

# Monographs Acquisitions Time and Cost Studies

## The Next Generation

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*This article is based on time and cost studies conducted at Iowa State University between 1994/95 and 2000/01. It represents a continuation of previous analyses in which monographs acquisitions functions were evaluated and examined with a view toward using the results as a management tool. Continued decreases in time and cost factors were anticipated as the library migrated to more advanced technologies, but time reductions were mitigated by new initiatives that were added to the work processes. As a result of various factors, costs associated with the acquisition of monographs generally increased, but the value of the services provided by the Monographs Acquisitions Department was enhanced considerably.*

Research in the field of time and cost studies is a very relevant tool for administrators and is useful for defining existing trends and predicting future directions for which the organization needs to prepare. This type of research can be especially valuable for libraries in the current environment where those who control the purse strings have an expectation that libraries will be able to prove the value and efficiency of the services they provide. Previous papers based on time and cost study data gathered at Iowa State University have proved of interest to the general library community in providing insight into operational structure and planning. This article is based on more current data, gathered at a time when the library was undergoing a series of changes in processes and organization designed to provide improved service to patrons. This represents a next generation of analysis, based upon statistics that covered the period when library acquisitions operations entered the next phase of technological advancement.

Organizations of all types, all around the world and throughout history, have frequently attempted to measure their effectiveness in relation to their particular stated mission. One of the ways that these organizations accomplish this is to examine variables generated by the actions or outputs of their operations. Two of the most important variables that can be measured by any organization are *time*, the amount of chronological units expended by employees in accomplishing their tasks in service of the organization's goals, and *cost*, the amount of financial units expended in the same way.

The goal of this endeavor is to increase the organization's effectiveness by examining and measuring what expendable resources (such as time, money, and other items) are being utilized and how they are being utilized. By doing this, managers and administrators are able to better comprehend how their organization

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functions, how it is meeting its stated (and unstated) goals, and how that performance could be improved.

To this end, between 1987 and 2001, the Iowa State University Library helped to create and implement an exhaustive time and cost study that examined these factors within the library's Technical Services Department. This article continues previous examinations of this study published in 1992 and 1996 and will cover the time period from when these papers ended their coverage (1994) until the study's completion in 2001.

This article largely follows the pattern established by two previously published papers that were based on the Iowa State University (ISU) time and cost study data. The study was begun in April 1987 and was suspended at ISU after 2001.

### The Purpose of Cost Studies

This cost study was instituted in 1987 and, at the time, its primary goal was to examine how the increased use of automation in the library was affecting the services that it provided and products that it produced, all of which, in turn, affected the end users of the institution. When cost studies are produced, they are frequently motivated by various institutional factors. Principal among these are the institution's increased expectations of fiscal accountability and declining budgets, which force an examination of how to use institutional resources more efficiently and effectively and where to make cutbacks, if necessary.

Bedford (1989) has noted three main reasons for conducting time and cost surveys: (1) to provide a management tool for controlling the costs of technical processing functions; (2) to manage technical processing functions with a progressive and dynamic approach; and (3) to compare cost information across academic research libraries in order to gain insights into factors that have direct effects on cost levels.

Cost studies are also very useful for managers, as well as potentially invaluable political tools for administrators. Kantor (1989) asserts that this cost information can be used to justify the costs (whether they are increasing or decreasing) of library operations to the "people who pay the bills," as well as being a motivational tool for staff and managers.

Two additional, recent papers examine time and cost studies through different prisms and use different methods for sampling and analyzing, diverging from those used at Iowa State University. Poll (2001) addressed activity-based costing that was tested at the Münster University and Regional Library in Germany from April 1997 to July 1999. One goal was to create a "transparency of costs," in other words, to make the disposition of expenditures easily visible, to better serve library political needs, and to justify costs for the funding institution. In this survey, the staff

filled out log sheets for two weeks. The results of these log books, which reflect the time a staff member spent on each activity, were extrapolated out to one year, rather than taking sample weeks throughout the year.

