Implementation of Information Technologies in the School of Technology and Information Management: A Case Study

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IMPLEMENTATION OF INFORMATION TECHNOLOGIES IN THE SCHOOL OF TECHNOLOGY AND INFORMATION MANAGEMENT: A CASE STUDY

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INTRODUCTION

A recent effort to expand library services became an experience for the entire School of Technology and Information Management (STIM) at Washington University in St. Louis - the Library, the administrative units and many of the School staff. The project grew into an exercise in both the sociological and technological factors that come into play when new information technologies are implemented in a technical library. The project was conceived in April of 1990 and full implementation of the first phase began with the start of the academic semester in January of 1991.

The STIM Library has undergone major evolution recently. Limitations on space, finances, and collection development are all facts of life for libraries in university settings, and these issues often are amplified by the seemingly endless simultaneous explosions in knowledge and in information technology. It was in such a context that the STIM Library and its parent organization needed to identify a way to bring library service into the 1990's, reach a broadened patron base, and accommodate a new organizational structure - all while remaining within constraints on staff, space and budget.

Initially, the scope of this project was seen as encompassing the technical considerations involved in the justification, selection and installation of computer hardware and electronic information services to meet the expanding and changing needs of the patrons of STIM Library. As the project progressed, it became obvious that administrative changes at the organizational level of the School, and sociological changes at the individual level would also play a significant part in the actual implementation of the information technologies that comprised this project. Managing the impacts of these non-technological changes was as much a part of implementing the new technologies as was the selection and installation of the hardware and software.

At the conception of the project, much planning was done. Initially, the overall future of the Library was assessed within the context of the STIM 3-5 year business plan. Given strong indications that the Library would continue to play a viable role in STIM, a reasonable set of guidelines dealing with space, staffing, and patron use was developed. Knowing that an organizational restructuring would take place during the project, a variety of administrative personnel was consulted early in the planning stage in an attempt to create an appropriate forum for continuing discussion of library development during the indefinite restructuring period. With this group working as an informal team, two important concepts were developed - the concept of repositioning the library in the STIM organizational hierarchy and that of using the Library as a component of the STIM marketing plan. These concepts played a key part in the pursuit of the project.

This recasting of the Library role within STIM was to produce real fruit as the rest of the organization came to view the Library in a different manner. As the Library moved into its new role in the organization, it received greatly increased visibility. Administrators began to modify their view of funding the Library, allowing new means of justifying the required expenditures for new technologies. Marketing personnel came to see the Library as a component of the marketing plan, and technicians responsible for the computers gained a new awareness of Library operations that has helped them to respond more effectively.
On the operational level, the Library was to deal with a greatly changed mission, and a variety of new patron groups, a scenario that would tax library services and challenge individuals both inside and outside of the Library staff to develop and implement creative practical solutions.

This case study examines the reasons prompting the initiation of the project, the relationships among various parts of the organization before, during and after the project, and addresses some of the lessons learned during the course of the project.

THE SCHOOL OF TECHNOLOGY AND INFORMATION MANAGEMENT (STIM)

The STIM Library is the primary library resource for the School of Technology and Information Management (STIM). STIM is the continuing education arm of the School of Engineering and Applied Science at Washington University in St. Louis. Several Centers of STIM operate in consortia arrangements with commercial and industrial firms in the St. Louis area.

The Library traces its roots to the time of the inception of the Center for the Study of Data Processing (CSDP) in 1976. CSDP provides professional and technical training seminars, conference events, and professional interaction opportunities for information system professionals at a group of about fifty consortium affiliated corporations. In 1985 CSDP became a unit of STIM. In 1990, further reorganization of STIM left the Library with a markedly changed and expanded mission. This change in mission served in large part to create the impetus for this project.

THE LIBRARY

The primary mission of the STIM Library is to provide information resources and services in support of those academic and professional programs of STIM related to the development, implementation and administration of management information/data processing systems (MIS/DP) in business and manufacturing. The Library offers, in one location, access to information resources not usually found or easily accessible in the region. Many of the resources in the Library that do exist elsewhere in the area are held in corporate collections with extremely limited access.

