become acclimatized to using EIN and the possibilities that EIN represented.

3. Unbundling: Unbundling, along with the change in government support of universities and university computing, meant that these institutions would be hard pressed to meet the demands being placed on them. Their first response was to curtail all activities that were not immediately and locally beneficial. Unbundling, however, represented an opportunity for EIN as well as a hardship. EIN was regarded as one of the few bright points in the whole problem, and once universities began to examine the benefits which EIN brought specifically to this area, it was expected that interest in EIN would grow.

The Eighth Quarter: 1 April 1970 to 30 June 1970

On June 26, the United States Office of Education announced an extension of the funding for EIN from 1 July 1970 to 30 June 1971. Two-thirds of the costs were shared equally between the

U.S. Office of Education and the National Science Foundation. EDUCOM was expected to provide the remaining third.

The response to EIN's efforts concerning the unbundling effort was minimal. There was no significant response to EIN's request for items of unbundled software; and a survey conducted by IBM indicated that universities did not budget money for the purchase of these items. As it turned out, unbundling never became a source of significant action by the academic community, though it did generate significant concern at its first appearance. Thus, while the "unbundling crisis" helped spread information on EIN and acted as a spur to both EIN and the academic community in terms of planning and coordinating, it did not result in an increase of usage for EIN.

During this time, EIN secured the commitments necessary for offering a new service that was expected to increase severalfold the resources of the Network. A new section was to be added to the Catalog listing entire computer facilities that could be reached through the Network. In most cases, this access would be by remote connection through telephone lines. The user could interact with the facility's program library, if it were on-line, to determine what programs best meet his need. Implicit in this, is that all of the programs available on the resource's site would be now available through EIN. This also provided the user access to data bases and storage, as arranged. Three institutions agreed to submit their entire systems to the network to be accessed remotely. One institution agreed to permit remote access on a limited basis initially, with the expectation that general access would be made available within a year. One institution, while not having remote access capabilities, agreed to submit its computer for general use by small colleges free of charge, at least initially. Work was begun on preparing the writeups for these submissions.

The growth of the Catalog did not conform to expectations, though it reached 76 entries by the end of the quarter. Entries continued to be added to the Catalog at the rate of about 10 per month. This was the maximum rate that the staff could redocument with the budgeted personnel. The budgetary picture had not been helped by a cost-overrun on the printing allocation. As a result of this overrun, a contract was let to the Educational Testing Service in Princeton, New Jersey for the printing of the supplements and updates, beginning in October 1970. It was expected that this would reduce the cost of printing by approximately 25%.

As before, usage of the anticipated type did not occur, though a significant number of requests were reported "outside"

the Network (estimated at around 100). In one sense, this latter item was an optimistic one, since it was indicative of the wide exposure given EIN. To further aid the dissemination of information about EIN, four new actions were undertaken. First, it was decided to print lists of new programs available through EIN in the EDUCOM *Bulletin*, along with the other EIN news, on a regular basis. Second, a press release on the new programs was sent to the Technical Representatives as part of the package sent to supplement the Catalog. This press release was meant for use in the campus newspaper, computer center bulletin, or other publication. Many institutions featured EIN information on a regular or an irregular basis in publications such as these. Third, EIN made extra copies of the Abstracts Section of the Catalog available for $10/year (versus $75/year for the whole Catalog). These were to be maintained through the Technical Representative and would provide quick reference information on EIN more widely throughout an institution, at a reasonable cost. In addition to these activities, the possibility of distributing the Catalog on microform was proposed and examination begun.

The fourth dissemination aid involved a cooperative arrangement with another organization. In May, EIN joined the Joint Users Group (JUG), a project sponsored by the ACM. JUG is an attempt to collect and organize the program documentation of various users groups. Its purpose is to facilitate the exchange of program documentation among users groups, of which there are sixteen members. These include the largest user groups: SHARE, DECUS, COSMIC, GUIDE and COMMON. EIN began to submit its program documentation for publication in the program catalog that embodied JUG's efforts. By the end of June about two-thirds of the programs published by EIN had been redocumented for sending to JUG.

Further dissemination efforts included the extensive list of conferences and meetings at which EIN was represented. These were:

*EDUCOM Spring Council, April 15—16
*EIN Workshop (part of Spring Council), April 16
*Presentation to the New York State Education Department, April 16 by Dean Demos Eitzer, Chairman of the Executive Committee
*Meeting with North Carolina Regional Educational Laboratory, May 30
*Attendance at Conference on the Use of Computers in Geography, Minneapolis, Minnesota, June 4—5
*Presentation at the Conference on Use of Computers in the Undergraduate Curriculum, Iowa City, Iowa, June 15—18 by Dr. Borman of the Executive Committee

*Presentation at Small College Computer Users Conference Clark College, Dubuque, Iowa, June 22—23

*Meeting with Dr. Harry Rowell on COSMIC and Share, June 25.

EIN was also present at the Spring Joint Computer Conference, held May 5—7 at Atlantic City, New Jersey. During the course of this conference both an EIN Executive Committee meeting was held and an advisory committee appointed by EDUCOM. Dr. J.C.R. Licklider was directed to head a committee composed of himself, Mr. Allen Kent of the University of Pittsburgh, Dean Demos Eitzer, and Mr. John LeGates in meetings on networking and the new opportunities available. The committee's labors were incorporated into EDUCOM's relationships with other networks, particularly the ARPA Network, rather than being published as a separate study on networks.

By the end of the second year, EIN was advanced enough to begin review and evaluation of its history and problems. A resource-sharing network was established and tested. The *EIN Software Catalog* was published and continued to grow, slowly perhaps, but with increasing improvements.

Two new areas were added to EIN's offerings: remote access systems and whole facilities. These represented a greater potential resource than could imaginably be contained in a catalog of applications programs alone. Publicity on EIN was widely disseminated and cooperative working relationships developed.

EIN began to react to the "unbundling crisis", but found that it never materialized. The major problems discovered in this year concerned the lack of usage through network channels. EIN appeared to have stirred-up a great deal of interest and initiated a number of requests, but all of them were outside of EIN's functional premise of using a program at the institution where it was operating. EIN requested and received an additional year's funding to overcome these problems and evaluate its experience.

The Third Year

Activities in the third year focussed on evaluating the performance of EIN, attempting improvements in EIN's operation and gathering data for defining and relating the lessons learned from EIN's efforts. Many activities outside of network administration were undertaken by the EIN staff to aid in this work.

The Ninth Quarter: 1 July 1970 to 30 September 1970

Network use continued to flow outside the established channels. In order to determine the response of EIN to this lack of usage and in preparation for the writing of a report for the funding agencies on EIN's first two years, a review of the operation of EIN and the impediments to the use of EIN was begun. Problems which appeared to be serious impediments were identified as:

1. Many universities are reluctant to spend money outside of their own campus. In the case of certain specific state institutions, this cannot be done without permission of a review board; approval that could take months to obtain. Also, universities found themselves in an increasing financial squeeze and were forced to curtail services.
2. Many potential users are hesitant to utilize a network which uses the mail as a medium of transfer. They feel that the turnaround time is too great or that their material will be lost or damaged.
3. There exist psychological barriers against running a program in a location where the user cannot interact with the program. This interaction not only includes making minor alteration in programs, but also consulting with the authors or other knowledgeable persons.

These possible reasons were to be examined by the EIN staff and the EIN Executive Committee, and discussed in the Final Report for the first two years of EIN's operation. This review seemed particularly necessary since the Catalog appeared to be approaching an adequate size. Many people began to report that they found interesting programs when they looked; it was anticipated that Network usage should have grown in proportion to this. Publicity for the Network did not seem to be needed. EIN had received quite heavy exposure through various conference presentations and through the efforts of the individual Technical Representatives at particular institutions, but this exposure had not resulted in any usage. Other considerations seemed to be operative, and the review was meant to discover these.

In response to requests from the Technical Representatives, a study was performed on the costs associated with a possible microform edition of the Catalog. Such an edition could be used to increase the number of copies of the Catalog at each of the EIN members, hopefully, without great expense to the Network. It was found that these costs were acceptable only if:

1. EIN distributed one or two copies of the Catalog, but not more;

2. EIN did not supply microfilm readers to its membership (requiring an extra expense at many smaller institutions, which could least afford it);

3. microform distribution was of only one type, e.g., positive print, one size only.

It was unlikely that the third condition could be met and the first two conditions were undesirable. Therefore, the idea of switching to microfilm was indefinitely tabled.

Growth of the Network reached a plateau. The membership stabilized at 77, with new members replacing institutions dropping membership. In addition, the growth of the Catalog was temporarily halted. The last supplement sent to the printer in Boston (prior to the shift of printing to Educational Testing Service) was repeatedly delayed by shortages, loss of key personnel and defective components. Since it was the last publication to be performed by the old contractor, EIN had little leverage which it could exert and received the supplement three months late. A return to normal supplement distribution schedules was expected by October.

EIN continued to be represented at conferences. During this period, a presentation on EIN was made at the Conference on Computers in Undergraduate Science Education, Illinois Institute of Technology on August 17-21 by Dr. Borman of the Executive Committee.

Mr. LeGates attended the IFIP World Conference on Computer Education in Amsterdam on August 24-28. While in Europe, Mr. LeGates also held discussions with the Université de Liège in Belgium, and visited the Deutsches Rechenzentrum in Germany concerning EDUCOM and EIN.

The Tenth Quarter: 1 October 1970 to 31 December 1970

The EDUCOM Fall Council was held in Atlanta, Georgia on October 15 and 16. It was devoted to the topic of networks. The program was arranged by Mr. LeGates, the Executive Director of EIN, who also chaired the main panel. The speakers were Dr. Thomas Kurtz of Dartmouth College, Prof. J.C.R. Licklider of MIT, Dr. Harry Rowell of Carnegie-Mellon University, Dr. Daniel Bernitt of the Pennsylvania State University and Dr. Lawrence Roberts of the Advanced Research Projects Agency. EIN figured prominently in the presentations and the analyses. The proceedings of this council were published in the September 1971 issue of *Behavioral Sciences Magazine*.

The EIN staff held a series of joint meetings with personnel from ARPANET, the national network being developed under the direction of Dr. Lawrence Roberts. At these meetings, possible common interests and potential actions available for the mutual benefit of these networking efforts were examined. EDUCOM, under the direction of Henry Chauncey, conducted a survey of presidents of EDUCOM member institutions and the American Association of Universities. The purpose of this survey was to determine potential interest in an on-line network of the EIN–ARPA type. The results of this survey indicated that 12 institutions were ready to join such a network immediately and an additional 69 institutions expressed interest in the concept and eventual membership. Only six expressed negative interest.

In November, the Final Report for the first two years of EIN's operation was prepared. This report was divided into two parts, with two attachments. Part I consisted of a theoretical paper on educational computer networks, discussing some of their general properties and presenting a brief taxonomy; and a presentation of the development, findings and history of EIN to that point. Part II was a first edition of the *Directory of Information Networks and Network Activities*, substantially identical to the preliminary version prepared in February 1969. The attachments consisted of copies of the *EIN Software Catalog* and the *Documentation Standards Handbook for the EIN Software Catalog*. The preparation of this report was particularly helpful in providing an opportunity to obtain an overview of EIN's history to date. This overview helped the EIN staff identify the trends in EIN's history and evaluate its performance.

The findings reported in Part I were essentially that a network had been set up and had attracted considerable interest and cooperation from academic institutions. EIN grew both in programs and members with little effort from EIN needed for the latter growth. Publicity about EIN spread rapidly and easily. The difficulties EIN experienced were in getting members to submit properly documented programs, and in attracting users. This second problem was not unexpected since the network was only a year old. The final conclusion reached was that it was too early yet to determine how successful EIN would be and whether it could reach economic self-sufficiency.

A survey was conducted by the EIN staff to determine the reasons for lack of traffic in the Network and to encourage use. The results of this survey were examined at the November meeting of the EIN Executive Committee. It was tentatively determined that use of the mail as a mode of transfer was the main cause of the lack of traffic. These reasons included slow turnaround time, distrust of the mail, inability to "fiddle" with the

program and unfamiliarity with remote usage. There was no immediately recognizable solution to this situation without major changes in EIN's mode of operation. As a result of this situation, EIN began to tie in more closely with the other activities that EDUCOM was planning or initiating, particularly the growing relationship with ARPA, and library resource-sharing efforts. This represented a recognition of EIN's difficulties; attempting both to partially circumvent those difficulties and to provide assistance to the other efforts of EDUCOM. In addition, members of the Executive Committee began to increase their contacts with other EIN members. They made themselves available for presentations on EIN at the campus of interested members.

There continued to be no usage of the Network through the established channels. However, one member alone reported over 80 requests for programs that had been published through EIN (as well as receiving publicity elsewhere). It was not clear how many of these requests were directly attributable to EIN, since few of the requesters reported where they had heard of the program they were interested in obtaining.

Writeups of the first remote access systems and of whole facilities submitted to EIN appeared in the Catalog during this time. The entire use of these facilities was made available, including access to the library, the executive control language and data files, where applicable. Other institutions began to consider the feasibility of preparing similar offerings. Their efforts were aided by the publication of the second edition of the *Documentation Standards Handbook*, which incorporated the standards for documenting systems software and whole facilities.

EIN's presentation at the World Conference on Computer Education in August began to bear fruit as the first European university joined EIN. It was expected that the effectiveness of this experiment in membership would be known within a year. A non-North American member has particular difficulties since they must contend with exceptionally long response time for even normal correspondence, and since the Catalog may not be in the native language. However, the Catalog is useful to them as a journal of what has been done and what is available.

Twenty-nine programs were redocumented and submitted to the Joint Users Group for inclusion in their program catalog during this time. Conversations were also held between the respective administrators of these projects to ensure their cooperation.

The Eleventh Quarter: 1 January 1971 to 31 March 1971

EIN initiated a series of moves to extend the life of the project for an additional period of time. Permission was received from USOE to extend the period of time over which the project would be carried out, provided that no additional funds were required. It was expected that this would add from three to six months to EIN's existence under USOE and NSF sponsorship.

Making judicious use of this available time, a study was initiated to determine the costs and benefits associated with commerical production and marketing of the Catalog. Several prospective publishers' names were gathered.

EDUCOM proposed or began several activities which were expected to lead to coordination with EIN. These included a study of data bases and their use, a project on educational management information systems, and the submission of a proposal to the Advanced Research Projects Agency for the purpose of performing documentation on the ARPA Network. This last proposal was one of a series of steps taken by EDUCOM designed to make the technology of the ARPA Network available for educational computer resource sharing.

There were certain striking similarities between the ARPANET and EIN. In both cases, the program was to be run at the submitting institution. There was to be a central documentation facility. Aids were set up to make remote usage easier for the user. The fundamental benefits, such as economy of scale and elimination of duplication were the same. Most important, perhaps, was that EIN had always viewed itself as Phase One of an operation which would grow into a nationwide, high-speed, hard-wire network. ARPANET seemed likely to provide the technological base for such a network. ARPA in turn was looking towards finding a user community, and EIN seemed to have just that. The problems which were causing lack of usage of EIN appeared to melt away under the application of ARPA technology.

Dr. Borman of the Executive Committee made a presentation on EIN at the Slavic Studies Association in Denver. Dr. Borman also conducted a survey of the physicists present at the EIN presentation to the Conference on Computers in Undergraduate Science Education at IIT in August. The survey concerned itself with the reasons why this presentation had not led to traffic through the Network. It was determined that the reasons for this were:

1. lack of direct relevance to the physics material itself;
2. unwillingness to use material at an off-site location;
3. general apathy.

The Catalog grew to 140 programs, five of them entire facilities; and one institution joined EIN. Forty-three entries were submitted to the Joint Users Group, bringing the total to about 90 percent of the EIN programs available for inclusion in JUG.

The Twelfth Quarter: 1 April 1971 to 30 June 1971

The EIN Executive Committe met in late April in Philadelphia, in conjunction with the EDUCOM Spring Council meeting. It was the feeling of the Committee that the publication of the Catalog by commercial publishers was not desirable. This was felt to violate the agreement through which the Catalog entries were submitted to EIN, i.e., for use at the originating institution by EIN members.

Educational Testing Service in Princeton, New Jersey made a donation to EIN of significant computational resources for use by EIN members. This made it possible for several institutions, selected on a first-come, first-served basis, to make remote usage of ETS programs available through EIN with no charge for computer time. The ETS facility supported remote access entry into their system. Notices of this offering were mailed to the EIN members, and also published in the EDUCOM Bulletin, the journal of the American Psychological Association, and the journal of the American Statistical Association. Unfortunately, the cost of communications, which had to be borne by the user, prevented most EIN members from taking advantage of this opportunity. The donation was not used.