Lawrence, Connaway, and Brigham (2001) took a broader approach, looking at library costs as they are spread out over the total life cycle of an item within a library collection. They were concerned with developing metrics for measuring and comparing these costs and for calculating those performance and cost metrics. The study also was able to quantify the relationship between an item's purchase cost and subsequent maintenance costs using a combination of work measurements and estimation methods.

### Time and Cost Studies at Iowa State University

Because of the wealth of raw data available from years of statistical reporting, numerous papers have been published that were based on time and cost analysis of various functions of library technical service operations at Iowa State University. These papers focused on aspects of cataloging, exploring how costs were affected by automation and the evolving national database of bibliographic records, and identifying work processes of high cost as fruitful areas to analyze with the goal of continuing cost reduction (Morris 1992; Morris and Osmus 1992; Morris and Wool 1999; and Morris et al. 2000). Two of the studies focused on early data concerning the high costs of acquiring monographs. Rebarcak and Morris (1996) described their analysis of the then most recent complete year of data, 1994/95, and analyzed the productive and nonproductive elements of the monographs acquisitions work processes. Morris, Rebarcak, and Rowley (1996) analyzed several years of then recent data, from 1990/91 to 1994/95, to obtain a clearer view of the relevant time and cost centers over the passage of time. They drew conclusions that initial automation efforts had only had a limited impact on acquisition costs, due to limitations in the scope of the changes that were implemented. The analysis in this article picks up where the previous data left off in terms of overall chronology.

### Key Findings of the Previous Monographs Acquisitions Analysis

The results of the raw data analysis from the time and cost studies have been published in previous papers and need not be repeated in detail here. To summarize briefly, these papers found that conversion from a manual system to an online system made the work processes, in general, more efficient, thus resulting in greater productivity and accuracy in departmental operations. The time reduction enabled cutting staff positions, which translated into cost

efficiencies, although cost reduction was offset by other factors, such as the reclassification of the remaining staff. In addition, one particular task, receiving materials, grew more complex and time-consuming because greater client expectations required incorporating new elements. However, the most crucial finding of the study was that acquisitions operations were largely just mechanized versions of earlier processes. They did not take advantage of technology to transform the process and to gain greater efficiency and value, as the Cataloging Department had done when reaping the benefits of cooperative cataloging made available by bibliographic utilities, such as OCLC. In the following five years, partly as a result of the cost study analysis that had gone on before, new initiatives and projects in the ISU Library did result in changes to some work processes. The changes mandated by these processes resulted in increased efficiencies, which continued to be refined in terms of time made available for more complex work processes and the delivery of enhanced products and services.

## Methods

Methods largely follow patterns established in the previously cited Iowa State University papers.

## Definitions

For the purposes of this study, and in the two previous papers, cost centers were created to allow analysis of time spent on tasks within the Technical Services Division. Eight centers were established; these were subdivided initially into 130 and eventually 139 tasks, which were then tracked for this study. The centers are divided into two major groups: product and overhead centers.

*Product centers* produce a product or service and include the time devoted to the following activities.

1. Acquisitions: All of the ordering, receiving, and claiming functions in the department, as well as the maintenance of associated files, but not the selection of materials, which is handled by selectors in the Public Services and Collections Division.
2. Cataloging: Copy and original cataloging, searching for copy, authority work, recataloging, and internal file maintenance associated with all new title cataloging.
3. Volume preparation: All functions associated with marking materials, inserting Tattle Tape, and in-house binding.
4. Catalog maintenance: All activities involved in maintaining online databases (public access catalog and serials catalog), card catalogs, and shelf lists; making holdings and location changes; and entering any cataloging completed off-line into OCLC.
5. Conversion: A long-term retrospective bibliographic conversion project as well as other smaller conversion projects, such as authority and serials Kardex records.

*Overhead centers* do not produce products or services; they support such activities. In time and cost analysis, the cost of the following centers must be apportioned back to the above product centers in order to arrive at the full cost of providing a product or service.