At the start of this project, the Library held approximately 5000 books, 1200 volumes of bound journals and 400 current subscriptions to journals, newspapers, and newsletters. Additional assets included various resources such as loose leaf update services from publishers such as Auerbach and Datapro. About one hundred videotaped presentations dealing with many aspects of MIS and CIM are in the collection.

The Library is intended to function primarily as a reference center. As such, the books and videotapes circulate only to STIM faculty and those persons employed in the information systems (I/S) areas of STIM affiliate companies. Walk-in access to the Library is available on a daily basis to all members of the University community. Reading-room access is provided to the general public on a space-available basis. This arrangement has, to date, been a problem only at the very busiest of times, such as finals week, when it may be necessary to ask individuals from outside the University and affiliate communities to leave the Library.

The Library is staffed by one professional librarian and eight student assistants, covering over sixty hours each week of access time. The Library is open at least four hours on each weekend day and at least eleven hours on weekdays. During the academic year student assistants from the college Work-Study program (CWS) are employed in a large variety of tasks, including
both technical and public service. In the Summer, part time assistants are hired on temporary appointments, as no CWS is available. Staffing was one of the first organizational issues that impacted the implementation of the project.

ORGANIZATIONAL ISSUES

At the outset, it was assumed that the major obstacle to success would be the ability to acquire appropriate electronic hardware, software and services within the existing constraints on budget and space. As it turned out, the real obstacle was the multifaceted problem of organizational and sociological issues surrounding the introduction of new information technologies to the Library, and, in turn to the overall STIM organization. The history and structure of STIM, and the changes to that structure that occurred in 1990 played a critical role in the progress of the project.

STIM had historically been a conglomerate entity of several related university centers and academic programs. Among these are the Center for the Study of Data Processing, (CSDP) discussed above, CIMCenter, providing programming for professionals in the area of computer integrated manufacturing, Center for Communications and Network Management (CCNM), a newer research and educational group providing training and consulting in the area of telecommunications, and several academic degree programs such as the Masters of Information Management and the Masters in Engineering Management.

The entrepreneurial nature of these centers led them to operate quite autonomously, sometimes with limited communication among programs, particularly in the area of information service needs.

CHANGES IN THE STIM ORGANIZATIONAL STRUCTURE

As the programs of STIM expanded both in number and in size in recent years, particularly in the CSDP, CIMCenter and academic programs, organizational changes at the School of Technology level were deemed necessary. For example, marketing and financial control functions needed to be addressed on a School level rather than the Center level as had previously been the case. The effect of these and other changes on the Library was, initially, to broaden the patron group to include many individuals from outside the original CSDP group, with a corresponding widening of information services needs. Examples include CIMCenter industrial affiliates and academic program participants, with needs for manufacturing-focused material in the one case and for specific course-related material in the other.

It has always been a challenge to the Library to at least informally address some of the information needs of several STIM units besides CSDP, but until Fall 1990 the Library focused primarily on support of CSDP programming. With respect to physical space, access to appropriate resources, and administrative expediency, it became apparent that, in the face of growth and reorganization, the resource mix, the information delivery processes, and the operational structure of the Library were in need of change. A view of some of the users coming to the Library as a result of the reorganization may help in understanding the changes needed.

PATRON GROUPS

STIM Library has always tailored its services around the needs of quite specific and identifiable patron groups. In the early years, the only patrons were members of the CSDP research staff and a few select corporate affiliate representatives. As the organization developed, the mix of patrons grew to
include interests that did not, in all cases, share common interests and needs. Examining the nature of the various patron groups now served by the Library may yield an understanding of the nature of the tasks required to address their needs.