A survey to determine the nature and extent of traffic outside of the Network was taken by the EIN staff. The survey involved contacting all of the institutions which had submitted programs to EIN and obtaining the necessary information from the Technical Representatives. The survey reported that at least 60 programs have been known to change hands as a result of contacts established by EIN. However, all of the Technical Representatives contacted indicated that they could not estimate the total number of requests for programs that were attributable to EIN. This was because many people did not indicate the source of their knowledge of the programs, and because persons other than the Technical Representative could have been contacted. The actual figure of such usage could be much higher, by as much as a factor of ten.

Mr. LeGates made a trip to the University of Michigan for the purpose of explaining interaction between the MERIT Network and other EDUCOM activities. The principal fruits

of that meeting were a number of activities within the MERIT Network. Mr. LeGates also made a presentation at Educational Testing Service in June on the subject of networks with emphasis on the ARPANET plans. The presentation was prepared for publication by EDUCOM. Finally, in late June, Mr. LeGates visited the Stanford Research Institute to discuss the relationship between EIN and SRI's Network Information Center for the ARPANET.

EDUCOM undertook the task of interesting an outside source in funding development of the ARPA Network as a vehicle for educational resource-sharing. Initial meetings were held with various private foundations, and with the National Science Foundation.

EIN completed redocumentation of the remaining seventeen of its programs available for submission to JUG. Publication of the JUG program catalog was expected shortly.

The Next Period: 1 July 1971 to 31 December 1971

Chronologically, this marks the beginning of the fourth year of EIN's existence. Operationally, the activities carried on in this period were a continuation of the activities of the third year. Since the demarcation between the two periods is vague, a more unified history is obtained by expanding the narrative of the third year to include this period. The focus of this fourth year was the same as that of the third: a review and evaluation of EIN's activities to more clearly present the lessons learned and the considerations which are crucial for planning future efforts. EIN was able to continue its operation into this additional year because of reduction in rate of spending, and permission from USOE to relax the expenditure deadline.

In July, questionnaires on EIN were designed and sent out to the EDUCOM Institutional Representatives and to the EIN Technical Representatives. The Technical Representatives' questionnaire was the more detailed, attempting to assess as many aspects of the EIN operation as possible. It requested the Representatives' opinion on the Catalog, the documentation standards, the procedures for using the network and the support and competence exhibited by the EIN staff. Extensive information was sought concerning the number, type and reactions of EIN users, the value of EIN's marketing effort, and the problems associated with the use of EIN at their respective institutions. Finally, several alternative modes of operation for EIN in the future were proposed and presented for evaluation. Approximately half of the Technical Representatives returned the questionnaire.

A less detailed questionnaire was sent to the EDUCOM Institutional Representatives of institutions that are also EIN members. This questionnaire tried to provide a greater base from which to determine the members' experience of EIN. About one-fourth of the Institutional Representatives responded to the questionnaire. Finally, a brief questionnaire was sent to Institutional Representatives from EDUCOM members who were not EIN members to determine the reasons they decided not to join EIN. Again, about a quarter of the Institutional Representatives responded.

An analysis of these questionnaires written in the latter part of this period is included in Appendix D.

Also in July, the Joint Users Group's *Computer Program Directory*, 1971 edition, appeared containing the writeups of EIN programs. As a result of this publication, EIN received several requests for additional information on some of its entries. Since these requests generally were for copies of the program deck or listing, the network did not show any legitimate usage. The EIN staff cooperated with the requesters as much as possible, though they did not possess the materials requested. To keep JUG abreast of EIN, an additional eighteen writeups were submitted to JUG in the middle of this period.

At the September 16 meeting of the Board of Trustees, EDUCOM decided to continue the EIN Project at its reduced level until June 1972, though the extended EIN grant would be exhausted by the end of December 1971. This meant that supplements and updates would appear less frequently (about quarterly), would be smaller and would emphasize programs, systems and facilities which could be reached via remote connection. By this period, the Catalog contained writeups for 175 items, including one SDI (selective dissemination of information) service, seven entire-facility writeups (six supporting remote access, four supporting batch processing) and several statistical, simulations and graphics packages. Membership grew from 81 in July to 88 by the end of December. The EIN Office still received no usage requests. (It should be reported here that one of the Technical Representatives, on his questionnaire, wrote that he had a user submit a job to EIN for which he never received any output. The EIN Office never received notification of this job nor any complaints about the matter until this questionnaire was received. The mail appears to have entirely obliterated this job.)

EIN continued to interact with other projects and organizations. On July 19-20, Mr. LeGates represented EDUCOM and EIN at the Washington University Conference on Satellites for Education in St. Louis. As a result of this, discussions were begun between EDUCOM and several federal agenices on

the possibility of a survey of the educational resources and users relating to the communications capabilities of satellites. In addition, EDUCOM continued to pursue its interest in the ARPA Network. EDUCOM Counselor to the President, Dr. Martin Greenberger, spent the month of July in the Boston area working with the ARPA Network and personnel. In September, EDUCOM commissioned a study to determine the economic feasibility of using the net for educational purposes.

Finally, the EIN Executive Committee was approached to see if they would be willing to oversee an EIN–ARPA joint interaction. The Executive Committee declined to do so, feeling that this represented too wide a deviation from their past work with EIN. Since EIN had greatly reduced its activities, the Committee voted to officially dissolve itself, with the members remaining available for reviewing the Final Report.

By the end of this period, another cooperative venture was being considered. The Harvard University Laboratory for Computer Graphics and Spatial Analysis and EDUCOM developed a proposal to set up a clearinghouse for advanced computer graphics programs. The Laboratory was to use its expertise to develop a series of integrated computer program modules that would provide generalized spatial analysis and display capabilities. EDUCOM would use the expertise gained in EIN to establish a center to distribute these modules, as well as information on the graphics programs available elsewhere. Joint discussions were begun with potential funding agencies.

The emphases in this last period were twofold. First was the process of collecting, reviewing and evaluating information about EIN for this report. Second, particularly since EIN was assured of a future through June 1972, work was begun on applying the expertise learned in the operation of EIN to other ventures. This involved a great deal of conversation and planning with a wide range of organizations. Through these two foci it is intended that the lessons and experience gained through EIN be disseminated to as wide an audience as possible.

V. FINDINGS

Interest in Resource-Sharing

The history of EIN illustrates both the widespread interest in the concept of resource-sharing and the organizational difficulties experienced by resource-sharing efforts in general. There were also specific lessons relating to remote usage and the mail as a mode of transfer of data.

Growth of Membership

EIN experienced a very favorable reception from educational institutions. Through the combined efforts of the EIN Technical Representatives and the EIN staff, and through representation at a large number and variety of conferences, EIN became widely known. Membership numbered near eighty at the end of the second year, not twenty as originally projected. At the writing of this report, it stands at 88, including eight Canadian members and one non-North American member. EIN membership entails a number of commitments, including the designation of a Technical Representative and commitment of resources to support his efforts. Key personnel were nominated to be Technical Representatives. Most were director of the computer center (or in a similar position of responsibility) at the member institution. This was in response to an EIN request that the Technical Representative be able to commit his institution's resources for EIN use. All of the institutions expressed a willingness to cooperate with EIN and agreed to honor requests for service through EIN.

Documentation Standards

One of the most successful aspects of the EIN operation was the documentation standards that were developed and distributed. They were produced by the EIN staff and a committee of Technical Representatives, working together. These standards were well received in the academic community as one of the first efforts at developing documentation for non-programmers. EIN received many compliments from various institutions on the quality of these standards. At least eight institutions adopted the standards as presented. Several more institutions adopted modified versions of them (adding flow-charts to the writeup for example). Many more recommended and publicized them. Finally, even if the members did not adopt the EIN standards or submit programs, these standards aided local documentation efforts and the submittal of programs. One institution reported that the EIN work saved them $4000 in developing standards for a local

documentation push. All of this is particularly gratifying since this impact was not anticipated in the intial EIN planning. The Documentation Standards proved to be a very beneficial by-product of EIN. Indeed, more respondents to the questionnaire sent to Institutional Representatives and Technical Representatives (Appendix D) identified the documentation standards as the most valuable aspect of EIN, considering it more valuable than the Catalog, Use of the Network, Support from Technical Representatives and Staff, and General Communication. It should be noted the strongest reviews were given to the standards for applications program writeups. The standards for remote access facilities and whole facilities relied more heavily on lists, brief descriptions and references, by necessity, and this led some people to question their comprehensiveness, though not their clarity or overall value.

Submittal of Programs

The primary source of information on the resources available through EIN is the *EIN Software Catalog*. Collection of material for the Catalog proved to be time-consuming, though not impossible. Member institutions would submit documentation if prodded, and were nearly always pleased with the resulting EIN writeups. Twenty-one institutions prepared 175 entries for inclusion in the *EIN Software Catalog*. About half of these prepared only one or two entries; the other half prepared a dozen or more entries. The single entries are not insignificant, however, since most of them are submittals of complete systems or whole facilities to EIN. They represent a greater source of computer power than could conceivably be documented and submitted to EIN on a program-by-program basis. Seven institutions submitted their whole facility for use through EIN and, additionally, a Selective Dissemination of Information (SDI) service is described.

An excellent selection of the standard applications programs and packages were submitted to EIN and documented. Both the standards of documentation and the selection of entries have received favorable review by member universities. This is a two-edged sword, though, in that these high quality programs and packages are widely known and equally widely available outside of EIN. EIN offered a selection of the excellent application packages that are standards in university computing. But being standards, their potential market has largely been filled, at least among the institutions that joined EIN. It would seem that a network such as EIN would need to assure itself of a market, perhaps by concentrating on the more unusual programs available or on those with closely controlled distribution or reaching new classes of users.

Efforts of Technical Representatives

As might be expected, the amount of time and effort the Technical Representatives were able to allocate to EIN varied widely. Many of the representatives expended considerable efforts on publicizing EIN and documenting software for inclusion in the EIN Catalog. However, all of the representatives had considerable responsibility in addition to EIN. Local needs and pressures often grew so great as to render the performance of EIN work impossible. Several Technical Representatives reported that they were simply too busy to adequately develop use of EIN at their institution. The financial situation of the universities is partly to blame for this, as discussed in the section on Institutional Difficulties. Nearly all of the representatives were able to attend meetings of the EIN Council. In addition, almost all of the representatives reported that they were keeping their Catalogs current, with few difficulties in understanding the updating and supplementing procedures.

Some Technical Representatives participated very actively and directly in EIN. This includes those persons who are involved in directing the operation of EIN: the EIN Executive Committee. The Executive Committee performed an invaluable service in guiding, reviewing and extending the development of the network in all its aspects. The members of this committee took an active lead in publicizing EIN, both at their own institution and at local and national meetings. They proposed, received and examined suggestions on improving the impact of EIN, such as ways of making the EIN Catalog more readily available. Their encouragement enabled EIN to expand its services to include remote access systems and whole facilities at an early stage in EIN's history. Overall, they greatly aided and extended the services EIN offered.

Without being leaders in the administrative structure of EIN, several Technical Representatives took a strong initiative on their own campuses, organizing seminars on EIN and requesting presentations from the EIN staff at these meetings. Also, the Technical Representatives who obtained the authority to submit whole systems and facilities for inclusion in EIN should be acknowledged here. They showed a willingness to push for expansion of the resources offered through EIN and for a greater interaction of their institution with EIN. One institution agreed to use of their facility by small colleges free of charge, on a trial basis. Another allocated free computer time for members wishing to use EIN programs remotely. Efforts such as these clearly indicate the cooperation EIN received from the Technical Representatives.

Difficulties in Resource-Sharing

Availability of Catalogs

Information on the resources being offered should be widely and inexpensively available. Balanced against this is the need for speed and ease in providing complete information on items of interest. The present configuration of EIN handles this second consideration well, since the EIN Catalog writeup itself is designed to enable a user to prepare his data to use the program. There are some problems with this scheme, however. The complete EIN Catalog is rather large; publication is no small cost. Consequently, only two copies of the Catalog are distributed free of charge to members. Additional copies are available at a cost of $75/year. The difficulty is that many Technical Representatives wanted to place Catalogs at a number of different places throughout their institution to present it before a wider audience. However, at $75/catalog, the cost was prohibitive. EIN responded to this difficulty by offering Volume One only of the Catalog for $10/year. This contains brief and general descriptions of the resources available through EIN, and the facilities supporting these entries.

Similar, but more general, criticisms of the EIN Catalog were raised by other Technical Representatives. A few representatives objected to the bulk of the Catalog and the large supplements needed to maintain and expand it. These persons wanted only the abstracts published for some programs. Requests for further information could be made concerning those of interest. A scheme such as this was considered during the "unbundling crisis", though no decision was ever implemented in EIN. Some representatives wanted EIN to publish only abstracts. A more developed suggestion along these lines was made by one representative: have EIN distribute abstracts of programs with fuller writeups available from the EIN Office by TELEX request. This suggestion would not only provide for inexpensive, easily distributed Catalogs, but also for the rapid transfer of information. The characteristics of ease of use and speed of response are the two most important criteria for estimating user reaction to a network. And as these comments indicate, users seem to be willing to spend some larger-than-minimum sum to obtain service that is faster or easier to use. EIN, unfortunately, appeared complicated (though it was not), and was slow. These handicaps overwhelmed its potential to bring savings.

Contact with Users

One of the key factors that shaped the work performed by EIN was the type of user EIN hoped to attract. Early in their planning, the organizers of EIN decided to orient EIN toward the unsophisticated computer user. The user knowledgeable of computers was already presented with offerings from many sources. He was able to organize and sift the information presented to him and decide on the merits and procedures for using the resources offered. An unsophisticated user faced greater problems, however, since much of the material was presented in a style and format foreign to him. Though he might be knowledgeable in a given academic field, the information available to him on the programs of potential interest was often largely indecipherable to him. Further, many prospective users were not even knowledgeable in the specific area of concern (e.g. a researcher wishing to statistically test a set of data, not being a statistician himself), and were even less likely to be able to intelligently select among the resources offered.

EIN was geared to enable unsophisticated users to evaluate and decide among the programs of interest. Documentation standards were designed to provide information on the mathematical method and usefulness of programs in a format that did not confuse the inexperienced user. User options for input and output were explained and the exact format and order of the user's cards was specified. In addition, a sample of the input and output for the program, with the associated cost, was provided to give the reader an actual example for examination. In this way, it was expected that even users who could not program and knew little of the procedures they wished to use, but who knew the type of results they were seeking, would be able to use EIN easily and freely. It is noteworthy that the Technical Representatives did not report any major difficulties concerning the descriptions of the resources offered or the directions for use of the resources. The major criticisms of EIN were focussed elsewhere.

The actual organization of the EIN Network conflicted with this user-oriented philosophy to some degree, since EIN worked principally through the Technical Representatives. As noted previously, these representatives often were computer center directors. They were usually computer specialists and none could be characterized as unsophisticated computer users. In conjunction with their organizational stature, this specialization often isolated them from the potential EIN user as described above.

The nature of the center-user relations further separated the Technical Representative from the unsophisticated user. Computer center personnel were aware of specific user needs only when confronted by specific users. The orientation of computer centers is often a passive one: they try to help on problems

users bring to them. This is not unexpected, considering the division of responsibility for systems and applications work described in the History of EIN. Both systems programmers and applications programmers also often have sufficient academic research interests to prevent them from taking a more active role in helping meet the overall objectives of academic computing services. But whatever the reasons, the Technical Representatives often worked with actual users only when the users sought them out. This adds a self-perpetuating character to the user community. It is likely that those users who were best known would be those familiar with the use of a computer. Novices could become discouraged or confused and quit without ever pressing the matter enough to be recognized by the Technical Representatives as acutely as someone with enough experience and comprehension to persevere in his efforts. More importantly, the successful user would be the person most likely to return for further use, despite the problems encountered.

Thus, it is likely that most of the representatives' contacts were also well-versed in the use of computers, a group of users for which EIN was not entirely suited. To these people, EIN appeared cumbersome and unhelpful since they could not easily obtain, modify or adapt programs to their desires. They would probably have been the first users of EIN, but they would also be greatly dissatisfied with the inability to interact easily with the programs available through EIN.

EIN did try an alternative marketing approach in an attempt to reach potential users directly. The primary efforts along these lines were a series of presentations made at conferences for specialized user communities, as noted in Appendix A. The EIN Data Column in the EDUCOM *Bulletin* should also be included here. These efforts did not stimulate any usage of EIN. In addition, a direct approach proved to be more expensive than working through the Technical Representatives. Considering the inadequate coverage of the user market that EIN could expect from attempting to present itself in all of the numerous specialized meetings, this direct approach was not cost-effective.