1. Support services: All administrative time, attendance at meetings, nondivisional library and university work, professional service and research, secretarial support, and any other work time not associated with any one center.
2. Leave: Vacation, sick leave, and holidays that occurred during a given sample week.
3. Automation: Time spent in software development and support, OCLC activities, some NOTIS/Horizon support, and the acquisition, utilization, and customization of hardware setup.

Each center contains common tasks such as training, procedure and policy documentation, consulting and referring, solving problems, sorting/shelving/distributing/receiving, and revising. Task definitions were based on logical differentiations between work activities, identifying activities that were anticipated to change with increased automation, and the uniformity of task definitions across cost centers to facilitate analysis on a wider basis. The centers and tasks originally were developed at Iowa State University in the late 1980s. In 1998, a multi-institution study of technical services was initiated with ISU; Vanderbilt University; Cornell University; University of California–Santa Barbara; and the University of Missouri–Kansas City. During this three-year study, the centers and tasks were enhanced and validated through successful use by all libraries.

## Data Collection

All technical services staff tracked their work hours during one-week sample periods that occurred initially six times a year, but that were later (in year three) decreased to four times a year. Collection periods were selected systematically. Time was recorded in quarter-hour increments and rounded to the nearest quarter-hour. Individual times were added together to determine the departmental totals for time spent on each task for a given sample week.

### Salaries and Costs

In each sample week, the annual salary data, including benefits, were gathered for each employee, and an hourly salary was calculated. For hourly employees, primarily students, their actual hourly wage was used. Time recorded in each task was multiplied by a given staff member's hourly salary in order to calculate the costs associated with each staff member's task. The cost for each task was the sum of all individual task costs.

### Recording of Data

Each employee was assigned a position number that indicated his or her location in the library organization. Members who held two or more positions in different areas were assigned multiple numbers. These numbers were used to sort data by organizational level. The data was collected anonymously. Reports issued from the study did not identify individual staff.

### The Focus of the Analysis

The longevity of the ISU cost center studies has presented a unique opportunity to study consistently gathered data on Technical Services Division costs during a period of great technological and philosophical changes in library operations, both in librarianship as a whole, and with this library in particular. This article focuses on the time and cost data associated with staffing for the Monographs Acquisitions Department within the Technical Services Division at ISU. The authors intend to review and update the findings presented in two previous papers—Morris, Rebarcak, and Rowley (1996) and Rebarcak and Morris (1996)—that analyzed data gathered from the same time and cost study from 1987/88 through 1994/95. These previous analyses recorded and illustrated changes that occurred during the transition period from a purely manual acquisition process into the nearly complete implementation of an automated, integrated library system (ILS).

During the subsequent five years, the pace of change has continued to quicken. The following analysis will demonstrate the impact of migration from a relatively primitive mainframe system to a more flexible client-server system, the impact of selecting or changing a major vendor, and the impact of taking advantage of outsourced products and services, such as PromptCat records, and subsequently integrating them into the Monographs Acquisitions Department's workflow. Much of the impetus for these major changes came as a result of decisions based on the previously mentioned and still continuing time and cost analysis, which aimed to drive down costs whenever possible or, alternatively, add value to the end product in cases

where cost reduction was not the most important goal. The cost center analysis has thus been utilized as a practical tool. The initial papers on monograph acquisitions processes described a dramatic reduction in time and cost associated with some ordering tasks as the Monographs Acquisitions Department went through a considerable shake-up during the mechanization of its processes. The data analyzed in this article describe the work environment that resulted after that initial time reduction took place and as new programs, which sought to continue improving the efficiency of monograph acquisitions processes, were implemented. These changes sometimes resulted in enhanced products rather than reduction of labor.