CSDP/STIM STAFF ASSOCIATES

CSDP staff associates teach and administer STIM academic programs, primarily in the information systems area. The fifteen CSDP associates also facilitate professional seminar offerings, and present customized training events at corporate facilities off-campus. They work with representatives from about fifty affiliated corporations.

A significant portion of the total Library mission is dedicated to both direct and indirect support of activities conducted by the associates. Direct support in the acquisition and delivery of library materials, expediting access to special material not held at STIM Library, and liaison with the libraries at the affiliate corporations are all regular activities in support of this patron group.

CIMCenter ASSOCIATES AND INDUSTRIAL AFFILIATES

CIMCenter provides a neutral ground for manufacturers, vendors, integrators and end users of computer integrated manufacturing systems. The ten CIMCenter associates work with two categories of affiliated organizations and provide dozens of seminar and conference events each year, targeted at manufacturing interests.

Because of a growing agenda at CIM Center, and due to the off-campus location of the primary CIMCenter location, this group is a natural partner for the Library in the pursuit of future efforts to facilitate remote information access and delivery. Within the scope of this project, however, the primary challenge was to assess the specific information needs of the group, implement appropriate solutions to those needs, and, perhaps the biggest obstacle, communicate to the newer patrons the purpose of the Library in their particular context.

STIM ADJUNCT FACULTY

Drawing heavily from the information systems and manufacturing communities, STIM employs approximately fifty adjunct professors to teach classes attended primarily by non-traditional students at both the graduate and undergraduate level. These courses lead to degrees such as the Masters of Information Management and the Master of Engineering Management.

STIM adjunct faculty use the Library for reserve material access, research for course development and as a reference center for directed research related to class assignments.

RESEARCHERS FROM CORPORATE AFFILIATES

Generally by appointment, individuals or small groups from the various affiliated corporations come to the Library for topical research. Information needs for this patron group are usually very specific, targeted to a defined project with a typically tight time schedule. For these patrons, the time value of information is especially critical.
Morning hours in the Library are reserved as non-public to better serve this type of patron. Library service to these corporate groups requires direct contact with the Librarian, and sometimes leads to the development of a consulting arrangement with a STIM associate, or involvement by the researchers in an appropriate STIM program. This type of Library activity is thus important to the mission of marketing not only the Library but the STIM academic and professional programs.

STIM ACADEMIC PROGRAM PARTICIPANTS

Many of the students in the various STIM academic programs are employed full time in a corporate engineering or information systems department. Ranging in age from the mid-twenties to the early fifties, many of the eight hundred or so active students hold undergraduate degrees but have been away from formal education for a number of years. These students are typically highly motivated, have very specific educational goals, and extremely tight schedules, attending class primarily in the evenings. To offer useful service, the Library must remain in touch with these facts about the non-traditional students that make up a large portion of the total patron group.

To this end the Library concentrates hours of operation and staffing in the afternoon and evening period. Faculty reserve is offered, and the Library is used as a faculty/student communication center. A bin file is maintained for use in distributing course handouts, relaying makeup tests and returning graded papers to students who may be away from campus on business matters. These services are useful to both faculty and students and they are a form of marketing for the Library in that some people come to the Library first for the communications services and then discover the true information resources in the Library.

With a group such as this using the Library for class-related research, it is an easy transition for many to also use the opportunity to network with fellow professionals, and to discover more about other programs of STIM and how they may be of value to their respective companies.

INTERNATIONAL STUDENTS

In 1989 STIM graduated the first class from a cooperative degree program with Tilburg University in the Netherlands. This program offers education at the Masters level for professionals working in information systems. Averaging in age from the late twenties to late forties these Dutch students bring a refreshing perspective to their classes and to the Library. It became apparent that an international view of the MIS literature was needed, not only to accommodate the Dutch, but to adequately serve the domestic patrons of the Library with an appropriate and necessary international focus. This fact weighed heavily in the decision to acquire some specific information resources during this project.