The dilemma for EIN in this was that personnel such as the Technical Representatives were established as a class of middlemen for computer usage at the member institutions. Financially, EIN could not afford to reach the potential users directly. Politically, EIN could not afford to bypass the computer center directors, even though they might not be in contact with the market EIN was trying to reach. In some instances where the Technical Representative was not the computer center director, an undercurrent of competition was established between the representative and the director that undermined EIN's chances for success.

The importance of the Technical Representatives was increased by the small size of the EIN staff. Since the entire staff never comprised more than five full-time people including technical editors and secretaries, most of the actual promotional work of EIN was done by the Executive Committee and the Technical Representatives. The Executive Director of EIN offered whatever assistance he could, speaking at meetings, attending conferences and ensuring the availability of publicity, but the actual effort of getting material in front of potential users at the various institutions was the Technical Representative's responsibility.

This arrangement meant that the impact of EIN at a member institution was dependent on the interest of the Technical Representatives and the time he could make available. Many of them were able to actively promote EIN by holding seminars and publishing information in the centers' newsletters. Many others, though, either had too many responsibilities or were not interested in promoting EIN, and EIN was unknown in these institutions. Some representatives were not able to carry out the responsibilities of Technical Representative because they were in the wrong organizational position and did not possess any responsibility for matters crucial to EIN. All of these served to lessen the impact of EIN on its potential user community.

Resource Community

A situation analogous to the users, but in this case regarding potential contributors of software, proved also to be an obstacle. As was discussed in the section on the History of EIN, the programs available for possible inclusion in EIN were not centrally catalogued or indexed anywhere, either locally or nationally. Details about, and even knowledge of most applications programs was available only by personal contact with the respective authors. The computer center personnel themselves did not always know this information. Collection of this material was one of the central tasks of the Technical Representatives. This diffusion of information on programs presented an early, and continuing difficulty to EIN's development.

Usage of EIN

There was no usage of the resources available through EIN that followed the established channels. People did not submit their jobs for processing at other EIN member institutions. All of the usage stimulated by EIN consisted of requests for copies of programs. The "Survey of Usage Outside the Network" (Appendix C) discovered over 60 program requests directly attributable to EIN with some greater

number that could not be definitely identified as EIN-initiated. Estimates of the total usage "outside of the network channels" are hard to make since all of the Technical Representatives declined to estimate such outside usage for their own institution when asked by the EIN staff. One or two made tentative guesses (50-100; 25% of the requests received by the program librarian) but all were immediately disclaimed for lack of an adequate informational basis. While this indicates that there was interest in resource-sharing and in EIN, it implies that there were serious impediments to the use of EIN.

Reasons for Lack of Usage

EIN generally planned to operate by sending data through the mail to the resource institution and returning the output to the requestor, though some programs are available on remote access equipment. The EIN staff and the Technical Representatives coordinated the flow of requests and results, with the staff responsible for overseeing the financial transactions. The operating procedures of EIN minimized the number and type of network access procedures needed since, essentially, EIN merely added outside jobs to the job stream already being processed by a member installation. All of the difficulties surrounding actual connection of different members' equipment, as well as problems with the actual transfer of programs, were avoided.

The difficulties for EIN associated with this operating procedure were focussed primarily on the vehicle used to transfer information between the members. The use of mail by EIN for this purpose posed several hazards for members. It was slow, with turnaround time measured in days or weeks. Data sent via the mail might be damaged or lost.

A further difficulty is tied to EIN's operating premise of using programs where they are running. This premise, in itself, diminishes the usefulness of EIN for persons who do not want to submit a job but who need to acquire programs for comparative or teaching purposes. EIN can serve only as a source of information to these people. However, even people who are willing to use a program through EIN have difficulties if they wish to modify either the program or their processing procedure. Since the program and its supporting personnel are not readily at hand, program modifications are nearly impossible. Any changes in the user's procedures, incorporating intermediate results, would either be time-consuming (requiring jobs to be returned and examined by the requestor), or require the requestor to have the resource Technical Representative act in his stead. Neither of these increases the attractiveness of EIN.

Inherent in remote usage of resources are many problems, including slow turnaround times, difficulty of providing for the selection of resources by users, difficulty of interacting with the resource, and other general problems of inconvenience. One constraint for networks such as EIN is that the user's expectation of response time and ease of accessibility have been greatly increased by time-sharing and other remote-access capabilities. It is against these response times and costs that a network is measured by many users. Resources-by-mail cannot compete with remote access networks on these bases, if there is a choice between them. EIN's problems could be overcome but only by establishing a directly connected network, e.g. hard wires. Dialup networks are very expensive on an ad hoc basis though there have been successful ones sustained by grants, such as the one at Dartmouth College. High speed dedicated networks are not yet available. Under these criteria, it is clear that EIN developed at the wrong time in the history of university computing. Ten years ago, time-sharing was still a concept. The scale used to judge turnaround time was still long and EIN could have functioned to alleviate the resource imbalances with the penalties still regarded as bearable. Ten years from now, computer-to-computer networks may be commonplace and the EIN concept of using a resource at the facility on which it is presently operating will then become the standard. The situation is well exemplified by the relationship between EIN and the ARPANET. EIN represents a well developed user community and administrative mechanism. It failed to function for reasons which would have been solved by having high-speed data transmission. ARPANET, by contrast, is developing this transmission, but is not ready for, nor constituted to acquire, a user community.

In summation, the procedures for using the resources provided to a network must be simple to use, ensure rapid return of results and not inhibit the user from interacting with the program. This is the general experience of these users at their local facility. Further, there exist no established channels for spending money off-campus in most places. Where such channels exist, either the funds themselves or the incentive to spend the funds is lacking. Lastly, many of the potential users were able to adapt their needs to the capabilities of the local library or to obtain a similar program from another source. Combined, these reasons account for the lack of usage of EIN.

Marketing

The split between EIN's potential user community and the Technical Representatives increased the importance of the marketing activities undertaken by EIN to aid the Technical Representative's efforts, since EIN could not

directly approach the user on a cost-effective basis. EIN experimented with a variety of methods of making its service known, though intensive utilization of these methods was often left to the respective Technical Representatives. Besides the publications most directly exemplifying EIN's work, the Documentation Standards Handbook and the *EIN Software Catalog*, the EIN staff produced several general publicity aids. A film title "The Educational Information Network" was produced and widely shown. Many meetings and conferences, local, regional, national and international, were attended, held and addressed. Special seminars on EIN at member universities were organized. Articles on EIN appeared irregularly in many publications, and regularly in EDUCOM publications. Most of EIN's programs were described in the *Computer Programs Directory 1971* published by the Joint Users Group of the ACM. Memoranda on items of particular interest were written and distributed. Press releases were regularly provided to the Technical Representatives on the new entries to the EIN Catalog. Lists of programs available for inclusion in EIN were irregularly distributed. Several telephone surveys were conducted to determine problems and stimulate usage. All of these increased knowledge of EIN, though they did not stimulate any usage of the anticipated variety. All of the usage of EIN consisted of requests for copies of programs.

The Technical Representatives were asked about the value of EIN's marketing efforts in a questionnaire (Appendix D) sent out at the end of EIN's third year of operation. About half thought these efforts were wholly inadequate or mediocre, one quarter thought they were of the right type but too little, and one quarter thought they were adequate. A few of those who expressed dissatisfaction with the marketing effort reported that the fault was their own.

Overall, EIN did not exhaust all of the avenues possible, though many of them were tried. One reason was that the costs of mounting an effective advertising campaign to reach a large cross-section of potential users were prohibitive. Another reason the EIN staff did not pursue these possibilities further related to the extensive efforts that had been made by several Technical Representatives in publicizing EIN. All of these representatives reported a very low return of interest in EIN and in confirmation, no usage was stimulated. Their experience can be summed up by one who said that he did not publicize EIN as much as he felt he should have, but he didn't think it would have made any difference if he had. The reasons for his low return on publicity relate to the needs and desires of the users, as described in the section on Reasons for Lack of Usage.

Institutional Difficulties

The financial difficulties of academic institutions also affected EIN. Most universities found themselves increasingly strapped for operating funds during this time. Many plans and projects were curtailed or postponed. The impact of this squeeze was even greater in university computer centers, owing to the curtailment of government sponsorship of computing activities and of research in general. It was a particularly jarring shock since this area of academic endeavor had enjoyed a relatively prosperous and dynamic past through manufacturers', university and governmental subsidies. These pressures make resource-sharing appear more attractive, not less, and help account for EIN's growth. However, all of these forces also increased the pressures on the Technical Representatives in their local responsibilities. As local problems grew, the representatives had less and less time to devote to EIN. They were accountable to the local institution and not to EIN, so EIN had little leverage with them. The financial crisis helped to stimulate the growth of EIN while, at the same time, discouraging members from using the network.

When faced with the decision of paying a small amount for the services offered by EIN or doing without such services, some institutions decided to do without. This was in spite of the fact that working through EIN had the potential of saving considerable sums of money. However, the situation had become so bleak as to force them to retrench to a reduced level of capabilities, making do with what they already had locally.

The reasons for this view of EIN as a "luxury" are partly due to the scale of saving that EIN presented. The benefits of EIN were clearest on a large scale, nationally perhaps. It was here that the mismatch of needs, capabilities and the resulting duplications and deficiencies would clearly be rectified by EIN. The benefit on a local scale did not look so immediate or so large, and many institutions were pressed enough to be forced to eliminate all "unnecessary" services, regardless of their long-term or large-scale benefits.

Perspectives of Large and Small Members

Institutional differences among members also posed problems for EIN. Members of EIN can be characterized as large or small and as buyers or sellers of computing power. Large universities generally viewed themselves as sellers of computing power to the network. They already had copies of programs similar to those submitted to EIN, and felt they were largely able to handle the requirements of their

own user community. Their general view of the network was that it would primarily benefit smaller institutions, enabling them to meet the demands for programs they had not or could not obtain. Many of the recommendations received from the larger members concerning future EIN activities stressed the need to increase the small college membership of EIN, since these were the places that would gain the most from EIN.

But the smaller institutions did not agree with these conclusions, though they did subscribe to some of its arguments. They felt that EIN was most beneficial to the larger institutions. Several of them did not submit programs to EIN because their competition in EIN consisted of the entries from institutions with larger computers. Since the programs were used at the submittor's site, this pitted their smaller or older computer against the larger, more sophisticated equipment. Not only were their common entries at this disadvantage, but the larger centers could offer programs that could never be run on a small machine. This meant that these smaller members would be buyers from EIN, with little possibility of even partially covering their expenses through the sale of resources to the network. Since these institutions had smaller budgets to start with, they viewed EIN as a drain on budgets that were already too meagre. The larger centers looked to be receiving benefits from EIN, at the expense (literally) of the smaller members. They simply could not afford this, and relatively few small institutions joined EIN.

Scope of Problems

It should be noted that the lack of usage of EIN cannot be extrapolated to other networks. In particular, networks consisting of physically-connected equipment do not fall within the realm of EIN's problems, though they are subject to the same user considerations. If anything, EIN's experiences point to the likelihood of success for such ventures if judiciously planned. The Technical Representatives generally reported that their potential users either wanted a program to be available locally or at least to look as if it were available locally by remote access connection. This is further confirmed by the large number of Technical Representatives who reported a heavy reliance on in-house programs in filling user requests for programs identified in the EIN Catalog, but which the user did not wish to use through EIN. The main objections raised against physically-connected networks by the Technical Representatives were their cost, not their convenience or their speed, as was the case with EIN. Hence, if a physically-connected network could be developed that could provide program access at a cost near

to the costs of relying on local capabilities, there is nothing in EIN's history that would predict the failure of such a network. Indeed, the prospects for success would rise. On the other hand, the problems associated with establishing the procedures for obtaining service are greater for physically-connected networks, particularly if the machines are not identical. Thus, it is clear that the characteristics of speed and ease of use must be balanced with cost in planning for all networks, even those greatly different from EIN.

Summary of Findings

EIN demonstrated that there is strong interest in the academic community in software away from home. Institutions are willing to commit major amounts of senior personnel time to resource-sharing efforts, and will make major resources available to other institutions.

Documentation sufficient to allow remote usage appears to be possible to produce at a cost which does not outweigh the potential cost benefit of resource sharing.

The use of the mail as a mode of transfer of data or programs does not appear to be feasible for a number of reasons, of which slow turnaround time and fear of loss are paramount.

All of the reasons for failure of usage within EIN, however, appear susceptible to solution by cheap, high-speed electronic access methods.

VI. PRESENT SITUATION AND FUTURE PROSPECTS OF EIN

At its meeting in May 1972, the Board of Directors of EDUCOM voted to continue EIN until January 1, 1973, but without additions to the Catalog. This would require an effective budget of $0. This decision was made as the result of the following considerations:

EIN continues to attract considerable interest and attention. Most institutions joining EDUCOM, for example, immediately join EIN. Programs continue to be submitted for inclusion in the Catalog.

There is ongoing usage of the Catalog. It is only of one type, however. Persons are requesting copies of programs for transfer to their own institution. There is no usage of the type intended: the transfer of data to the program where it is running.

The reasons for lack of usage, and lack of income, within EIN appear to be curable by the introduction of high-speed communications technoloyg. This technology is emerging in the form of the ARPANET and other innovations. EDUCOM is in direct negotiation with ARPA, NSF, OTP and other organizations which will be involved with the use of these developments. It appears possible, even likely, that a fruitful venture can be molded from EIN and these other efforts.

Prior to January 1, 1973, the EDUCOM Board of Directors will again review the status and prospects of EIN.

APPENDICES

APPENDIX A

List of Conferences Attended

Presented below are the conferences at which EIN was represented by either the Executive Director or a member of the Executive Committee. This list does not include all of the meetings and discussions that were held with other educational and resource-sharing institutions; rather it concentrates on those gatherings that attracted more than local interest.

Conference	*Date*
Association for Computing Machinery National Conference and Exposition Las Vegas, Nevada	August 27-29, 1968
Conference on Undergraduate Education in Computer Science[1] Park City, Utah	September 9, 1968
National Science Foundation meeting of ten regional networks	October 7-8, 1968
EDUCOM Council Meeting[1] Boston, Massachusetts	October 15-16, 1968
Morel Conference[1] St. Mary's of the Lake, Michigan	November 19-20, 1968
Illinois Institute of Technology regional meeting Chicago, Illinois	December 6-7, 1968
Fall Joint Computer Conference San Francisco, California	December 9-11, 1968
EDUCOM Spring Council[1] Boulder, Colorado	April 15-16, 1969
EDUCOM Fall Council[1,2] Notre Dame, Indiana	October 13-14, 1969
Fall Joint Computer Conference[1] Las Vegas, Nevada	November 18-20, 1969
Association for Computing Machinery-- Special Interest Group on University Computing Centers Conference on Unbundling[1,2] Atlanta, Georgia	February 16-17, 1970
EDUCOM Spring Council[1,2] Boston, Massachusetts	April 15-16, 1970
New York State Board of Education[1] New York, New York	April 16, 1970
Spring Joint Computer Conference Atlantic City, New Jersey	May 5-7, 1970

Conference	*Date*
Conference on the Use of Computers in Geography[1,2] Minneapolis, Minnesota	June 4-5, 1970
Conference on the Use of Computers in the Undergraduate Curriculum[1,2] Iowa City, Iowa	June 16-18, 1970
Conference on Small College Computer Users[1,2] Dubuque, Iowa	June 22-23, 1970
Conference on Computers in Undergraduate Science Education[1,2] Chicago, Illinois	August 17-21, 1970
IFIP World Conference on Computer Education Amsterdam, Netherlands	August 24-28,1970
EDUCOM Fall Council[1] Atlanta, Georgia	October 15-16, 1970
Slavic Studies Association meeting[1,2] Denver, Colorado	March, 1971
EDUCOM Spring Council[1] Philadelphia, Pennsylvania	April 29, 1971
Conference on Computers in the Undergraduate Curricula[1] Hanover, New Hampshire	June 22-25, 1971
Conference on Communications Satellites for Education[1] St. Louis, Missouri	July 19-20, 1971
Computing and Higher Education: EDUCOM Seminar for Presidents and Vice Presidents Durham, New Hampshire	August 22-25, 1971
EDUCOM Fall Council Columbus, Ohio	October 14-15, 1971

Notes:

1. Information on EIN was presented at this meeting.

2. The presentation at this meeting was part of EIN's direct marketing effort.

APPENDIX B

List of Dates of Catalog Growth

Presented below are the publication dates and the number of programs in each of the supplements to the *EIN Software Catalog*.