### Structural Changes at ISU from 1994/95 to 2000/01

Major structural changes were implemented at ISU between 1994/95 and 2000/01. Efficiencies resulted from automation and completing the transition from a manual monographs acquisitions function to an online ILS. The decision-making process that instituted these changes was based partially on the findings of previous cost study analyses. As a result, the faculty position supervising monographic acquisitions was eliminated, and the functions were merged with the Serials Acquisitions Department to form a larger, unified Acquisitions Department. To avoid confusion, in the following text, the department and its succeeding incarnation as a section will be referred to as the Monographs Acquisitions Department.

The duties of the Monographs Acquisitions Department consist of vendor selection, ordering, receiving, claiming, and record maintenance. Pre-order searching and payment for material fall outside the responsibility of the department.

In 1994/95, the Monographs Acquisitions Department was comprised of a faculty department head and 7.5 full-time equivalent (FTE) merit staff employees. As a result of having eliminated several staff positions through attrition, by 2000/01, the Monographs Acquisitions Department was headed by a professional and scientific (P & S) class member and staffed by 4.5 FTE merit staff members. The need for student assistants lessened even more dramatically. In 1993/94, the Monographs Acquisitions Department hired 1.15 FTE of student assistance, and in 2000/01, the department only required .17 FTE.

### Production Statistics

Consistent with practice reported in a previous paper, receipt statistics were used as a general productivity marker, which enabled costs to be assigned to the various activities performed (see figure 1). Based on the receipt statistics, productivity generally increased during the period of analysis except from 1997/98 to 1998/99, the years

leading up to and encompassing the library's migration to a new ILS, after which productivity recovered.

The analysis of monograph acquisitions activities is focused on the years 1994/95 through 2000/01. In some figures, statistical data from 1993/94 is included as a base level to understand how the first analyzed year (1994/95) underwent change.

### Major Events and Projects in Monographs Acquisitions

At the start of this period, the ISU Library had decided to stop using multiple approval vendors and to choose one single, major approval vendor. The intent was to increase ordering and processing efficiency, to take advantage of vendor-produced management reports, and to assist in negotiating more advantageous discounts. YBP Library Services won the bid to become ISU's major monograph vendor in 1994/95. The consolidation of various types of orders took some time, and the department staff was required to learn new patterns of communication with the new vendor.

As previously mentioned, in January 1996, the former Monographs Acquisitions Department was merged with Serials Acquisitions to form a unified Acquisitions Department. This resulted in major changes in staffing considerations, since the former department lost a faculty member, whose job had been to supervise monograph acquisitions. However, the decision had been made that this would be an appropriate staff deletion. Since the monograph ordering and receipt processes had been streamlined, they required less direct intervention and supervision by a professional librarian. This new hierarchical structure was instituted smoothly with no measurable negative impact on productivity.

In October 1996, ISU's Parks Library, in cooperation with both OCLC and YBP Library Services, implemented the receipt of PromptCat records for items handled on the YBP Library Services book approval plan. This was only a small step in furthering the library's use of outsourced monograph processing, but it was all that was feasible at the time, given local preferences for flexible selection and physical processing. Due to the library's wish to retain the right to reject approval material that did not fit the library's collection development requirements, physical processing of these volumes was not desirable. A cataloging profile was created that defined the exceptions for which the library did not choose to receive OCLC records along with the approval material (volumes from numbered series, volumes from sets that were subsequent to volume 1, and Z classification titles). The staff person who handled approval receipts was required to learn certain cataloging criteria in order to determine whether or not the PromptCat cataloging record required any further work from the library's