Thus, STIM in 1990 was an organization in flux, presenting the STIM Library with a changed mission and a markedly changed patron group with broader needs than in the past. At the same time STIM and the Library were facing these internal changes, the world of information was making rapid strides toward the future. Electronic information sources were proliferating, alternate formats such as CD-ROM were becoming more common, and both the availability of and demand for information was increasing rapidly. Given its mission and patron group, it was important for the STIM Library to be a leader, not a follower, in the presentation of information services to the patron groups of STIM. Individuals and corporations coming to STIM for advanced education in management information systems and computer integrated manufacturing could not be effectively served through a library that utilized dated information...
service techniques. It was evident that a project to renovate the Library was truly an opportunity to not only upgrade library services, but also to enhance the perception of all of the STIM programs through improved marketing and through improved delivery of Library service.

THE PROJECT DEFINED

An informal ad hoc team was formed to help in the development of this project. As the organization was already in flux at the conception of the project, and as further changes were imminent, this team had to operate quickly and with a minimum of structure. This informality and flexibility proved to be a luxury when it became necessary to deal with the various impacts of the projects, many of which proved to be non-technological.

Individuals participating in this planning team included the Associate Dean of STIM, the Business Manager and the Marketing Manager. These administrators could offer direction on the mission and future role of the Library within the STIM organization and advise on financial matters relating to the project. The CSDP Senior Technical Associate with responsibilities for microcomputer, local area network and client/server research actively participated in the planning and specification of much of the hardware and software. The supervisor of Workstation Technical Services was consulted on the appropriateness of network configuration for the LAN, and on several practical matters related to servicing the equipment without interrupting patron use.

With heavy input from the Librarian, and in consultation with the individuals mentioned above, a general project structure was defined, with the following general goals:

- Upgrade overall library services to a level commensurate with the technical offerings of STIM programs.
- Implement specialized information services appropriate and needed to serve new patron groups.
- Position the Library to serve a public face marketing support function for STIM programs.
- Create an informal test bed for LAN technology, providing exposure to LANs for both the STIM staff and the WTS technicians.
- Create a foundation allowing for future information access improvements including, but not limited to, electronic links among the Library, other STIM units, and corporate affiliate offices.
- Implement project within existing space and staffing limits.
- Utilize in-house Workstation Technical Service (WTS) technician support where possible.

Given these goals, the project would address matters of concern to several areas of STIM, and allow for greater financial justification than a strictly parochial library-only project would. Additional to the enhanced financial support opportunity was the improved positioning and visibility for the Library, both within STIM and the special library professional community.

With the proliferation of patron groups and missions, it was necessary to offer a wider range of information services in the same physical space, with the same staff and much the same budget. The University faces a severe space shortage, and a physical expansion of the Library in 1989 occupied all space that would be available for the foreseeable future. Staffing was in place,
and the practice of heavy reliance on student assistants could not be immediately changed. Funding was limited by the realities of STIM revenues, and the rapidly changing structure of STIM mandated that major changes be implemented soon, rather than waiting for budgeting in a future fiscal period. Other alternatives for service improvement had to be addressed.

The installation of electronic information technology was the obvious choice, both for utility and for consistency with the mission of STIM. Specific tools were identified by the Librarian, working closely with the Senior Technical Associate and the WTS supervisor. Administrative clearance was solicited and granted on a variety of issues. The use of electronic services solved many space problems. Although inconvenient at times, the changes could be implemented with the existing student staff in place. Given the multiple focus of the objectives for this project as mentioned above, it was possible to access other funding sources to supplement the Library budget during acquisition of the new technologies, thus avoiding the need to delay implementation until a future fiscal period.

A local area network consisting of a server machine and two patron access machines was chosen as the backbone of the new electronic services in the Library. While patron access on the end user stations would be limited to the more broadly focused CD-ROM product that was to be acquired, the "Librarian" machine was to be configured to access a variety of online information sources. It was intended that, to varying degrees, these services could be accessed for specific needs by either the Librarian or by the student assistants. End users, depending on need or status, could request access assistance after they had explored the existing library resources or the CD-ROM product. The various technologies performed at a variety of levels, limited not as much by product deficiency, or from mis-specification to the intended purpose, as by organizational and sociological factors. Examining these technologies individually in the context of their implementation in STIM Library will shed some light on the differing levels of performance.