Supplement	*Date*	*Number of Programs*
Original Catalog	8/69	12
1	9/69	13
2	10/69	8
3	11/69	8
4	12/69	9
5	1/70	5
6	2/70	11
7	3/70	5
8	5/70	9
9	6/70	9
10[1]	10/70	18
11	12/70	22
12[2]	2/71	15
13[3]	4/71	9
14	5/71	8
15[3]	8/71	14
	TOTAL	175

Notes

1. Contains two general facility access writeups.
2. Contains three general facility access writeups and a SDI (Selective Dissemination of Information) service writeup.
3. Contains one general facility access writeup.

APPENDIX C

Survey of Usage Outside the Network

100 CHARLES RIVER PLAZA • BOSTON • MASSACHUSETTS 02114 • (617) 227-1805

EDUCOM

3 June 1971

MEMORANDUM

TO: John C. LeGates

FROM: Wayne Zafft

CONCERNING: Survey of Usage "Outside" EIN

This memo is a report on a survey of the institutions which have submitted programs to EIN. It is an attempt to discover the amount of usage that has been going on "outside" of the EIN Network. An example of this outside usage is a request for a copy of a deck or listing of an EIN program, rather than using the program at the resource institution.

Background

The EIN Software Catalog presently lists 149 entries from 18 institutions. Seven of these entries are not applicable to this analysis, as they consist of complete facility writeups and an SDI service. This leaves 142 programs at 14 institutions as the surveying sample.

Approximately 8% of the programs are listed as "Proprietary; not for distribution." However, in every case but one, the proprietary programs were from institutions that also have non-proprietary entries. No attempt was made to differentiate between the two types of entries.

Survey

Contact was made with 13 institutions, accounting for 141 programs. Initial contact was made with the Technical Representatives (TR's); any additional contacts were made on the recommendation of the TR (four cases: three program librarians and an assistant director). Questions attempted to discover:

1. The number of EIN-identifiable requests received by the TR or anyone else,
2. Which programs were requested,
3. An estimate of the number of requests which are attributable to EIN, but which did not specifically mention EIN,
4. The number and object of requests from within the TR's institution for copies of EIN programs elsewhere, and
5. The policy of the institution toward such requests.

Requests

Detailed information on the number and object of the requests is presented in the tables below.

TABLE 1

Requests Through TR's

Institution	*Req. Received for Pro.*	*Requested Pro. from*	*No. of Catalog Entries*
Dartmouth College	0	MSU-2	11
ETS	20[α,β]	?-1	12
Florida State U.	1	0	6
U. of Iowa	0	0	11
Iowa State U.	0	FSU-1	9
U. of Maryland	0	0	4
Michigan State U.	3	0	4
CUNY	Not Contacted		1
Northwestern U.	12	0	38
U. of Notre Dame	3	0	7
U. of Pennsylvania	0	0	2
Pennsylvania State U.	12[α]	0	25
U. of Pittsburgh	0	PSU-1	2
Washington U.	2	ISU-1	10
	53	6	142

[α]estimated

[β]TR at ETS reports that he has received over 90 requests for two programs, "the majority of which" are not EIN-attributable. In addition, he enumerated almost 10 requests for other programs that specifically mentioned EIN. I have estimated the total number of requests as 20.

TABLE 2

Requests Received at EIN Office (not from TR's)

Resource Institution	*No. of Pro. Requested*
Dartmouth College	1
ETS	2
Florida State U.	1
Michigan State U.	6
Washington U.	4
	14

TABLE 3

Program Requested at each Resource Institution

Institution	*Programs*	*No. of Requests*
Dartmouth College	Anthropology Series (10 programs)	1
ETS	OBLIMIN	1
	MINRES & UMLFA	10 (est)
	KRUSKAL, MSA-1, SSA-1	6
	(others)	3
Florida State U.	SYMAP	1
	SAMOS	1
Iowa State U.	ZORILLA	1
Michigan State U.	SCHEDULE	3
	BIRS	3
	ACT	1
Northwestern U.	Complete Library	1
	Z3SLS	2
	TRIAL	2
	LINPROG	1
	MESA1	1
	BMD29	1
	INFOL	1
	NUCROS	1
	SUZYQ	1
	ATTANAL	1
U. of Notre Dame	SCRIPT	3
Pennsylvania State U.	(not known)	12
Washington U.	INQUIRER II	3
	KGIC	2
	TOTAL NO. OF REQUESTS	63

Analysis of EIN-Identifiable Requests

Table 1 is a summary of the information the TR's reported. Table 2 was obtained by checking the EIN Project Office files. It lists only the institution of the program sought (not the institution of the requestor). Table 3 was constructed as the best estimate of the usage which has followed EIN channels (either through the TR's or the Project Office).

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None of the requests in Table 2 were from TR's, though half of them came from institutions that were EIN members. There is no overlap between the transactions reported in Table 1, Col. 2 and those reported in Table 2. (EIN notified the requestor's TR if he had one. None of the TR's reported these requests.) Table 3 is the sum of Table 1, Col. 1 and Table 2, adjusting for those transactions which are reported in both Table 2 and Table 1, Col. 1.

On examining the sending side of the transactions, we find the following. The 14 institutions surveyed account for about 20% of the total EIN membership (77), and probably have the most active TR's. Assuming that these institutions also account for 20% of the requests (which is probably low), Table 1, Col. 2 shows that the TR's were involved in sending only 10% of the requests (6 of 60). Also, since half of the requests listed in Table 2 came from institutions that have TR's; there are at least two requests made without the TR's prior knowledge for every request made with his knowledge (1 to EIN Office + 1 directly to resource TR).

Other EIN-Attributable Requests

In every case, the TR's declined to estimate the number of EIN-attributable requests received which did not specifically mention EIN. All claimed to have no basis for such an estimate. One person, when pressed, said 25% of the program requests received by the librarian involved EIN in some way, but this figure was immediately disclaimed.

Most TR's mentioned that their programs were described in several publications and there was no way of determining which publication was stimulating requests. In addition, several TR's said that readers could easily be familiar enough with their center to know who to contact directly to obtain a copy of a program, without having to go through the TR and without having to mention EIN.

Policy

The TR's, with three exceptions, reported they tried to cooperate with program requests and provide the item sought (deck or listing). The exceptions were as follows: Michigan State University was willing to send programs if it could be a two-way exchange; i.e., if they could also get copies of programs freely. University of Pennsylvania spoke of a strong user-community orientation which focussed their attention to their own network. They were not unwilling to send copies of programs but this would be decided on a program-by-program basis. Washington University indicated a desire to support EIN; hence they would encourage network usage rather than sending copies of programs. They would send them in "special circumstances".

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APPENDIX D

Results of Questionnaires to IR's and TR's

Questionnaire to IR's of Institutions that Did Not Join EIN

Questionnaires were sent to the representatives of the thirty-five EDUCOM members that did not join EIN. Ten persons returned the questionnaire. Nearly half of the respondents were from large institutions (University of Washington, University of Michigan) and half from prestigious private institutions (Princeton University, Johns Hopkins University). Only two replies were from smaller colleges, and in one of these, the respondent only asked for more information, not having heard of EIN previously. This leaves a working sample of nine responses.

The responses show that, on the whole, the objectives of EIN were supported. However, EIN was viewed as being only partially effective in reaching its objectives and, consequently, the effort involved in using the network was large for the returns received.

EIN was established to share software without exchanging it. The responses to the question on the purpose of EIN show some confusion in this area. While only one representative thought EIN would both exchange programs and run them without exchanging them. Since there were four people who understood EIN's function as running programs without exchanging them, half of the respondents had some misunderstanding about the operation of EIN. The exchange of programs was a process EIN was trying to inhibit, at least for computational purposes. If EIN helped the user who needed a copy of a program for use as a teaching example, then that was a fringe benefit, not a primary thrust of EIN.

Universities decided not to join EIN primarily because they felt that they were already meeting their user needs. EIN looked

as if it were demanding a disproportionate share of work and manpower for a questionable return of increased capability. All of the representatives thought that the decision-maker (if not himself) had received all of the available information. One representative said that it was not his prerogative to make the decision; he would wait for a ground swell of interest. Under the circumstances, such a ground swell was unlikely.

The representatives were not uniform in their recommendations for improving EIN. The two strongest groups responded by (1) recommending direct electronic connection and (2) indicating that no alterations were likely to prove attractive. This latter group was composed of people who stressed various other reasons for the unattractiveness of EIN; e.g., there was more to be gained by associating with users of similar equipment or whose staff was oriented to certain specific languages (APL), or the lack of a "strong advocate" for EIN on campus. It should be noted that no respondent felt that being able to sell programs or consulting time would make EIN more attractive.

Finally, the responses concerning the principal benefit of EIN to the academic community were also varying. Equal numbers of representatives (3) gave the following answers; documentation standards, general communication among institutions and that the question was better addressed to EIN members. Two people identified the Catalog as the principal benefit of EIN, one said there was no benefit and no one identified use of the network. The questionnaire sent to Technical Representatives shows a similar judgment about EIN, even including the unanticipated valuation of the

documentation standards, slightly greater than the EIN Catalog itself.

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EDUCOM

Letter to Institutions Representatives of Members that did not join EIN

A project of EDUCOM with which you have not become involved is the Educational Information Network (EIN). As part of its evaluation of EIN, EDUCOM is trying to find out where it succeeded and where it failed and why. We would very much appreciate your taking a few minutes to fill out the enclosed questionnaire. This would be especially helpful in telling us about the areas that EIN did not serve. It may also enable us to design a service more useful to you.

We thank you very much for your cooperation.

Very truly yours,

John C. LeGates
Executive Director of EIN

JCL:lw

Enclosure

Received 10 Responses from 35

Questionnaires Sent

D4

100 CHARLES RIVER PLAZA • BOSTON • MASSACHUSETTS 02114 • (617) 227-1805

EDUCOM

In General

Please feel free to check all the options which apply in each question. They are not normally intended to exclude one another. Please do not hesitate to give additional comments on the back of each page where you wish to amplify on an answer or feel that the questions do not apply.

NAME _____

INSTITUTION _____

TITLE OR POSITION _____

1. What is your overall impression of EIN?

   See Attached Sheets.

2. As you understand it, is EIN

   2 primarily for large, computer-rich institutions?

   4 for the purpose of exchanging programs?

   7 for the purpose of running programs without exchanging them?

   1 primarily for small institutions?

3. Why have you chosen not to join EIN?

   ___ little or no interest in computers

   1 little or no interest in resource sharing

   4 can't dilute our efforts with an additional operation

   1 don't have the right man for the job

   Please explain in your own words.

   See Attached Sheets.

4. Have you been well enough informed about EIN so that you feel comfortable making the decision to join or not join?
   5 Yes 1 No If not, why not and what additional information would you like?

   See Attached Sheets.

Question 1: What is your overall impression of EIN?

--not yet achieving goal of wide exchange

--could be helpful to some schools. Is actually only partially effective.

--My impression is that EIN could be very useful if one or several individuals at institution, desirably in the computer center, took a strong interest and pushed it internally. Lacking this kind of internal championship, the institution is likely to be unable to make much use of EIN.

--EIN is an organization which may have useful software available provided that the software is written for your computer.

--It has worthwhile objectives, but the effort involved in being an effective member is high for the returns received.

--not in the spirit of our computing environment.

--That, in general, EIN has not been too successful.

--It neglected to find the needs of the people it purported to serve. It prepared a menu for people whose tastes were not consulted.

Question 3: Why have you chosen not to join EIN?

--not sure the investment in EIN is of value (relative to other problems) of investment.

--Our computer group feels self-sufficient and is already providing as much help to smaller schools as possible.

--No one in the computer centre has taken a sufficient strong interest to make me think that joining EIN would be a very useful thing at the University of Toronto.

--The University cannot afford to devote the time of the individual who could make active membership meaningful.

--1. The programs offered are mostly suitable only for large machines.
2. It is more trouble to go through EIN than to write our own programs or modify the EIN programs to fit the problem.
3. There are far more programs better suited to our machine in COMMON.

--Almost all programs needed by our users are available here. Our computer center has very few requests for external programs which we can get from other sources. We have not produced any that outsiders would wish to use at our center.

--Don't believe in program sharing, unless it is on-line, dynamic, and in APL.

--There are no budgeted funds to purchase services outside of Princeton. We have sufficient capacity so that it is unnecessary. As far as contributing our resources to EIN, the detailed documentation is a frightening amount of work with little obvious payoff. We do, however, make the computing resources together with all of its library routine available if people wish to establish RJE links.

Question 4: Have you been well enough informed about EIN so that you feel comfortable making the decision to join or not to join? If not, why not and what additional information would you like?

--I am not at all familiar with EIN. Please send me all of the information that you can.

--I didn't make decision. Head of Computer Science Dept. did He had all information sent to me.

--It is not my prerogative to make the decision as to whether or not to join EIN. I feel I must wait until there is sufficient ground swell of interest and enthusiasm before we take any such step.

--We do have the Documentation Standards Handbook, your invitation letter of November 8, 1968, your initial distribution of the EIN Software Catalog, and supplementary indexes in EDUCOM Bulletins.

5. What alterations in EIN would make it attractive to you?

__3__ electrical connection among members

_____ a service that would allow members to sell programs

_____ a service that would allow members to sell consulting time

Please explain in your own words.

See Attached Sheets.

6. In my opinion, the principal benefit of EIN to the academic community has been

__3__ documentation standards

__2__ EIN Catalog

__3__ general communication among institutions

_____ use of Network

__1__ no benefit

Please explain in your own words.

See Attached Sheets.

Question 5: What alterations in EIN would make it attractive to you?

--The network (ARPA?) will be needed to make it practical.

--I doubt if any would.

--It is not that EIN is unattractive to me at the present time. It is that I do not presently have the time to devote to championing it and no one else has emerged as a strong advocate.

--With the resources currently available there is more to be gained by association with people concerned with the same computer than with an association such as EIN.

--Electrical connection would be too expensive for the service that it could perform; local or regional networks are more appropriate. It is not likely that the academic community would buy enough programs or consulting to support selling these services.

--We are very APL oriented, and unless this language is stressed, we shan't be interested.

--Our scarce resource is staff and space. RJE connections get work in and out of the machine with very little impact. RJE connections are, unfortunately, expensive.

Question 6: The principal benefit of EIN to the academic community has been ____?

--I really can't say because it hasn't served me.

--Most benefit from any organization comes about as a result of contacts that are established with other installations. I would think that question would be better posed to members of EIN who have reason to feel there are worthy benefits.

--I am really unable to make an evaluation of the benefit of EIN to the community up to the present time.

--If the EIN Catalog can become as extensive as that of SHARE (COSMIC) and other user groups or ACM, it would become the standard computer library for Universities. This does require much effort because many programs in existing libraries do not work as described. Thus, reliable, well-tested and well-documented programs are needed. The large computer Center will probably make only occasional use of the library and then by direct request to the author for the program deck--probably not for remote computer service. Perhaps as more programs go into the EIN Catalog and out of general circulation, (for example WATFOR, WATFIV, PL/C, SPSS, OSIRIS, BMD, TSAR, etc.) there will be heavier dependence on EIN.

--Believe we should clearly point out our error in not compiling material only after some minimum number of users was identified.

Questionnaire to Institutional Representatives of EIN Members

Seventy-five questionnaires were sent to the Institutional Representatives of the institutions that joined EIN. In the case where the Institutional Representative was the same person as the EIN Technical Representative, only the questionnaire to Technical Representatives was sent. Eighteen representatives completed and returned the questionnaire; four returned it without completing it, indicating that the Technical Representatives would answer it for them.

Nearly two-thirds of the responses were from moderate-sized computing installations, e.g., those institutions with a computing budget of $500,000—$2,500,000, with the remaining third from smaller institutions (budget of $100,000—$500,000). Only one institution reported a budget larger than $2,500,000. These figures are generally in line with the overall membership of EIN, which consisted primarily of moderate to large institutions, with a minority of smaller institutions filling out the membership.

About half of the people who returned the questionnaire answered any given question. These people generally had favorable opinions of the documentation standards, EIN Catalog and efforts of the EIN staff, though on some questions (such as those seeking evaluation of the EIN staff) several people said they had no basis for a reply. The opinions of those people who did not answer a given question is not known. Moreover, it cannot be assumed that these unstated opinions were negative, since several questions

with provision for negative responses were also left unanswered.

Publicity for EIN was generally done by word of mouth, memos, display of the Catalog, and listing EIN as a resource. From half to two-thirds of the representatives reported using these vehicles. Of those who have seen EIN's publicity aids (varying from very few for the film on EIN to almost everyone for the EIN Data Column in the EDUCOM Bulletin), most thought they were good. However, all but one representative thought that EIN's marketing effort on their campus was either wholly inadequate or not extensive enough. No one thought the efforts were of the wrong type, but no one thought they were excellent, either.