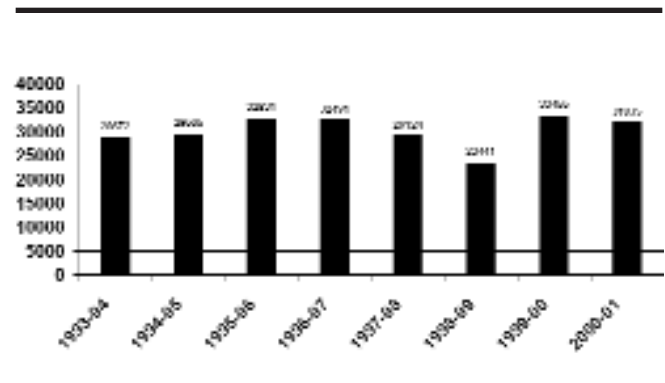


Figure 1. Monographic Production Units

in-house catalogers, or if the record could be accepted "as is." The fields for the ISBN number, title and subtitle, imprint, series, call number, and encoding level had to be considered for accuracy and completeness. These added processing elements made the receiving process more time-consuming, which consequently required reclassification of the staff member involved. The benefit of this was that monographs were now processed more quickly, since they now could normally bypass the in-house cataloging process.

The Cataloging Department realized additional benefits as well. One result was that the library was able to shift responsibility for cataloging down in the organization, since copy catalogers now had the time to work on the less-than-full level of copy cataloging that formerly had been done by faculty catalogers, thus freeing the time of faculty catalogers to work on more original cataloging. All levels of catalogers had sufficient time to handle the emerging need for cataloging of electronic resources.

The most dramatic event that affected the monograph acquisitions staff during these years was the decision to migrate to a client-server-based ILS system called Horizon, done, in part, as a measure to anticipate the then-feared "Y2K" computer problem, rather than simply patching the NOTIS system to handle the issue. Preparation and training for the migration, as well as postimplementation cleanup and enhancement of records, required major efforts and concentration from the staff. The nearly three-month hiatus from December 1998 through February 1999, when technical service operations could not be performed, required a frustrating adjustment on the part of the highly motivated staff. In addition, another issue was that acquisitions information would now be scattered among numerous screens of data, as opposed to residing centrally on a single screen; local requirements have since resulted in many new fields being added to Horizon via local software development. Thus, procedures for ordering and receiving are correspondingly more complicated than they were in the old NOTIS environment.

### Specific Tasks Showing Growth or Reduction

#### Training and Revision

Both time and costs in this category gradually were reduced to minimal levels, though they recorded a temporary upswing in 1996/97 and 1997/98, after which they resumed their previous sharp downward trend until they leveled off (see figures 2 and 3). Percentages in figures 2, 3, and the following figures are based on 100% equaling the total of all technical services staff time spent in monographs acquisitions tasks.

During these years, the department was eliminating positions through attrition, as digitized online processes made operating procedures more efficient. In addition, staff members were being reclassified in recognition of the greater range of responsibilities they had to assume and the increased complexity of an ILS. Therefore, most staff stayed in the department, and few new staff members were hired, thus reducing the need for basic employee training. The task of training showed a temporary increase in 1996/97 and 1997/98. This was due to the loss of an experienced staff member, whose position was not refilled, and resulted in the department's other staff members being trained to handle the former position's responsibilities.

This category also included revision as well as training. While systems training was a factor in completing the conversion of manual processes to NOTIS (1993/94), when approval receipts had begun to be processed online, and during the second generation conversion from NOTIS to Horizon (1998/99), time still dropped in this category due to the need for less revision. Digitized NOTIS records were less prone to error, and revision speed was increased in the NOTIS environment because of the greater accuracy of records. This reduction in revision was accelerated later when Horizon was introduced, since there was no longer an opportunity for formal revision after the initial work had been accomplished. Revision had to become self-revision within the work process. In addition, as the staff became well trained in their more complex duties, the need to catch errors greatly diminished.

Differences in the rate of decrease and increase between time and cost in this category tended to indicate the level of staffing involved in the training process. In 1995/96, costs fell more sharply than did time. This resulted from the loss of the faculty supervisor position when the Monographs Acquisitions Department was restructured into a section within the larger Acquisitions Department and when training duties were consequently undertaken by less expensive staff. Costs also rose at a higher percentage during 1996/97 and 1997/98, due to the loss of an experienced staff member, whose higher-salaried supervisor then was required to perform all of that person's training and revision duties. However, in 2000/01, while costs were only