**SELECTION AND EVALUATION OF SPECIFIC INFORMATION TECHNOLOGIES**

Public face was an important issue for many reasons. Many of the Library patrons come from the corporate world and look to the University for leadership in research. These people expect a certain image in their dealings with the University. When the decision was made for the Library to serve a more direct role in marketing STIM programs, facilities and equipment were needed that would present a solid public face to those seeing the Library as their first impression of STIM.

It was decided to purchase an IBM P/S 2 Model 80 configured with a single internal IBM CD-ROM drive for serving Computer Library, from Ziff-Davis Publishers, across the LAN, using Ethernet/Lantastic. Telecommunications would initially be directed through an IBM 2400 baud modem. While components of the setup could have been sourced elsewhere, the decision was made at a high administrative level to stay completely IBM for hardware. This accomplished the intended purpose, but has caused minor drawbacks in the areas of modem/software compatibility, and microchannel architecture service support.

Ethernet-based networking was used frequently in several parts of the Washington University School of Engineering, and seemed to be the most practical choice for the STIM Library LAN. Cost, utility, and the familiarity on the part of the WTS technicians deemed Ethernet the right choice.

Lantastic was chosen as the network operating software for primarily organizational reasons. The Workstation Technical Services (WTS) group, although officed in the same building, had previously had little contact with the Library. To implement efficient service, it would be necessary to orient
the WTS group to the specific ways that impaired technical support would derate library services. To start with as few variables as possible, it was decided to go with Lantastic, a product with which the technicians were more familiar at the time, and one that would serve Library needs for the near-to-mid future. It was realized at the outset that a change to Novell might be needed in a future phase.

Computer Library, now Computer Select, supplied on CD-ROM by Ziff-Davis publishers, was chosen as the primary general service electronic tool for the Library. The reasons for this choice were both technical and pragmatic. With the loading of many popular MIS titles along with IEEE and ACM journals, the product was of use to a wide range of the patrons. STIM evening students, OSDP and CCNM staff associates, and corporate affiliate patrons have all made heavy use of this technology. The full-text feature is a real advantage in a Library pressed for shelving space and serving patrons that primarily use recent material. Recent additions of hardware, software and computer company information databases have further increased the utility of this product.

Ziff-Davis was willing to execute a licensing agreement that allowed use of the product on the LAN. This type of networked access was needed to serve the anticipated patron volume, and one of the justifications of the project originally had been as a LAN test-bed for STIM.

Dialog was chosen as the primary online database service because of the variety and number of databases available through Dialog, and because of the Librarians familiarity with the utility. Experience with online files such as The Computer Database, Computer ASAP, and COMPENDEX indicated that these services, accessed through Dialog, would be of great use.

Because of the cost issues and the training needed to search efficiently, use of the Dialog databases is limited by the time of the Librarian. This being the case, searching is done by appointment, and usually limited to faculty or affiliate research projects after other tools for reference have proven ineffective. Online searching of this nature is one area that could be utilized to greater advantage with the capability for training a permanent staff person for searching.

An interesting aside to the issue of online searching was the apparent incompatibility of the IBM internal modem with Smartcomm communications software in this application, which led to the use of Procomm rather than Smartcomm. Smartcomm is the more widely used software in other libraries at the University. This was typical of several inconvenient roadblocks in the way of a smooth implementation.

The influence of the Dutch in the Tilburg cooperative program was evident during the first semester that these students were on campus in 1989. In their approach to many topics, EDI and interactive video to name but two, it was evident that their approach to I/S research was being impacted by exposure to literature other than the standard U.S. holdings. While the Library has always maintained subscriptions to several European journals in the field, there was no comprehensive source to turn to for this international focus in literature.