A wide variety of reasons for the lack of usage of EIN were presented. The most common one was the lack of funds. Other reasons included the difficulty of off-campus use, a general lack of interest in EIN, and the overall adequacy of relying on software locally available. Accordingly, there were few suggestions for improvements to increase the usage of EIN. Some respondents suggested specific local changes, but the other suggestions were scattered. They ranged from building a "real network" to forgetting the whole thing. No specific common problem was identifiable behind the suggestions.

On examining the opinion expressed on the overall value of EIN, a noteworthy connection with this opinion and the size of the computing budget of the respondent's institution emerges. The smallest institutions were most critical of EIN. The criticisms tapered off as the budget became moderately large ($500,000—$2,500,000) and then increased slightly for the largest institutions. On a scale from 1 to 5 evaluating EIN, the smallest institutions' responses were near 1, the moderately large ones around 4 and the largest

institutions around 3. EIN appears to be having the most difficulty with a small school environment (as is the case with many other computer-connected areas). This points to problems in the suggestion that EIN increase its small-school membership in order to increase usage. It is not clear that any greater usage will be generated.

Finally, the documentation standards were identified as the most valuable aspect of EIN, with the EIN Catalog and general communication among members as the next selection. No one identified Use of the Network or Support from the EIN Staff and TRs as the most important aspect.

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EDUCOM

Letter to Institutional Representatives
of EIN Member

18 Complete and 4 Not Complete of 75 Sent Out

EIN, the Educational Information Network, is approaching a major turning point in its history. The precipitating event is the termination of our grants from USOE and NSF.

An extensive questionnaire is being sent to the Technical Representative at your institution. This includes all the questions we are addressing to you, plus several more. We would like to ask you to fill out the enclosed brief questionnaire in order to help with the following goals.

First, we would like to prepare a final report which will be as thorough and as objective as possible. EIN has been a valuable experience, and has demonstrated that certain things will work, and others will not. We would like to document the knowledge which EIN has generated, and make it available to interested parties, both as academic fact, and as information valuable to future resource sharing efforts.

Second, we would like to determine the most useful course of action for the Network itself. The basic choices are to continue it as it is, to alter it, or to terminate. At the least, there must be a change in the mode of funding. Other changes will be seriously considered after your responses and those of your colleagues have been studied.

Like all questionnaires, this one may not address itself to your particular situation. If not, feel free to alter or add to it. Free form or essay answers will be particularly appreciated. Our basic objectives are to find out what happened, why, and what we should do next. Feel free to let us know in any way you want.

Finally, please feel free to be critical. The goal is to acquire knowledge, and a little constructive criticism never hurt anyone.

We realize that this will take time, and that you haven't much to spare. However, we will appreciate your effort, and the information you supply will be very valuable and without your response the survey will be incomplete. The results of this survey will be made available to you.

Many thanks,

John C. LeGates
Executive Director of EIN

THE INTERUNIVERSITY COMMUNICATIONS COUNCIL

100 CHARLES RIVER PLAZA • BOSTON • MASSACHUSETTS 02114 • (617) 227-1805

EDUCOM

In General

Please feel free to check all the options which apply in each question. They are not normally intended to exclude one another. Please do not hesitate to give additional comments on the back of each page where you wish to amplify on an answer or feel that the questions do not apply. In some questions you are given a choice between answering in general terms, such as "frequently" and "occasionally" or answering in numbers. You may take either or both choices.

NAME _____

INSTITUTION _____

TITLE OR POSITION _____

1. Estimate annual computing budget of your institution.

4	$100,000 to $250,000	2	$250,000 to $500,000
4	$500,000 to $1,000,000	7	$1,000,000 to $2,500,000
1	$2,500,000 to $5,000,000		over $5,000,000

2. We found the documentation standards:

poor			1	4	6	good
unclear			1	3	6	clear
not comprehensive		1	1	3	5	comprehensive

3. We have

2	adopted them for internal use
2	recommended them
4	publicized them
1	received favorable comments
	received unfavorable comments

Not——1 ↓

4. How do you find the documentation in the Catalog?

poor			1	6	5	good

5. We have used 6 the Catalog.
recommended 4
publicized 6

Not—1 ↓

6. Did you feel that the EIN Staff was

unhelpful				2	5	helpful	Could not Evaluate—4
not competent				2	5	competent	
uncooperative				2	5	cooperative	

7. What techniques have you used to make EIN better known at your institution?

None—1

12	Word of mouth
11	Display of the Catalog and Documentation Standards Handbook
9	Memos
1	EIN Film
7	List the Catalog among your resources
3	Articles or Press Release
	Direct reference
3	Special meetings about EIN

8. Do you feel you are kept up to date on EIN activities?

13 Yes 1 No

9. What do you think of EIN's publicity aids?

	Good	Mediocre	Bad	Have not seen
Film		1		9
Press Release (supplements)	4	2		4
EIN Data Column in Bulletin	7			3
Conference presentations	4	1		5
Visits by EIN staff	2			8
Memoranda	2	1		7
Telephone calls	3			7

10. Do you feel that the EIN marketing efforts at your campus were

4 of the right type but too little?
____ of the wrong type?
4 wholly inadequate?
____ mediocre?
1 adequate?
____ excellent?

-----Budgets for use of computer services off-campus do not Exist.

11. Explain briefly why you feel there was not more usage of the Network in the manner in which it was intended.

See attached sheet.

12. What do you think needs to be done to get more usage from EIN?

See attached sheet.

13. Do you feel that having a single representative at your institution is the best way for EIN to function? 10 Yes 3 No
If not, why not?

See attached sheet.

14. Regardless of what EIN may have done for you, there is doubtless something which it did not do for you. For example, if you used a program successfully, there is a reason you did not use more. The purpose of these questions is to find out the reasons why various things did not occur.

3 my institution was undergoing a change in administrative policy or personnel and could not deal adequately with EIN

my institution cannot conveniently spend money
7 off campus
2 out of state

7 there was a pervasive lack of interest

____ EIN conflicted with another interest group

1 the EIN concept was too different to catch on

8 we already have an in-house library which meets our needs.

Please explain in your own words.

Page 3, Question 11: Explain briefly why you feel there was not more usage of the Network in the manner in which it was intended.

Budget: $2,500,000 to $5,000,000

*(1) The money problem
(2) Using outside programs is usually a problem.

Budget: $500,000 to $2,500 000

*Fairly adequate library exists locally with good level of user support.

*There were few individuals who needed programs from other campuses. More likely that idnividuals with smaller computing centers need our programs.

*Not enough time to soak in.

*New installation. We have in house a good variety of application programs.

*I never really had much information on EIN.

*1. Programs available were not of interest to personnel of our campus. 2. Resources not available to pay for the service. 3. Local software was sufficient.

*We're just gearing a new center—new policies, new group of people.

*EIN rep did not do his job.

Budget: $100,000 to $500,000

*Unworkable in small-school environment.

*EIN Representative is in better position to know.

*No budgets.

*Our users lack funds.

Page 3, Question 12: What do you think needs to be done to get more usage from EIN?

Budget: $2,500,000 to $5,000,000

*Have a real network built cooperatively.

Budget: $500,000 to $2,500,000

*Change the EIN rep on campus.

*We had to get our feet under us—it seems EIN would have worked for us, had we been able to use it.

*Change the objectives of EIN to one of exchange of software rather than sale of services.

*More publicity on our part;
More funds for external spending.

*Confidence in the permanance of EIN.

*Encourage smaller campuses to use major facilities.

*It seems that most appropriate steps have already been taken, with little tangible results – don't know any way to suggest.

Budget: $100,000 to $500,000

*We have to change the attitude of our users.

*Computing economics must change. Department do not have budgets and comp. centers have no desire to foster their own competition.

*Forget the whole thing!

Page 3, Question 13: If you do not feel that having a single representative at your institution is the best way for EIN to function, why not?

Budget: $2,500,000 to $5,000,000

*(Yes) But this of course has to be expanded from that one person.

Budget: $500,000 to $2,500,000

*(Yes) There isn't enough interest to divide the work more than one way.

*(No) The functions of the Institutional Representative and Technical Representative differ too greatly.

*(No) One does not contact enough users.

*(No) The University has 4 campuses with computing facilities.

*(Yes) But it was in the wrong hands.

Budget: $100,000 to $500,000

*Under current circumstances, it does not matter.

15. We had prospective users who did not use the Network because

3	basic distrust of using computers at remote locations
	inconvenience of preparing input
	distrust of U.S. mail
	fear of slow turnaround
2	too expensive
4	can't fiddle with program or computer at that kind of distance
2	inadequate or poor documentation
2	inadequate support
	we had a better one in house

Please explain in your own words.

--inconvenience and cost
--poor representation, ignorance
--gearing up a new computer center, too busy
--awkward, near impossible procedures for purchasing services

16. Did you find that EIN has been overall

unsatisfactory	3	1	4		3	satisfactory
incompetently handled	1	1[1]	2	3	3	competently handled
not worthwhile for me	4	1	3	2	1[2]	worthwhile for me
none of these				3	3	instructional, educational or interesting

[1]on our campus
[2]but I'm only one who can say so.

17. What have you found to be the most valuable aspect of EIN?

7	Documentation Standards		Support from EIN Staff and TR's
5	EIN Catalog		
	Use of Network	4	General communications among members

Please explain in your own words.

We consider the extensive work to document well to EIN standards the Catalog entries we submitted was helpful to us although the programs' use via the Network was never selected.

18. EIN can change its form at any time. The purpose of this section is to obtain your reaction to several of the possibilities. Please answer for all the various alternatives. It is not our intention to present these as competing with one another.

Possibility 1

EIN can continue more or less as it is.

Possibility 2

EIN can continue more or less as it is but there would be an annual charge to the members for the Catalog.

Possibility 3

Catalog of Resources. EIN would publish a much expanded Catalog whose effort is to list all noteworthy educational computer resources and the conditions under which members could get them. EIN would in no way help in the transfer of these items or guarantee their performance.

Possibility 4

Program Exchange à la SHARE. EIN would collect programs from various sources and make them available to our members. The performance of these programs would be guaranteed. There would be a charge for the Catalog and an additional charge per program.

Possibility 5

Program Exchange: another model. EIN would purchase programs from the member institutions or would serve as a broker allowing the institutions to sell programs directly to one another. The institution which sold a program would then support it on a consulting basis for a fee if desired.

Possibility 6

Direct Electronic Connection. EIN would establish direct electronic connection among its members. Each user could then purchase programs or computer time at a remote location going to the site which offered the most desirable or cheapest service. Resources on the net would be able to sell capacity to the members.

--Not compatible with computing and budgeting environment of this institution.

Possibility 7

Your option. Tell us what you would like.

See attached sheet.

Option 7 : Your option for an alternative form for EIN.

--More membership by smaller institutions to use EIN.
--The time is rapidly coming whereby institutional computing could and probably should for economic reasons, become a reality. Regional networks are obviously working; EIN should increase the expansion and interconnection of regional computing facilities into a national network. The ultimate success would, of course, depend on the economics and the necessity to minimize computing costs on campus.
--I hope that EIN can work toward an actual network.
--Disband organization.
--EIN Representative can answer this better.

Possibility 1	Bad Idea	4		4	3	1	Good Idea
Possibility 2	Bad Idea	5	2	1	2	1	Good Idea
Possibility 3	Bad Idea	4		2	4	2	Good Idea
Possibility 4	Bad Idea	3	1	1	5	3	Good Idea
Possibility 5	Bad Idea	3	2	3	2	3	Good Idea
Possibility 6	Bad Idea	2	1	2	1	6[1]	Good Idea
Possibility 7	Bad Idea					1[2]	Good Idea

[1]But dangerous, expensive; would kill small centers
[2]Regional--national networks

We understand that these numbers may be difficult to supply. Your response will be taken as a rough estimate and will not be used for accounting purposes.

Value of This Service to My Institution Would be

	0 to $500	$500 to $1K	$1K to $10K	$10K to $100K	more exactly	can't quantify
Possibility 1	7	1				3
Possibility 2	9					2
Possibility 3	7	2				2
Possibility 4	4	2	3			3
Possibility 5	5		4			2
Possibility 6	5			2		3
Possibility 7			1[1]	1[2]		

[1]more small institutions as members
[2]regional-national networks

My Instituion Would Pay ? to Obtain This Service

	0	$250	$500	$1K	$2K	$5K	more exactly	can't quantify
Possibility 1	8	1						2
Possibility 2	8	1						2
Possibility 3	7	1	1			1		2
Possibility 4	3	2	2			1	0-250K	3
Possibility 5	4	2		1			0-250K	3
Possibility 6	5		1	1			50K	2
Possibility 7			1[1]				50K[2]	

[1]more smaller institutions as members
[2]regional--national networks

UNIVERSITY OF KANSAS MEDICAL CENTER

RAINBOW BOULEVARD AT 39TH STREET
KANSAS CITY, KANSAS 66103 • AREA CODE 913 • 236-5252

SCHOOL OF MEDICINE
OFFICE OF THE DEAN

August 31, 1971

Mr. John C. LeGates
EDUCOM
100 Charles River Plaza
Boston, Massachusetts 02114

Dear Mr. LeGates:

I have received your questionnaire about EIN, and find it almost impossible to respond to it in a meaningful way by filling in the form.

As you know, the institutional membership includes the main campus at Lawrence, and the University of Kansas Medical Center in Kansas City. I am resident at the Medical Center. The Technical Representative at the institution is the Director of the Computation Center on the Lawrence Campus. I am sure that he will answer in more detail from the viewpoint of that campus.

Apart from whatever information he may submit, I must really say that EIN has had no impact at all on this university. Expecially here at the Medical Center there has been no interest in what it provided, in spite of a fair amount of publicity. This result is expressed in the answers to question 14. "There was a pervasive lack of interest."

With that response, I believe that further answers to most of the other questions are really unimportant. This also makes it extremely difficult and really impossible to select from the various possibilities for future action. I really can not contribute to that.

You asked for frankness, and this is it.

Sincerely yours,

Russell C. Mills

Russell C. Mills, Ph.D.
Associate Dean

RCM:mo

D26

WESTERN MICHIGAN UNIVERSITY

THE GRADUATE COLLEGE

KALAMAZOO, MICHIGAN
49001

September 17, 1971

Mr. John C. LeGates
Executive Director of EIN
EDUCOM
100 Charles River Plaza
Boston, Massachusetts 02114

Dear Mr. LeGates:

I doubt that my questionnaire with its responses will be very revealing. Unfortunately, the participation of Western Michigan University in EIN was almost zero. I think there were several reasons.

1. Western Michigan University has been a member of EDUCOM for several years. I could say quite honestly that until Dr. Chauncey became President, it was almost impossible for me to ascertain what direction was being taken either by EDUCOM or EIN.

   I attended all the meetings, but found them to be nebulous and I had a great deal of difficulty ascertaining the reference of what was being discussed. Perhaps this is my fault, but this is the way I felt.

2. Although EDUCOM and EIN have major objectives with dealing with the dissemination of educational information, I seem to find that more time is spent on discussing computer methods rather than dealing with the fundamental problem of information dissemination. I wish the meetings dealt more with the kinds of information worthy of being disseminated and then let the technology discussion follow. However, this did not seem to be the direction in which EDUCOM or EIN was going.

3. It is true the Western Michigan University just graduated from a small computer to a DEC PDP-10 which has capabilities far beyond those we need at the moment. Without question, the past year and a half has been spent in orienting ourselves to the use of the computer and to establishing and using remote terminals. Thus, EIN and EDUCOM have taken second priority.

4. The services of EIN, as I originally conceived them, were concerned mainly with information exchange. However, it now seems that the emphasis is on taking advantage of computer facilities available elsewhere through a complicated administrative procedure. The latter we did not need since

we had, in addition to our small computer, access to the IBM 360, Model 67, at the University of Michigan, and the major Burroughs installation at the Upjohn Company in Kalamazoo. Complications involved with using EIN would be almost ridiculous.

I shall be attending the Columbus meeting with our Technical Representative, Mr. Jack Meager, who is also director of the Computer Department at Western Michigan University. Hopefully this meeting will enable us to bring back information more relevant than that we have received at previous meetings.

Very truly yours,

George G. Mallinson, Dean

GGM/jh

Enclosure

Questionnaire to Technical Representatives

Questionnaires were sent to eighty-one Technical Representatives. Forty-five representatives returned the questionnaire, six partially answering it (completing about 10% of the questions) and two declining all answers because they could not meaningfully respond. Two thirds of the responses were from institutions with a moderate-sized computing budget ($500,000 - $2,500,000), one fourth had a smaller budget, and one tenth had a larger one. As might be expected, the computing functions for the various user types were under one management in most institutions. Only in the largest cases were the research, academic and administrative computing functions managed separately in even half of the institutions.