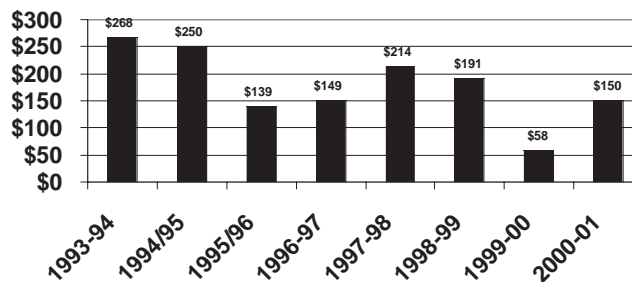


Figure 2. Training/Revision—Costs

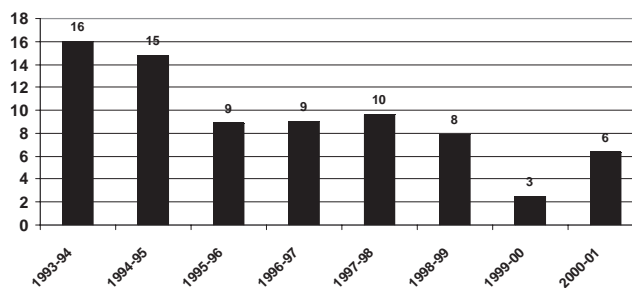


Figure 3. Training/Revision—Hours

slightly increased over the previous year, the time spent in this cost center rose at a more pronounced rate, reflecting the fact that training of new student assistants had been delegated to lower-level staff than the departmental supervisor.

#### Consulting and Problem Solving

A distinct downward trend in time and cost in this category continued until 1997/98, when statistics rose (see figures 4 and 5). During the period from 1993/94 to 1996/97, many important changes were accomplished without reducing momentum toward the goal of trimming time spent in this activity. The final steps of online conversion, switching to a new major vendor, implementation of a new department structure, and introduction of PromptCat processing were all accomplished in a cost-effective fashion by staff who had been trained and reclassified to handle added complexities. The restructuring of the department after the faculty-level department head left was also a factor, since the remaining staff had been trained in advance to handle more complex decisions with greater autonomy and less consultation.

The time increase during 1997/98 was primarily due to consultation discussions on how to remove the task of the physical processing of volumes from the workflows of the department. The increase also was partly due to the loss of

a key ordering assistant, whose position was not filled. The work of this position had to be integrated into the activities of the remaining staff, who had to take on new ordering tasks. The time increase starting in 1998/99 initially was due almost entirely to the migration from the NOTIS system to Horizon, which called for the complete reworking and advance testing of existing procedures, and then the subsequent debugging period after the system went into production. The time spent in solving problems may have been exacerbated by a temporary loss of access to closed orders. A key system migration decision had been to migrate only the library's open orders to Horizon. The closed orders were extracted for later use, and the creation of a searchable Access file of this data was not a high priority. For many months, the acquisitions staff had to solve any problems associated with closed orders without reference to this information. This may have added to the amount of time and consultation needed to make any decisions; it also led to problems being set aside until the missing data was made available. The needs of the more complex ILS system, which experienced more frequent upgrades than had the former turnkey system, had an impact in increasing time spent in this cost center. In addition, orders increased in complexity, due to selector interest in new sources for material located on various Web sites. Order complexity has continued to keep this cost center's time and costs high.

### Searching

While most of the statistical data associated with the cost centers analyzed in this article pertain to the work of the Monographs Acquisitions Department's staff, a complete analysis of monographic acquisitions functions within the Technical Services Division would not be complete without discussing the cost center of searching (see figures 6 and 7). This activity was performed almost entirely by members of the Monographs Copy Cataloging Department's Pre-Order Searching Unit and not by members of the Monographs Acquisitions Department.

Analysis of 1994/95 and 1995/96 indicates that time and costs increased each year compared to the previous year, though firm orders, based on receipt history (figure 12) continued to rise. Although orders searched do not always equate to the number of orders processed, since requests may be weeded out by the searching activity, this cost center demonstrates the division's increased productivity. Searching was streamlined through the conversion of manual monograph ordering to the ILS system as well as general improvements at OCLC due to technology improvements and increased completeness of the bibliographic database during this time period.

