BUILDING A MANAGEMENT INFORMATION SYSTEM
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Abstract: Statistics are an important tool in management decision-making. Every area of the library performs work that is measurable in some way. In many libraries data on collection activities results from daily routines, and is facilitated by integrated library systems, but the collection of data on reference activities is left to periodic sampling, generated by hand tallying. In 1994 at the Medical Sciences Library of Texas A&M University we began to investigate, design, and implement a method of collecting statistical data on the computer based on a program developed at the Houston Academy of Medicine/Texas Medical Center Library in 1993. By 1995 we had a fully functional, customized Management Information System, using the Paradox relational database software, that tracked not only client service interactions at the reference desk, but also administrative operations such as billing. The system was migrated to Microsoft Access in 1998. The MIS is still used to track reference desk transactions, mediated searches, librarian-taught classes, and activities in the Clinical Veterinary Librarian program.

This paper flows from the basic fact that all libraries generate data. This data may come from interactions with users, it may come from administrative activities, it may come from collection development, use and maintenance activities. All libraries also co-exist with larger entities: universities, municipalities, and professional organizations to name a few. And libraries turn that raw data into statistical information that is reported to those larger entities. That information is also used within the library for a variety of purposes: benchmarking, accreditation, resource allocation, personnel decisions, trend analysis, policy decisions, measuring effectiveness, assessing training needs, and strategic planning. Frequently that data is collected on paper, sometimes daily but frequently through semiannual sampling and transcribed into a useable format using spreadsheets. A Management Information System provides a data warehouse and tools to transform data into information to assist in analyzing library services, measuring effectiveness, and making decisions. How data is collected, stored, and processed in a Management Information System, and how that system was developed at the Medical Sciences Library at Texas A&M University, is the focus of this paper.

In 1994, the director of the library recognized the need for systematic collection and compilation of accurate data on library activities. Up until that point, although some departments had monthly reports of activities such as number of items added to the collection and number of journals shelved, all other use information was based on sampling. The library business manager and I were charged with the task of investigating, designing, and implementing a system to make it possible to collect all information on a per transaction basis. This system was also designed to track administrative functions such as inventory, personnel information, travel requests, and invoicing. The director was closely associated with the director of the Houston Academy of Medicine-Texas Medical Center Library who had overseen the development of a much more complex system at that library. This relationship allowed us to examine what had been developed there in 1993 and customize it for our needs. As with any major undertaking, the process would involve a continuous loop of planning, implementation, soliciting feedback, and improving the product based on feedback.
A first step in the planning was to determine the organizational needs for data; what would be the purpose of the MIS? Another early step was to consult with the departments involved and decide who should have access to different parts of the MIS; some data would be need to be protected through a password system, especially with some administrative functions. Another consideration was ease of use; a major goal was to make the interface as simple and accident-proof as possible. This was being designed at a time when most of the staff only used the automated library system, online database searching and word-processing; very few staff used any other software programs. The software chosen for the MIS was Paradox, a DOS-based relational database program that had been the choice of the Houston library. This was not the era of easy-to-use software; both of us traveled to Austin, Texas for a weeklong training on Paradox programming.

The first module programmed and implemented was for administration purposes. Since the designer (and programmer) was also the business administrator and a primary end-user, he was in an ideal position to answer all the questions for his area. In the administration offices, it was used for accounting purposes, tracking employee personal leave and university travel, and equipment inventory. These modules served their function for several years before being made unnecessary by university-sponsored and controlled accounting, personnel, and inventory systems.

The second module developed was the information services module. This module was designed to collect data on user services immediately after transactions. These services included reference desk transactions, literature searches, educational programs, clinical veterinary librarian programs, and document delivery transactions. We led several brainstorming sessions with staff in each of those service areas to determine what should be included in the forms they would be filling out online.

We found common data points between the administration and reference modules that could be shared, such as customer data, staff data, departmental data, and vendor data. Within the information services module, a form was programmed for each service type. Although this could be seen as redundant, for example a reference desk transaction could result in a literature search, it was felt for statistical purposes it would be best to track them separately. We simply programmed in a shortcut on the reference desk form that opened up a database search form.

The basic design premise we followed was to make the interface simple and as user-friendly as possible. This is essential if staff members at a high-traffic service point are going to use it. If the staff person had too many options to select and had to hand key basic information the interface would be seen as a time-consuming nuisance. Based on interviews with reference desk staff, I came up with a list of twelve core data elements that covered a variety of transactions. The software filled in two of the data elements automatically: date and time. The “Question” data element offered the staff member the option of free text entry of a specific question or a drop-down list of generic questions: database help, equipment help, holdings information, citation verification, library hours, etc. The staff member selecting an option from drop-down lists populated the rest of the nine data elements. Those elements included the reference type, contact type, location, staff member initially contacted, and the staff member who may have been called on for
secondary assistance. Over time, as a part of the feedback loop, the data elements have changed. Two of the initial twelve elements referred to the user affiliation; because reference staff did not like to ask for the departmental affiliation of users, it was rarely populated and subsequently dropped from the form. The “quick question” list has evolved; unused ones were removed, and others added when new patterns of similar free-text questions were noticed.

In the design of the MIS, a very important aspect was that of a shared understanding of vocabulary. Definitions were agreed upon for each term used in the collection of data. What is the difference between a plain “reference” transaction and an “extended reference” transaction? What is the difference between demonstration, instruction, orientation, and staff development? How does a mediated search differ from an expert search or a plain reference search, especially when the same person can do all types? What is the difference between the library’s use of the term “outreach” and when a librarian goes to a department to do a demonstration? In the case of the Medical Sciences Library, the term is limited to those transactions conducted by the outreach librarian in fulfillment of external contractual obligations such as we have with a local health center or the National Library of Medicine. In the case of the general university library, outreach is what occurs when librarians go out to university departments.

Another important aspect of both the development and implementation phases is complete documentation. We documented the structure of the relational database with all its associated queries and reports, as well as providing a data dictionary for both the staff using the input interfaces and the managers using the reports the system generated. The reports offered managers a monthly summary of activities in each of the areas using the MIS. These reports also evolved in response to management needs. One example is a custom report that broke down the sum of reference desk questions into what questions were most frequently asked. That report led to another request for a report on how many questions were being referred by paraprofessionals to professional librarians. Another request was for what types of questions were being logged while the professional librarians were staffing the reference desk. All of those reports eventually led to changes in staffing. They also justified a transition to a single service point where reference help, circulation activities, and document delivery are all available.

In conclusion, I believe that our MIS has served the library well for almost ten years. It is again time to re-examine what data we are collecting and how it is used. As with the administrative module, modern software for document delivery replaced the need for that part of the MIS. As the staff comfort level with modern operating systems and software has grown, and software has changed, I changed the MIS. In 1999 I migrated the MIS from Paradox to Microsoft Access. This change allows easier adaptation of the interface and the reports since Access does not require programming skills. The simplicity of the software allows staff to run their own queries on the reference database. There is a warehouse of data available for use in tracking trends in reference activities. Reference librarians published a paper on the Clinical Veterinary Librarian Program using data from the MIS. More research could be done on the types of searches logged as a part of that program. Data from the MIS on declining internal reference transactions supports the Medical Sciences
Library’s move toward more departmental liaison work for librarians. The MIS has served the library well for many years. I expect it to continue to evolve as long as management needs data to support decisions.