The representatives were generally favorable in their opinion of the documentation standards used by EIN. Many of them recommended and publicized them, and at least eight institutions adopted them as an internal standard. These eight included institutions of all sizes.

The opinions expressed about the EIN Catalog were also generally favorable, though not as strongly as for the documentation standards. Some doubts were expressed about the comprehensiveness of the selection of entries. Few people reported that they were confused by the updating and correction procedures for the Catalog, though several of them complained about the volume of material. All of the institutions submitting programs to EIN who evaluated the resulting writeups, thought they were well-written. The two institutions that had negative comments did not submit the entries to EIN, apparently being deterred by the failure of their own documentation efforts.

Slightly less than half of the representatives report publicizing, recommending and using the Catalog, with favorable comments outnumbering unfavorable ones nearly three to one. However, use of the Catalog was on an occasional basis, and seemed largely restricted to the representative's own usage and to those people the representative directly referred to the Catalog. When asked to give numbers for the various aspects of usage (number of people selecting a program, number of programs acquired outside of the network) the great majority of responses were "zero." Only 10% of the representatives reported five or more people having asked to see the Catalog, for example. In general, only about 10% of the responses gave a non-zero level of activity for each of the usage aspects and most of these responses were near zero themselves. The estimates for usage outside of the customary channels were larger, though not greatly so.

The suggestions for increasing the usage of the network were generally of two kinds. One said that physical electronic connections between users and resources were needed (these were usually the larger members). Smaller members thought that the problems were too great and EIN should either disband or eliminate the network

side of the operation and maintain the Catalog only. The more common recommendation was to disband.

Over half of the representatives used word of mouth and display of the Catalog to publicize EIN; over one-third listed the Catalog as a resource and issued memos on EIN. Knowledge of EIN's existence appears to have been fairly widely spread, since several representatives reported over 50 people having knowledge of EIN at their locale. However, this knowledge appears to have been minimal since few people knew EIN well enough to have an opinion of it. Of thos who did, the opinions expressed were generally neutral, with as many regarding it as significant or useful as those regarding it as insignificant or useless. Surprisingly, the smaller institutions were slightly more favorable to EIN than the larger ones, though the difference was only barely noticeable.

Support from the EIN staff was acknowledged as generally available. The primary weak point was the information sent to new Technical Representatives. Several representatives questioned its clarity. Even more reported that they do not recognize having ever received it. However, most of them felt they had the continued support of the EIN staff. (Two people said they did not have this support; one because they were delayed in receiving their Catalog, one who did not explain further.)

The marketing aids of EIN were well regarded by those who had seen them. The sole exception to this was the film on EIN which received twice as many "Mediocre" responses as it did "Good" ones. More than half of the respondents had seen the press releases and EIN Data columns in the Bulletin; less than a third had seen the other aids, on the average.

The overall marketing effort of EIN was reported as inadequate by a ratio of 2 to 1. The marketing effort at the local campuses was described as less than adequate, though the responses were divided between those that felt they were only mediocre and those that felt they were more seriously inadequate. Only two people reported that the efforts were defintely of the wrong type; no one said they had been excellent.

Three institutions reported that they tried to use a program through the Network. Two of them said that usage was difficult and slow and they probably would not do it again. However, it should be noted that the EIN Office had not previously received notification of these efforts at usage. In neither case was a Job Run Form received, nor were there any complaints or inquiries prior to the questionnaire. Either the jobs were lost in transit or the users did not fully understand use of the Network. The one member who did properly notify EIN, reported no difficulties and was willing to use the Network again.

The Technical Representatives felt they were generally knowledgeable about EIN and its operating procedures. However, about 25% said

they did not know EIN well enough to use a program through the Network. Most of the representatives said they were too busy to actively make use of EIN capabilities, and just attend meetings and tried to follow the activities. The priority of EIN in their interests was either very low or moderate. Almost all representatives spend less than 5 hours per month on EIN, and most of these spent less than two hours. However, most of them felt that the present representational arrangement was the best EIN could hope for. They generally thought that a single representative at an institution was best (though multi-campus institutions wanted one per campus) and that either they or someone in their position was the best representative.

Besides the representatives' difficulties with scheduling time for EIN, several other common obstacles for EIN were identified. These included difficulties with spending money off-campus, the general lack of interest in EIN and the adequacy of local resources for most jobs. People did not use the Network for a variety of reasons, of which the inconvenience, fear of slow turnaround time and inability to interact with the resource were the most common. The prospective users generally used an in-house program, though they obtained the program from another source about half as often.

Members did not submit programs to EIN because they were too busy, didn't have any of interest (some said their programs had already been submitted by other institutions) and because they could not service requests for programs (often owing to organizational or equipment changes). About two-thirds of the respondents reported that they publicized the Catalog as much as seemed worthwhile. Those that didn't were evenly divided between being too busy, lacking a mechanism to do so, and lacking confidence in EIN.

The opinion of EIN was split on its overall satisfactoriness. It was generally regarded as having been competently handled, but was not worthwhile for the respondent. It was characterized as somewhat instructional, educational or interesting. The opinions of the smallest institutions were most critical of EIN, becoming less so as the size of the institutions' computing budget increased. The only question where this did not hold was on the worthwhileness of EIN for the respondent. All of the respondents generally agreed in their opinion on this, and that it had not been very worthwhile.

Most respondents thought EIN's approach should have been as it was, rather than along disciplinary or manufacturers' lines.

In comparing networks, SHARE, ERIC and the NSF regional networks were regarded as being more useful and better known than EIN. COSMIC was less useful but more well-known. Most of the rest (JUG, QCPE, ENTELEK, NERCOMP) were less useful but about as well-known, among those who knew them at all. Several networks were largely unknown (QCPE, ENTELEK, NERCOMP).

In general, EIN was felt to have been worth very little (though one member reported a $4,000 saving in documentation standards development), but also to have cost very little. The great majority of respondents felt that the ending of EIN would be a nonnegligible loss. The documentation standard was identified as the most valuable aspect of EIN in the greatest number of responses, with the Catalog as a close second. About half as many people identified General Communication among Members. Only one person specified Use of the Network and Support from EIN Staff and TR's.

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EDUCOM

Letter to Technical Representatives

45 Returned of 81 Sent
6 Partially Answered (~10% of questions)
2 Not Answered

EIN, the Educational Information Network, is approaching a major turning point in its history. The precipitating event is the termination of our grants from USOE and NSF.

As a Technical Representative you are a member of the community which has been most actively concerned with EIN. We would like to ask you to complete and return the enclosed questionnaire. If you have not been active with the Network for very long, we would appreciate your conferring with the previous Technical Representative or other active personnel in order to complete it. Our goals are as follows:

First, we would like to prepare a final report which will be as thorough and as objective as possible. EIN has been a valuable experience, and has demonstrated that certain things will work, and others will not. We would like to document the knowledge which EIN has generated, and make it available to interested parties, both as academic fact, and as information valuable to future resource sharing efforts.

Second, we would like to determine the most useful course of action for the Network itself. The basic choices are to continue it as it is, to alter it, or to terminate. At the least, there must be a change in the mode of funding. Other changes will be seriously considered after your responses and those of your colleagues have been studied.

Like all questionnaires, this one may not address itself to your particular situation. If not, feel free to alter or add to it. Free form or essay answers will be particularly appreciated. Our basic objectives are to find out what happened, why, and what we should do next. Feel free to let us know in any way you want.

Finally, please feel free to be critical. The goal is to acquire knowledge, and a little constructive criticism never hurt anyone.

We realize that this will take time, and that you haven't much to spare. However, the information you supply will be very valuable and without your responses the survey will be incomplete. The results of this survey will be made available to you.

Many thanks,

John C. LeGates
Executive Director of EIN

JCL:lw

Enclosure

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EDUCOM

In General

Please feel free to check all the options which apply in each question. They are not normally intended to exclude one another. Please do not hesitate to give additional comments on the back of each page where you wish to amplify on an answer or feel that the questions do not apply. In some questions you are given a choice between answering in general terms, such as "frequently" and "occasionally" or answering in numbers. You may take either or both choices.

NAME _____

INSTITUTION _____

TITLE OR POSITION _____

I. IDENTIFICATION

1. Estimate annual computing budget of your institution.

4[1]	$100,000 to $250,000	6	$250,000 to $500,000
12[2]	$500,000 to $1,000,000	17[3]	$1,000,000 to $2,500,000
4	$2,500,000 to $5,000,000	_____	over $5,000,000

[1]--1 partial [2]--1 partial [3]--4 partial

2. Are the research, academic and administrative computing functions at your institution under the same management? 27 Yes 16 No

3. What percentage of the computing resources at your institution are devoted to each of the following categories?

_____ administrative _____ instructional

_____ research _____ student _____ commercial

4. In the immediate future, which of these areas will be the priority area in your institution?

_____ administrative _____ instructional

_____ research _____ student _____ commercial

5. At your institution, approximately how many?

_____ equivalent full time faculty	_____ equivalent full time students
_____ computer related staff and faculty	_____ students enrolled in courses making direct use of computers

Information on Questions 3-6 could not be meaningfully and concisely compiled.

6. Approximately how much computing (in dollars) is

	sold	secured from commercial sources
instructional?		
research?		
administrative?		

II. EIN OPERATIONS

A. The Documentation Standards Handbook

1. We found the documentation standards

poor			5	16	13	good
unclear			4	15	14	clear
not comprehensive		4	9	11	7	comprehensive

2. We have

8 adopted them for internal use
14 recommended them
10 publicized them
10 received favorable comments
1 received unfavorable comments

B. EIN Software Catalog

1. How do you view the format of the Catalog (loose-leaf, divided into Facilities, Abstracts, Entries, and Index Sections)?

unhelpful	1	1	3	13	15	helpful
unclear			6	14	12	clear

2. How do your users view the Catalog format?

unhelpful	1		5	6	5	helpful
unclear	1	1	7	5	3	clear

3. Were the updating and correction procedures for the Catalog confusing to you or your staff? 4 Yes 31 No

4. Do you feel your Catalog has been kept up to date?

29 Yes
7 Yes, but it was difficult
2 No

5. How often do you refer to the Catalog? (Estimate numbers if you wish.)

_____ Frequently 31 Occasionally < 1/month--4
_____ Regularly 3 Never _____ (Numbers) > 1/month--3

6. How many times have other persons been referred to the Catalog?

_____ Frequently 27 Occasionally < 1/month--6
_____ Regularly 3 Never _____ (Numbers) > 1/month--2

7. How many people use the Catalog other than those you specifically refer?

_____ Many 25 Few _____ (Numbers) < 1/month--8
> 1/month--1

8. Please check all the boxes which apply for the EIN Catalog.

the documentation is	Poor			5	15	11	Good
others feel the documentation is	Poor		1	3	8	6	Good
the selection of entries is	Poor	1	6	8	10	3	Good
others feel the selection of entries is	Poor		6	1	7	2	Good

9. We have

16 used the Catalog.
17 recommended the Catalog.
20 publicized the Catalog.
8 received favorable comments.
3 received unfavorable comments.

C. Usage

1. How many persons have asked to use the Catalog?

_____ Many 24 Few

No. of People	0	1-4	5-10
Responses	9	3	5

2. How many persons have selected a program from the Catalog?

_____ Many 14 Few

No. of People	0	1-4	5-10
Responses	22	6	0

3. How many persons have requested that a program be brought to your site for use?

__ __ Many 12 Few

No. of People	0	1-4	5-10
Responses	23	5	1

4. Of these, how many of these have you tried to acquire?

____ Many 6 Few

No. of People	0	1-4	5-10
Responses	22	6	0

5. How many did you acquire?

_____ Many 3 Few No. of People 0 1-4 5-10
Responses 25 5 0

6. How many persons have wanted to use a program at the site which listed it in the Catalog?

_____ Many 7 Few No. of People 0 1-4 5-10
Responses 24 4 1

7. How many persons have used a program through the Network?

_____ Many 3 Few No. of People 0 1-4 5-10
Responses 30 3 0

8. Estimate, if you can, the number of people who have used EIN information but did not go through the customary channels by contacting their technical representative who in turn contacted another technical representative?

_____ Many 4 Few No. of People 0 1-4 5-10 10+
10 2 1 1

9. Have you submitted programs to the Catalog? 9 Yes 16 No

If not, why not?

10. If you submitted entries, how do you view the resulting writeups?

7 Well-written 1* Poor
1* Fair _____ Sorry I sent it

*Did not submit entries to EIN.

11. Did you feel that the EIN Staff was

unhelpful		1			5			10		helpful
incompetent					5			8		competent
uncooperative		1			5			9		cooperative

12. Explain briefly why you feel there was not more usage of the Network in the manner in which it was intended.

13. What do you think needs to be done to get more usage from EIN?

Page 4, Question 9: Have you submitted programs to the Catalog? If not, why not?

Budget: $2,500,000 to $5,000,000

*Our installation is only 6 months. We have a CDC-6400 and have got a large number of programs through VIM and directly from other universities.

*1. Initially, we were facing an impending change in our operating system which would have obsoleted our submission. 2. Since the change, we have intended to make submissions, but have become too involved in internal documentation problems due to the change.

Budget: $1,000,000 to $2,500,000

*My institution does not have computer time to sell and we rarely generate complete programs and documentation to a point of use to others.

*Never quite got around to it; we interact quite strongly with SHARE and GUIDE.

*The programs we would have submitted (stat. programs) were already submitted by Northwestern University.

*None completely documented.

*Overlapped by equivalent or better offerings from other similar sites.

*Saturated facilities.

*Since our computing is free, we have little motive.

Budget: $500,000 to $1,000,000

*We didn't seem to have any that would be worthwhile submissions.

*We did not participate much in EIN.

*We are in the process of converting to a new and different (for us) computer system. Maybe later!

*University decision to not use EIN (and, in fact, to withdraw from EDUCOM).

*Since we had not established a habit of using EIN programs, the time involved in determining ways to submit programs was just not spent, nor even considered.

*Nothing to be proud of, leary of taking on new responsibility.

*Not very sophisticated here, yet.

Budget: $250,000 to $500,000

*We have been changing from one machine to another and are just now in shape to submit!

*Unfortunately, we had other priorities at the time.

*The list of programs is almost exclusively for large computers and ours is medium size.

Budget: $100,000 to $250,000

*Resource poor institution -- when we did have a program to offer, the system in use was changed before it was documented.

*We have just become a member of EDUCOM--haven't prepared our documentation yet.

Budget: $500,000 to $1,000,000

*Original idea--there is no real desire to send data to someone else to use.

*Preference for on campus facilities.

*Parochial users.

*Access method too slow.

*We tend to have an in-house group of programs that meets the needs of our users, and the amount of energy needed to seek outside help of the type offered by EIN seemed too costly from time and economic standpoints.

*University decision to not use EIN (and, in fact, to withdraw from EDUCOM).

*Fund availability; people time to publicize and aid prospective users.

*Difficult programs required revision and it was easier to write them from scratch. Easy programs were written cheaper than they could be bought.

*1. Intra and inter lack of communications; advertising by key people. 2. No interest in commonplace routines; nothing spectacular. 3. Inertia--a common failing among academics.

*In our case, users expect remote access, which was rarely offered; secondly, most of our users are accustomed to writing (or having a student write) any specific program not already available to them in the library.

*We do not have many aggressive users who will search for the programs they need. Also there are many good sub-programs in SPS, BMD, etc. Also most of our users do not have funds and the University itself is financially pinched.

Budget: $250,000 to $500,000

*We would of like to have a) more administrative programs included in the Catalog b) more programs for smaller campuses.

*I believe computer centers are pre-occupied with day to day operation.

*No center had uncommitted funds it could divert to outside facilities.

*People do not like to use programs on a mail order basis.

Budget: $100,000 to $250,000

*We have been in EDUCOM less than 6 months.

*The people who needed the resources the most were just those who could not put up front money to cover transactions, and who also did not have programs to offer though they did have time to offer.

Page 4, Question 12: Explain briefly why you feel there was not more usage of the Network in the manner in which it was intended.

Budget: $2,500,000 to $5,000,000

*In our case, the need for such services should come within the next year. We feel the delay between the time you submit a job and the time you get the results is prohibitive.

*This University has a good batch of computer programs which can handle most user needs; where this has not been the case, research has probably been modified to fit existing programs. Local computer work is subsidized.