In addition to supporting the Dutch students during their time at Washington, it seemed advisable to make more international literature available to the American students. Rather than load the budget and pack the Library with additional European journals, an agreement was made with Reuters Textline to supply online access to the Reuter:file database and deliver documents on demand at a fixed price. These documents would be printed in the Library at the time of the database search. While not an end user service, it was felt that student assistants could be trained to do topical searches and retrieve documents for patrons in need of this service.
The information in the database is quite useful, and the command syntax for searching is within the grasp of the library student aides, but it proved to be impracticable to use only one student as a searcher, and the time to train all eight students was prohibitive. The search service could not be adequately supported by the librarian who held a variety of other operational and administrative responsibilities.

This information technology, to be optimized in application, really should have the benefit of use by stable staff that can be trained and that will be able to use the search utility on an ongoing basis. This is one factor that has led to the consideration of the addition of part-time permanent staff to augment the student assistants.

The technology modules of Current Contents on magnetic tape were already being served to the Washington campus at the inception of the project, through the WU Medical School Library. Although the service had been available in the main campus library, it suffered from lack of use. The service was not being aggressively promoted at the time, and the only access was through a single terminal located in the main campus library.

With approximately a year's worth of table of content information on several thousand journals (the approximate equivalent of those indexed in Science Citation Index), Current Contents is a very useful database, whether used for keyword searching or for topical current awareness. As a result of this project, it is now served in the STIM Library as a librarian or student-assisted technology, but patrons are encouraged to apply for their own personal passwords and dial in to take advantage of this low cost service.

The fact that this service is taught quickly is an advantage when training student assistants to use and demonstrate it. A disadvantage is the rather complex login procedure and dial-up password access that prevents it from being directly accessed by end users.

INTERNET ACCESS

One of the functions of STIM Library is to serve as a central point for demonstrating and utilizing information technologies that are in accord with the operations of the various STIM Center activities. Networking of computer technology is of particular interest to the Center for Communications and Network Management (CCNM) of STIM. The Internet is one example of a networking conduit that is being used increasingly by individuals at the various STIM centers for a variety of purposes. In the case of the Library, the use of Internet to access the catalogs of other libraries is not only a good information resource for patrons it is a good way to demonstrate to both the patrons and the STIM organization that the Library is operating as a technological peer (and, in some cases, superior) of the technology-based Centers.

Since this project was implemented, and outreach efforts conducted, there have been several instances where individuals from other parts of STIM have come to the Library either for advice on specific technologies now used in the Library, or to suggest consortia arrangements to extend the service level in the future. This type of active interest should be one indicator of acceptance of the new information services by the primary users of the services.

THE WTS SERVICE AGREEMENT

Part of the academic mission of the STIM Library is to afford educational opportunities across the STIM organization, whenever possible. In a period of reorganization, it was also seen as desirable to promote arrangements that would serve to unify various STIM units. In light of this, great effort was
made to work with the Workstation Technical Services (WTS) group, consisting of managers and a student technician staff, in the installation and maintenance of the hardware/software involved in the project. It was hoped that this association would serve to build a closer relationship between the two units of STIM that previously had had little association, and it was further hoped that the proximity and familiarity with the Library would eventually grow into a support situation better than could be provided by outside suppliers of technical service.

This arrangement caused some delays in the start up of the LAN, as the WTS student technicians usually had to work in short time increments built around class schedules, a problem similar to that encountered with the student Library aides. Serious consideration was given to calling in outside technical help in an attempt to get the CD-ROM product to serve across the LAN, but with some effort, the WTS group was able to find the solution.

Initially, the support situation with WTS was uncomfortable, and seemingly inefficient. After start up, however, it was possible to reap the benefits of local on-site support that is available at short notice and at odd hours. The student technicians gained experience on systems that may not otherwise been accessible to them, and because they set up the system themselves, there exists a greater sense of ownership among the technicians than if they were maintaining a commercially installed system.