However, in 1996/97, both time and costs for searching rose for one year only, although firm orders started a down-

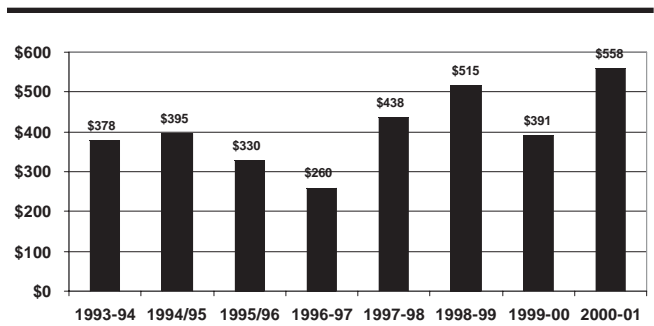


Figure 4. Consulting/Problems—Cost

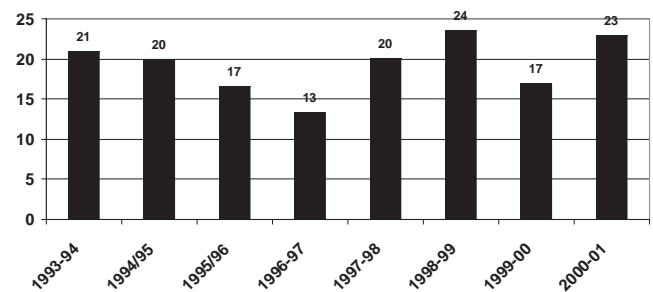


Figure 5. Consulting/Problems—Hours

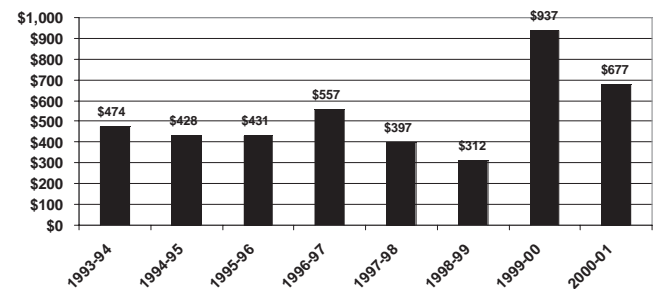


Figure 6. Searching—Costs

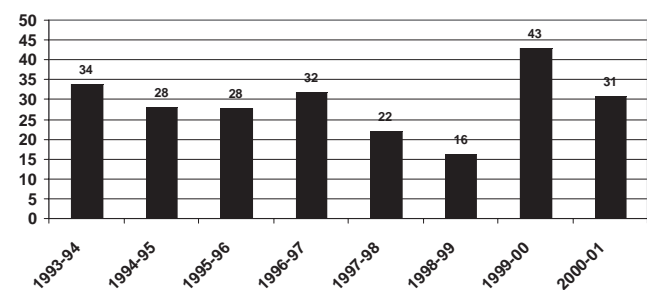


Figure 7. Searching—Hours

ward trend that lasted for three years. This was an unusual year for searching analysis to describe, since the library was making changes in its acquisition of copublished British and American imprints. Whereas the library formerly had maintained an approval plan to supply British imprints, during that year the plan was discontinued, resulting in a large backlog of requests to be searched to determine if the library had acquired or ordered the books' American imprints already. In many instances, this had occurred, so this transition year saw a higher than normal number of searches that did not result in orders.

In 1997/98 and 1998/99, the time and cost declined again, reflecting the decrease in firm orders. In the latter year, this decrease was exacerbated by the Horizon migration, which forced a stop in ordering activity for a three-month period and which mandated that ordering become a lower-level priority than receiving once the system was operational.