*Individuals reluctant to send data away, but are not prepared to wait for arrival of program to own institution. The financial aspects create untold problems. These problems must be solved if the network is to survive.

Budget: $1,000,000 to $2,500,000

*Free computing here.

*Users wish to use computer at own site so that they can adapt it to their specific needs.

*Remoteness, time delay & inertia of "on-campus" activity and funding.

*Dollars.

*Usual program catalog symptomology. Easier to believe that "in-house" developments are or would be superior: i.e., faulty movtivation.

*--unappropriate programs available
--too much trouble in sense of turnaround, mail, etc.
--researchers do not want to lose control of their data.

*Attempts were made to use programs on site. User left our campus before output sent back (6 months).

*Too slow and cumbersome--credits/money problems

*Communication handicaps in dealing with mail and long distances to solve special problems is discouraging to experimentalists.

*Lack of inertia! 1. People at large institutions with large computers will generally want to do their computing locally where they have better control and easier communication. 2. People at small institutions which, I feel, EIN was designed to serve and not members.

*Too clumsy, awkward; we already hold much of the know-how here in our own packages.

*Responsibilities for budget for computer services are not vested with the users in a "hard-dollar" sense.

*1. The programs are a loose agglomeration, not an original set
2. Turnaround time and prospect of mailing decks discourages use of system.

Page 4, Question 13: What do you think needs to be done to get more usage from EIN?

Budget: $2,500,000 to $5,000,000

*1. solve the financial problems. 2. More publicity.

*Eliminate standard programs which everyone has and build a collection of programs which could be viewed as odd-ball. The user who sees a constant need for a program needs to have that program on site.

*Make use of on-line systems (TELECOM).

Budget: $1,000,000 to $2,500,000

*Computer use economics must become a more important and rational issue. The evangelical--romance era is still with us----the users have delusions of "Free Computer Time" and the centers foster their own growth and perpetuation.

*Get off the "by mail" execution mode; let "our computer" communicate (TP) to another computer at absolute rock-bottom total cost.

*It may help to emphasize the distribution of the programs rather than use at the home site. Obviously, not all entries will be distributed.

*I think it is dead in the present form. Perhaps these resources made available thru the ARPA style network would become useful if there was adequate voice communications available in parallel with the data comm. link.

*Verify that installation submitting program does in fact have the procedures for quickly and easily handling submitted jobs! Also that programs can be used as advertised.

*Operate it in a network that offers access to computers.

*Is network functioning well? If not, abandon. Continue catalog if it seems supportable; it is a very good effort of its sort.

*Reduce dollars.

*Viable network activities must realize dividends not individually obtainable, i.e. literature retrieval service, census summary tape processing center, proprietary software.

Budget: $500,000 to $1,000,000

*I don't know.

*Sharp increase in remote access facilities which, taken as a whole, provide a broad range of languages & services, e.g., extensive string handling and text editing programs, means for relatively simple formating of output; clear, simple diagnosties for novice users; less statistical-research emphasis (most everyone has this stuff up to a point) and perhaps more stuff useful instruction in a specific area (adjunctive user in education).

*Intensive studies of user behaviors, followed by analysis, and then followed by prototype networks, utilizing results of behavioral studies.

*Nothing here, we have dropped our membership.

*We need to do some hand-holding! But no time, funds!

*Change self-sufficient concept of our research computing center.

*Those on our staff who advise users need to be more familiar with EIN possibilities.

*Concentrate primarily on on-line usage and access. Encourage telephone consultation rather than written inquiries (operational programs only, not for catalog development).

*No hope. Typewriter entry and HASP/HASP appear to be the way of the future.

*Treat it more like a business.

Budget: $250,000 to $500,000

*Nothing can be done to make it work! Theoretically its a good idea, but practically speaking it will not work.

*I don't view the idea as very practical due to communication costs, and lack of funds which can be diverted outside. Our one attempt resulted in considerable time spent just trying to determine the line speed and signon procedure. Link never used.

*Concentrate on large central computer sites and try to set models for centralized computing.

Budget: $100,000 to $250,000

*1. Allow institutions to offer time to pay for network expenses, without having to list a program in the catalog. 2. Allow resource transactions through EIN TR, where the "vendor" TR would then pay the network. 3. Commercial teletype usage by system--with a S/R set in H.Q. would speed things up.

*We need more publicity; more coordinating effort on our part.

D. Support

1. What techniques have you used to make EIN better known at your institution?

24 Word of mouth

26 Display of the Catalog and Documentation Standards Handbook

18 Memos

3 EIN Film

16 List the Catalog among your resource

11 Articles or Press Release

7 Direct reference

5 Special meetings about EIN

2. How many people do you estimate have heard of EIN at your institution?

5 Many 20 Few

No. of People	1-10	11-50	50+
Responses	4	4	5

3. How many people know it well enough to have an opinion of it?

____ Many 27 Few

No. of People	0	1-10	11-50
Responses	3	8	1

4. Of these, what percentage regard it as

4 significant or useful 20, 10, 10, 5

9 neutral 50, 80, 20, 5, 50, 50, 20

1 insignificant or useless 10, 70, 90, 50, 50, 80, 30

5. Do you feel you are kept up to date on EIN activities?

18 Yes 2 No

6. How do you view the information sent to new TR's?

14 Helpful & Self-explanatory

2 Obscure

4 A good supplement but had to know the basic facts already

9 Didn't receive

7. Do you feel you have the ongoing support of the EIN staff?

19 Yes

5 Yes, when I ask

2 No

8. Has EIN supported you in your efforts to submit and document programs?

15 Yes ____ No

____ Not always 21 Not applicable

9. Has EIN supported you in your efforts to use and to obtain information about programs?

5 Yes ____ No

1 Not always 24 Not applicable

10. What do you think of EIN's publicity aids?

	Good	Mediocre	Bad	Have not seen
Film	3	7	___	22
Press Release (supplements)	21 1	3	1	6
EIN Data Column in Bulletin	18 1	6	___	6
Conference presentations	12 1	3	1	14
Visits by EIN staff	7	1	___	22
Memoranda	9	4	___	12
Telephone calls	4	2	___	21

11. Do you feel the marketing efforts of EIN as a whole, including your efforts, were adequate? 11 Yes 22 No

If not, please explain.

12. Do you feel that the EIN marketing efforts at your campus were

6 of the right type but too little?

2 of the wrong type?

6 wholly inadequate?

8 mediocre?

8 adequate?

____ excellent?

13. If you used a program, did you find the service

____ efficient? 1-no easy to do?

____ prompt? 1 would do it again?

____ accurate? 1 would not do it again?

These responses were from the two members that said they tried to use the network but failed. The EIN Office did not receive the forms nor any previous complaints on these jobs.

Page 6, Question 11: Do you feel the marketing efforts as a whole, including your efforts, were adequate? If not, please explain.

Budget: $2,500,000 to $5,000,000

*Documentation and organization of computer programs locally was not far enough advanced to allow for a move into a national system.

Budget: $1,000,000 to $2,500,000

*No visible payoff.

*A more evangelizing spirit would have helped a bit.

*We did not do enough; but we have at the same time only for the first time been organizing our own program library.

*Yes, but the time wasn't right.

*Our efforts have not been sufficient. Plans have been made to upgrade effort.

*Local push was minimal.

*Our own efforts could be improved.

*I personally did not do that much to encourage EIN use in our environment.

Budget: $500,000 to $1,000,000

*EIN suffers from being an academic based organization and has that view of the world.

*A tremendous marketing effort would be needed.

*EIN viewed as an unwelcome competitor.

*My efforts were minimal due to the relative priority of EIN in my list of responsibilities.

*They just don't have the stuff to market for us.

*I was usually disappointed with the thrust and accessibility of most programs in the Catalog, so never could pay claim to a program, persistent effort on my part to promote them.

*It's a tough problem, most of the marketing must be done locally and we just don't have the staff or the mechanism to get the word out.

Budget: $250,000 to $500,000

*I don't think the present structure is a priority yet.

*I think the marketing effort was inadequate but an increasing effort would not have helped.

*The primary marketer of EIN is the Technical Representative. As TR, I was supplied with plenty of advertising but no product--i.e., no Catalog.

Budget: $100,000 to $500,000

*Since answer 9 of page 4 indicates we could not make use of the resource. There was no point in marketing it.

*Because of the lack of funds.

E. The Technical Representatives

1. Do you feel you know EIN well enough to inform interested persons of its general operational procedures? 29 Yes 7 No

2. Do you feel you know EIN well enough to use a program through the Network? 26 Yes 10 No

3. How would you describe your relationship to EIN as TR?

1	Active user	14	Follow activities with interest
16	Attend meetings		
11	Too busy	15	Follow activities

4. Do you feel you have time to keep up with EIN activities? 19 Yes 14 No

5. What priority do EIN activities have in your interests?

low |16|6 |9 |2 |3 | high

6. Do you feel that the functions of technical representative could be performed more effectively by someone in a different organizational position than your own? 12 Yes 23 No
If so, please explain.

7. Do you feel that having a single representative at your institution is the best way for EIN to function? 23 Yes 8 No

8. If not, please explain.

Yes--12, No--3

9. If so, would it be you?

10. If not, please explain.

11. Please estimate the number of hours per month that you gave to EIN. _____

Hours	0	1-2	3-5	6-10	10+
Responses	1	17	9	3	1

Page 7, Question 6: Do you feel that the functions of technical representative could be performed more effectively by someone in a different organizational position than your own? If so, please explain.

Budget: $1,000,000 to $2,500,000

*I am no longer connected with the computer service which stands to gain the most from EIN activities.

*If we had a heavy EIN user.

*In practice, the program librarian at the Computer Center handled EIN inquiries. She filled in much of this questionnaire.

*Perhaps the program librarian.

*If this computer center's director viewed EIN as a resource rather than a competitor, he might be helpful.

*Program Librarian.

Budget: $500,000 to $1,000,000

*Perhaps but not necessarily.

*It may be that, given the current contents of the Catalog, a Faculty Applications consultant would do better than someone primarily interested in education, like myself. No so much an organizational problem as one of philosophy.

*I'm the 4th or 5th that has tried, don't see how making it a half dozen would help.

*Organizational position has not been a problem only people and time.

*Someone with support of local computing center.

*My administrative duties are too pressing to allow me to spend adequate time. Recent reductions in staff make improvement here unlikely.

Budget: $100,000 to $250,000

*I have too many other responsibilities but our staff is too small to allow for a full-time person to cover this job.

Page 7, Question 8: Do you feel that having a single representative at your institution is the best way for EIN to function? If not, please explain.

Budget: $2,500,000 to $5,000,000

*The University of Quebec has 5 campuses. A TR for each campus could be preferable.

Budget: $1,000,000 to $2,500,000

*Too much dependence on one persons interests.

*We have not tried more than one. I would like to involve our somewhat new associate for campus computing activities more deeply.

Budget: $500,000 to $1,000,000

*One representative with departmental liaisons. A single source of basic info though should not be eliminated.

*It obviously hasn't benefited EIN enough. More representation involving computer users might help.

Budget: $250,000 to $500,000

*I don't feel technically competent in the areas to which this question applies.

Budget: $100,000 to $250,000

*Too much for one person part-time.

Page 7, Question 9: If you feel that having a single representative at your institution is the best way for EIN to function, would it be you?

Budget: $1,000,000 to $2,500,000

*Probably.

*If the computer center director viewed EIN as a resource rather than a competitor, he might be helpful.

*Yes, but has to be delegated to a subordinate.

*Yes, or someone on my staff.

*Should be more than myself.

Budget: $500,000 to $1,000,000

*Not necessarily.

*Yes, As things settle down this year I plan to make better use of EIN resources.

*Yes, because inspite of my philosophy, I'm probably more interested in doing it than anyone else.

Budget: $250,000 to $500,000

*At present.

Budget: $100,000 to $250,000

*Probably, or someone else in the center.

Page 7, Question 10: If you do not feel that having a single representative at your institution is the best way for EIN to function, please explain.

*If the computer center director viewed EIN as a resource rather than a competitor, he might be helpful.

*Person directly responsible for user services.

*Perhaps S/B Manager of software systems.

12. Please estimate the total man-hours per month concerned with EIN at your institution.

1 Many 18 Few

Hours	0	1-2	3-5	6-10	10+
Responses	3	4	5	4	3

F. Problems

Regardless of what EIN may have done for you, there is doubtless something which it did not do for you. For example, if you used a program successfully, there is a reason you did not use more. The purpose of this section is to find out the reasons why various things did not occur.

1. Blanket Problems

6 my institution was undergoing a change in administrative policy or personnel and could not deal adequately with EIN

my institution cannot conveniently spend money
20 off campus
6 out of state

20 there was a pervasive lack of interest

3 EIN conflicted with another interest group

5 The EIN concept was too different to catch on

23 We already have an in-house library which meets our needs

Please explain in your own words.

2. We submitted all the programs to the Catalog which seemed reasonable to submit. 7 Yes 17 No

3. We did not submit more (or any) programs because

10 there weren't any of interest

the procedure for submitting programs was
2 too inconvenient
5 too time consuming
too expensive

11 we are not equipped to service requests for programs we list

13 we were too busy

3 we lacked confidence in EIN

Please explain in your own words.

Page 8, Question 1: Blanket Problems with EIN

Budget: $2,500,000 to $5,000,000

*Users usually expect immediate turnaround. Complete in-house capability is necessary for adequate service.

Budget: $1,000,000 to $2,500,000

*We meet local needs with our own small library plus we use some IBM Type III programs.

*Our own internal organization is developing haltingly under the burden of depressed financing.

*Most of our users are primarily interested in obtaining programs that they can use here.

*EIN did not offer programs which were needed by in-house users.

Budget: $500,000 to $1,000,000

*As I indicated earlier the major problem was allotment of time.

*There's a little "NIH" in all of us.

Budget: $250,000 to $500,000

*No catalog, ergo no involvement.

Budget: $100,000 to $250,000

*Equipment changes meant we could not contribute. Computer Centre in re-organizational throes for 2 years - became very inward-looking.

Page 3, Question 3: We did not submit more (or any) programs because...

Budget: $2,500,000 to $5,000,000

*We submitted those programs which were felt to be of greatest interest to members of EIN.

*Efforts to standardize programs and documentation were begun but, as yet, have not advanced far enough to allow submission.

Budget: $1,000,000 to $2,500,000

*Internal documentation efforts were underway during this time.

*Refused to list program without adequate documentation.

*No recognition to authors/contributors.

*We are kept quite busy communicating info to/from SHARE, GUIDE, and "our buddies at other schools".

*I do not feel that EIN meets the needs of users:
(1) Turnaround time
(2) Mailing decks
(3) EIN rep has duties for which he is accountable. EIN is not one of these; therefore little time or interest in EIN.

*It looks as though anything we could submit is available elsewhere.

Budget: $250,000 to $500,000

*When we received no requests, we didn't care to continue effort in that direction.

*We did not know what programs were already available.

Budget: $100,000 to $250,000

*Same as Blanket Problems. The one difficulty of my position in the organization structure was I could not force people to contribute.

4. We publicized and exposed the Catalog as much as seemed worthwhile? 24 Yes 10 No

5. We did not publicize and expose the Catalog because

3 there is no convenient mechanism to do so

5 too busy

3 lack of confidence in EIN

Please explain in your own words.

6. We had no users who were interested in a program in the Catalog?

10 Yes 16 No

7. We had prospective users who did not use the Network because

7 basic distrust of using computers at remote locations

9 inconvenience of preparing input

4 distrust of U.S. mail

11 fear of slow turnaround

6 too expensive

12 can't fiddle with program or computer at that kind of distance

1 inadequate or poor documentation

____ inadequate support

6 we had a better one in house

Please explain in your own words.

8. Did the prospective user (give numbers)

1 drop the job

4 write his own program

13 use another program in house

7 get a program from another source

1 use another network

Please explain in your own words.

Page 9, Question 5: We did not publicize and expose the Catalog because...

Budget: $2,500,000 to $5,000,000

*UMST program were not added to the catalog until early summer. This fall was to have been a kick-off time for pushing the catalog.

Budget: $1,000,000 to $2,500,000

*We never believed in the notion of EIN.

*My institution cannot conveniently spend money off campus.

*I do not feel that EIN meets the needs of users and therefore was not inclined to publicize the service.

Budget: $500,000 to $1,000,000

*Very low return of interest on publicity that I did offer.

*Low level of anticipated usage. Parochial interests.

Budget: $100,000 to $250,000

*We could not use the network because of equipment changes.

Page 9, Question 7: We had prospective users who did not use the Network because...

Budget: $2,500,000 to $5,000,000

*Too inconvenient to ship data to remote location.