Future installations could benefit from better communications of needs and objectives at the outset of the planning. In this project, the change of WTS managers during the project made this extremely difficult. Nevertheless, most of the desired benefits of the Library/WTS relationship have been realized.

CONCLUSIONS

The project can be deemed a success in that, through the implementation of new technologies, the two primary objectives of providing upgraded service to the broadened patron group, and of assisting in the marketing of STIM programs have been met. Looking back, one can see various technological and sociological impacts of the project that affect the current and future performance of the technologies discussed here. Managing these impacts during the progress of the project and, most importantly, after the implementation of the project proved to be the true challenge in implementing the new technologies and in the planning of future projects.

Technological Factors

Although an excellent first step has been made, the utility of some of the technologies could be greatly improved by facilitating more, and faster access. Many technologies are, in this first phase, only available with librarian or library aide assistance. Some, such as Dialog need to remain that way for cost control. Others could benefit from changes in a future project.

The growth of user need at the Hampton Avenue facility since the inception of the project has increased at a rate far beyond all projections. This rapid growth, in combination with the remote location, has limited the access to several of the new technologies. Computer Select, and a yet-to-be-acquired CD-ROM based product for CIMCenter, probably SuperTech from Bowker, need to be made available directly to the Hampton Avenue facility for CIMCenter and CCNM. This group of patrons can operate independently in most cases, and should not have to suffer the drive between locations to conduct a search on these utilities. The STIM Library book catalog likewise should be electronically available to Hampton.
Staffing and Support

The specific technologies were chosen appropriately, and most have well served their intended objectives. The effectiveness of some of these technologies was limited by the amount of training that it was possible to give to the library assistants. The rotating schedule of the student staff and the need to seasonally change support staff severely impaired staff training in the use of the new tools. Training is, at best, time intensive, and it was not possible for one librarian to bring all students up to speed on all new tools. A training period of about 30 days was allowed between installation of the new equipment and the opening of public access, but much more was needed initially, and there is little opportunity for training replacement students.

Reuters may not be continued as a library service offering until this staffing situation changes. An alternative may be to contract out Reuters services requests, possibly to the School of Business Library on Campus. Given the low frequency of use at that location, however, and consequent staff unfamiliarity with the service, it may be necessary to look in a completely new direction for this type of international literature coverage.

Current Contents and the Washington University Olin Library System OPAC (LUIS/NOTIS) should be accessible directly by end users, rather than on a library-assisted dial-up basis. While technologically simple to do, this is one example of where the sociological impacts of implementing a particular technology may outweigh the technical impacts. More negotiating and alliance building among STIM, Olin Library System and the WU Medical School Library is needed to effect further change.

With all of the increased visibility as a result of this project, in many cases the need for even more user awareness became evident. With the newer patron groups came users that were unsure of their allowed access to the Library, and others who were aware of their access privileges but, due to limited experience with a technological library in the past, were unsure what, if anything the STIM Library could do for them.

One beneficial impact of this project was the uncovering of this type of gap in the patrons' knowledge of the Library. We are now positioned to deal with this information gap.

Faced with an expanding and diversifying patron group, a broadened mission and the need to modernize information services within several constraints, the STIM Library engaged in a project to acquire and install electronic information technologies to meet these new needs. The impacts of this project were both technological and organizational, and the management of the socio/organizational impacts contributed as much or more to the success of this project as the technological decisions. Solid technology decisions cannot ensure success in the face of negative socio/organizational impacts, but in some cases, positive management of these impacts can help overcome some of the technological problems in a project such as this.

STIM Library was fortunate to have conducted this project at a time when the administrative team was able to function in a flexible manner, and when the opportunity existed for the Library to grow into a new, albeit somewhat non-traditional role in the STIM organization. The patrons, the Library staff, and the STIM program units are all benefiting from the expanded role that the Library is now able to play in both the delivery of information services and in the marketing of STIM and its programs.