Budget: $1,000,000 to $2,500,000

*Usual NIH symptomology - not in-house.

*To use the Network would require a major effort to overcome campus problems.

*In general, there are few facilities people need badly enough to pay $ and go through all the fuss of using EIN that we can't provide here or at a nearby school on some informal arrangement.

*Most of our users want instant results and fear of other people handling their data.

*Make-shift available on campus.

Budget: $500,000 to $1,000,000

*Very few looked at the Catalog.

*Research Computing Center policy.

*We have the Biomed Series.

Budget: $100,000 to $250,000

*We could not use the Network because of equipment changes.

Page 9, Question 8: Why did the prospective user decide not to use a Catalog program?

Budget : $500,000 to $1,000,000

*I don't know, but I suspect those who did not acquire the program wrote their own version or had a student do it for them.

*I did not inquire about their reasons for not going beyond looking.

G. General

1. Did you find that EIN has been overall

unsatisfactory	7	5	8	5	1	satisfactory
incompetently handled		3	4	13	7	competently handled
not worthwhile for me	11	5	7	5	2	worthwhile for me
none of these	1	3	3	9	5	instructional, educational or interesting

2. Did you feel that the basic approach of EIN should have been

5 along disciplinary lines

2 along manufacturers lines

18 as it was

3. As resource sharing efforts go, do you feel that EIN is

obscure	9	12	7	5	1	well known

4. In a very rough manner, we would like to compare EIN with some other resource sharing activity with which you may be familiar. Please check all the boxes that are appropriate.

	More Useful Than EIN	About The Same	Less Useful Than EIN	Better Known Than EIN
SHARE	20 1	1 3	1	20
COSMIC	6	6	7	10
JUG	2	2	5	2
QCPE	1	1	3	
ENTELEK	1	1	5	4
NERCOMP	2	1	4	2
NSF Regional Networks	8	2	3	7
ERIC	6	1	2	7
IQN			3	

	Comparably Known	Less Known Than EIN	Can't Judge	Never Heard Of It
SHARE	6	1	1	
COSMIC	5	3	5	3
JUG	6	3	9	5
QCPE	1	3	6	19
ENTELEK	5	1	5	14
NERCOMP	2	1	8	15
NSF Regional Networks	7	1	9	2
ERIC	6	1	6	10
IQN		2	5	21

5. The numbers given here will be taken as a very rough estimate of the real value. It will not be used in any accounting procedures. Please try to include such things as money saved by not having to rewrite a program, etc.

EIN has been worth

1 a great deal 26 very little

per year to my institution.

7——$0
2——$1—$500
1——$4000+

EIN has cost

2 a great deal 25 very little

per year to my institution.

4——$0
5——$1—$500
2——$1500—$2000

6. If EIN should end, how great a loss would this be to your efforts?

___ Significant
30 Negligible
6 Nonnegligible
___ Would be constructive

7. What have you found to be the most valuable aspect of EIN?

17 Documentation Standards
1 Support from EIN Staff and TR's
14 EIN Catalog
1 Use of Network
8 General communications among members.

Please explain in your own words.

Page 11, Question 7: What have you found to be the most valuable aspect of EIN?

Budget: $1,000,000 to $2,500,000

*Documentation Standards were used in a wide spread documentation effort.

Budget: $500,000 to $1,000,000

*Acquaintance with problems of and approaches to resource sharing.

Budget: $250,000 to $500,000

*SIGUCC probably more helpful and worthwhile.

*The EIN Conference on Computer Networks.

III. THE FUTURE

EIN can change its form at any time. The purpose of this section is to obtain your reaction to several of the possibilities. Please answer for all the various alternatives. It is not our intention to present these as competing with one another.

Possibility 1

EIN can continue more or less as it is.

Possibility 2

EIN can continue more or less as it is but there would be an annual charge to the members for the Catalog.

Possibility 3

Catalog of Resources. EIN would publish a much expanded Catalog whose effort is to list all noteworthy educational computer resourc s and the conditions under which members could get them. EIN w uld in no way help in the transfer of these items or guarantee their performance.

Possibility 4

Program Exchange à la SHARE. EIN would collect programs from various sources and make them available to our members. The performance of these programs would be guaranteed. There would be a charge for the Catalog and an additional charge per program.

Possibility 5

Program Exchange: another model. EIN would purchase programs from the member institutions or would serve as a broker allowing the institutions to sell programs directly to one another. The institution which sold a program would then support it on a consulting basis for a fee if desired.

Possibility 6

Direct Electronic Connection. EIN would establish direct electronic connection among its members. Each user could then purchase programs or computer time at a remote location going to the site which offered the most desirable or cheapest service. Resources on the net would be able to sell capacity to the members.

Possibility 7

Your option. Tell us what you would like.

Page 12, Question 7: What would you like to see in the future of EIN?

Budget: $1,000,000 to $2,500,000

*I like the Catalog.

*The concept is not compatible with the computing budgetary environment of this institution.

*A very large number of programs have been written at educational institutions. The permanence of these programs, their reliability and quality of documentation varies over a complete spectrum. Possibility 4 (or something comparable) should be used for programs that are well documented and easily transportable. Beyond that EIN could serve as a communications mechanism for the other programs. Many people would permit their work to be publicized if they knew that it didn't obligate them to too many responsibilities. The level of transportability should be quantified along with all other information that would help a potential user communicate with a possible source of help. The key of this catalog would be to get a large volume of entries succinctly and conveniently indexed.

The main sources to be tapped are not the Computation Centers, but are the applications areas of the campus.

*Lay it to rest--resurrect as is in a few more years when money and technology are right.

*EIN = Clearinghouse. Member institutions contribute, maintain, upgrade contributed programs. In return for significant contribution, institution has free/cost access to all EIN programs. EIN functions: (1) Maintain cross-classified current catalog. (2) Develop quality criteria, subject all incoming programs to quality evaluation and publish results in catalog. (3) Each member institution to send EIN correction/upgrade information, which EIN then distributes to all institutions who have previously received that program from EIN.

The fundamental problem with EIN as it now stands is that the member institutions have little to gain from contributing programs to EIN except the status/publicity associated with such contributions. The catalog is therefore lacking in many application areas.

An equally serious problem is that the existing mechanism for using EIN programs is so cumbersome and tedious that most users will not try to use it.

*Possibility 6 + Catalog of Resources as in Possibility 3.

Budget: $100,000 to $250,000

*As I have intimated,a combination of Possibilities 3 & 5 tied together by request telecommunications. There need be but 1 catalog, at EIN Headquarters, which would be queried by Telex and then request handled by TR's with payment made by vendor.

1. Possibility 1 Bad Idea | 9 | 11 | 7 | 3 | 2 | Good Idea
   Possibility 2 Bad Idea | 12 | 7 | 2 | 8 | 2 | Good Idea
   Possibility 3 Bad Idea | 7 | 4 | 2 | 10 | 9 | Good Idea
   Possibility 4 Bad Idea | 7 | 4 | 6 | 11 | 4 | Good Idea
   Possibility 5 Bad Idea | 11 | 6 | 2 | 7 | 6 | Good Idea
   Possibility 6 Bad Idea | 8 | 5 | 7 | 9 | 3 | Good Idea
   Possibility 7 Bad Idea | | | | 1[1] | 1 | 2[2] | Good Idea

   [1]Program Catalog, [2]Comb. of 3&4 and Poss. 4

2. We understand that these numbers may be difficult to supply. Your response will be taken as a rough estimate and will not be used for accounting purposes.

Value of This Service to My Institution Would be

	0 to $500	$500 to $1K	$1K to $10K	$10K to $100K	more exactly	can't quantify
Possibility 1	13	6				4
Possibility 2	12	6				3
Possibility 3	8	8	5		750	2
Possibiltiy 4	8	7	2			4
Possibility 5	11	3	4		1000	3
Possibility 6	8	2	4	3		7
Possibility 7	1[1]	1[2]			1-2K[3]	1[4]

[1]Concept not compatible, [2]Program Catalog, [3]Comb. 3&4, [4]Poss. 6&3

3. My Institution Would Pay ? to Obtain This Service

	0	$250	$500	$1K	$2K	$5K	more exactly	can't quantify
Possibility 1	8	5	2					8
Possibility 2	9	4	1	1				7
Possibility 3	7	5	3	1			500-1000	6
Possibility 4	5	5	3	1				8
Possibility 5	10	3	1	1			2-5K	6
Possibility 6	7	1	2	1	2	1		9
Possibility 7	1						1-2K	3

4. What do you think should be done with EIN?

D66

Page 13, Question 4: What do you think should be done with EIN?

Budget: $2,500,000 to $5,000,000

*It should be made an extension of the educational community in that it would be supported by the universities and colleges for the purpose of providing documentation and communication relative to computer resources existing within the educational community. In addition, EIN would assist in implementing means of accessing the actual computer facilities for service, not on a pay-as-you-go basis but on a free exchange basis within a percentage of available facilities.

For example, each college and university would contribute a dollar amount based on some agreed on criterion. This would support the administrative and direct operating costs of EIN. From these funds EIN would support the documentation and distribution efforts, etc. of the Network. At the same time each college and university would agree to support EIN through the contribution of a fixed percent of its computer resources, to be used by other members of the Network. In this way, it would be possible to utilize the Network without entering into any financial transactions.

I'm sure this idea can be polished and promulgated much more effectively than I have described it above. However, I am completely convinced that the success of EIN lies in the "free" exchange of computer programs and resources within the Network.

Budget: $1,000,000 to $2,500,000

*I suppose that your responses to this questionaire will stratify into "opinion" groups arranged by size of Center and the level of experience at the campus. So, I feel that my biased view is somewhat representative of medium sized universities of the 360/50 - 65 - 75 level. Some of our needs could very well be satisfied by an EDUCOM type organization such as:

Consulting Assistance

a. For internal computer affairs, i.e. organized major hardware and software decisions.
b. For problem solving.

As for "a.", I could visualize a central point of contact such as you, who would have available to him a group of experienced professionals on-call to fulfill specific consulting assignments.

As for "b.", instead of distributing a very expensive loose-leaf publication to describe the where, how, etc. for obtaining computer processing of a problem, I suggest that you distribute a "condensed" listing of program titles (very inexpensive) as a shopping list to participating institutions but orient the service via telephone. In other words, if I have a faculty member with a special problem, I'd like to call you, describe it and have you or a member of the staff research the library and recommend whether we obtain a copy of the program or send the data or whatever. This is the "easy-to-use" service that people are looking for more and more. I also have some thoughts on EDUCOM-ARPA NET next time we meet.

*Try to keep at least the least unprofitable parts operating.

*Combined with the ARPA Network and/or possibly the G.S.A. services network with a major effort investment by the Federal Government to provide Inst. & Research computing services at low cost, there might be hope.

*Basically, I feel that EIN has been a valuable experiment, and should be carefully written up to guide future attempts at disinterested program brokerage. The lessens learned are surely related to the psychology (or behavioral patterns) of university computer users. The university world badly needs to know the facts about how much different groups of people used the EIN system.

For the present, if EIN is generating as little business as I suspect, it seems clear that it should be dropped. However, if an annual charge of, say, $500 for the catalog, plus a reasonable service charge for each program request (say $10) would cover expenses, then I would think it should definitely be continued.

*I think EIN is worthwhile. We have downgraded submitting programs because our documentation is terribly inadequate and we have not had the time to do anything about it. Almost all program swapping services we use are used very infrequently simply because users find they are too time consuming. We (1) publish lists of services; (2) give talks on services; (3) send for programs; (4) put programs on system; (5) ask user to check out programs. Invariably the costs involved in (5) are too great!!

*(Put on the shelf.) Publicize successful intra university/state/regional discipline/manufacture information networks. Stimulate cooperative data-bases.

*Implement Possibility 5.

*Continue as is.

Budget: $500,000 to $1,000,000

*Order of preference: Possibility 6 (a la ARPA);
Possibility 5
Possibility 4

At one point, we talked about taking over and expanding the ARPA system. How does that stand?

*Perhaps when I figure out what to do with university computing centers I'll know. What's going to happen to the total spectrum of university based computing?

*Objectively analyze who did what, why or how. Analyze these variables in terms of original model. A report of this sort will/should have important considerations for future educational computing networks.

*Terminate as a noble try.

*Difficult to venture a useful opinion since EIN never functioned well here for a variety of reasons.

*I really believe the money could be better spent in other ways. Close it down.

Budget: $250,000 to $500,000

*Set standards for regional networks.

*Possibilities 2 or 5. Possibility 6 when feasible.

Budget: $100,000 to $250,000

*Continue as is.

*It should continue, on a low profile--with emphasis on fast resource sharing and justifying itself on cost effective basis.

WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON 99163

COMPUTING CENTER

August 20, 1971

Mr. John C. LeGates
Executive Director of EIN
EDUCOM
100 Charles River Plaza
Boston, Massachusetts 02114

Dear Mr. LeGates:

I was pleasantly surprised to receive your letter as I was unaware that we distribute the Newsletter off campus. I am enclosing a copy of our documentation standards which you will find are very similar to the EIN standards.

As with most Centers we have been plagued for a long time with a lack of documentation on most of our programs. As usually happens, staffing problems forced us to relegate the problem to the bottom of the stack. We have managed to streamline and automate the rest of the library so that we can now spend time on this particular problem. At first we felt that the EIN standards would be sufficient; however, we also belonged to SHARE and we have some additional requirements in our own Center so that we were forced to modify the EIN standards. However, they formed the basis of our system.

Over the next year we plan to develop some programs that will allow us to implement our documentation standards and automate distribution of the programs. Specifically, the various parts of this project are:

1. Putting all program abstracts under an interactive on-line information retrieval system. This system which is already being used elsewhere on campus correlates the user's request with the abstracts and determines which programs the user will be interested in using. At that point the user will go to our library to see the actual documentation to determine which programs he now wants to use. This will help us eliminate the problem where the program is listed under one name and yet used for a different function or referred to in a different way by the user.

2. We plan to end up with all back-up at the source level along with documentation and the abstract. This means that any program that we have on the system is readily available to us in a source form and at any point that we have problems with the program we

will revert back to our source copy. As we implement this area, we will submit the programs to the EIN catalog.

3. We are designing a program to allow automatic retrieval of source programs. This will allow a program librarian to service all requests for programs merely by punching the proper cards. This program will retrieve the source from our back-up tapes, copy them to the requester's tape and also notify the original contributor that his program has been requested and giving the name of the requester. This will allow the original contributor to communicate with the requester if he so desires. Because we also service some government agencies, we probably will have to charge for some of the programs. What we plan to do in this area is charge what the agency wants to sell the program for and then take a cut off the top for distribution of the programs. The libability for the program will rest with the agency that originally contributed the program to us. We also plan to charge some nominal fee merely for distribution of the program; however, we do not intend to assume liability for the correctness of the programs.

I realize this is an ambitious undertaking that will never be completely finished. My primary goal is to have a skeleton system set up and then slowly move in the direction of the goals. As I said before I expect to have the system available by next summer along with a healthy start toward implementing our goals.

Sincerely,

Mads Ledet

Mads Ledet
Manager, User Services

ML:mmr
Enclosure

WAYNE STATE UNIVERSITY

DETROIT, MICHIGAN 48202

COMPUTING AND
DATA PROCESSING CENTER

OFFICE OF THE DIRECTOR

General Comments:

One aspect of program sharing not really brought out in the questionnaire, vitally affects the Ein effort and largely explains its failure. With few exceptions, programs are written to satisfy their authors. These programs can frequently be transferred to other institutions and made to work successfully there when the expected use is sufficient to provide a high degree of expertise at the receiving institution. On the other hand, Ein aimed itself squarely at the casual user, and attempted to circumvent the above problem by running the program at the originating institution. However, this sort of use of an unfamiliar program, i.e., a remote use, especially when the program is not designed for "amateur" use is a very difficult task. Most of the demand for use of computers at other institutions comes from those who have been there and gained familiarity. In the present state of the art of computation, we still do not have facilities useful for the casual or amateur use. Note that I use the term amateur unconventionally as referring to one unfamiliar with the operating system and application package he intends to use. He must go through a learning period, and this is difficult at a remote facility.

Of the possibilities you mention for the continuation of Ein, only possibility four addresses itself to this problem - and only then since you say that program performance will be guaranteed. Of course, this is not longer exchange ala SHARE. However, if your guarantee of performance would include editing of the program to make it more "user oriented" whatever that would mean, then sharing for the casual user would have more of a chance. In fact, good programs of guaranteed performance would be in demand at any institution - there are very few if any such products yet.

Possibility six, the establishment of an electronic network, is coming, and Ein could well move it along more rapidly. The other possibilities do not address themselves to any real problems in the computing community.