In 1999/2000, the huge increase in time, cost, and order numbers reflects the fact that receipts were now under control, so orders were returned to their normal high priority status. A large backlog of orders now could be processed. By 2000/01, these statistical numbers all showed a reduction over the previous year, reflecting what was a normal level of activity, since the backlog no longer existed and orders were keeping pace with collection development expectations.

### Ordering

This task, in particular, is heavily dependent on selector activity and, in some years, the authorization of orders was a lower priority than others for some of these particular selectors. Their division (Public Services and Collection Development) was restructured in 1997, when broad subject area responsibilities were split up into narrower subject categories and distributed among a larger number of selectors, many of whom were new to selection responsibilities. However, selection was only one component of the faculty job descriptions in the public service areas, and it sometimes was forced to become a lower priority due to large, ongoing collection development projects and other public service responsibilities, such as reference and instructional duties. A final factor was that some budget years were less robust than others, with a related decline in the numbers of orders submitted.

Those administering monographs acquisitions functions must take this variability of high and low ordering patterns into account when making decisions on how to accomplish ordering goals when the amount of the department's staffing remains stable. This requires the department to be responsive to these variable factors when prioritizing staff work.

Ordering activity among the selectors is more naturally tied to the academic year cycle, while Monographs

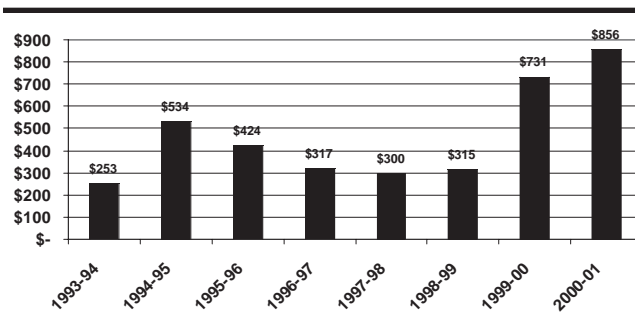


Figure 8. Ordering—Costs

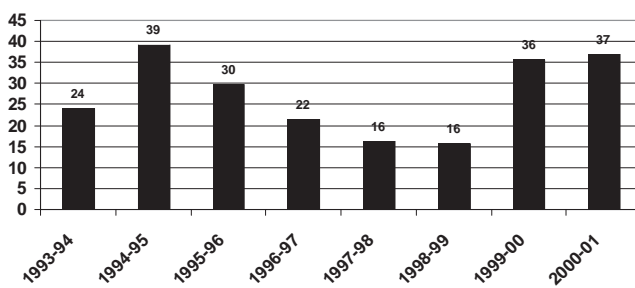


Figure 9. Ordering—Hours

Acquisitions Department preferences in this area are more naturally tied to the fiscal year cycle. Complicating matters further, the publishing industry follows its own calendar. Maintaining an even flow of order requests (and their resulting receipts) can be difficult due to these conflicting cycles.

Time and costs associated with ordering evidence a large increase from 1993/94 to 1994/95 due to the department's transition to a new major monograph vendor, YBP Library Services (see figures 8 and 9). Costs increased during this period even more than time did, which reflected the need for the department's highest-level staff to devote sufficient time to implementing this transition and also to assist in overcoming inevitable start-up problems. In addition, the rise in receipt statistics for firm orders during both 1994/95 and 1995/96 reflects the placement of increased numbers of firm orders. The streamlining effect of the library's reliance on one vendor approval plan, as opposed to a number of smaller ones, meant that the library was able to identify and fill gaps in its collection. The library also was able to rely on the consistency provided by the single plan in placing orders based on form selection. From 1994/95 until 1998/99, time spent in ordering dropped consistently. The number of orders placed during these years had remained stable up until 1997/98. The time reduction was primarily due to a greater facility with



digitized systems by the now technically experienced staff, the increased efficiency of dealing with one major vendor as opposed to several, and the increased acquisition of approval plan materials. In 1997/98, orders dropped as a direct result of the reorganization of selection responsibilities among the subject selectors.

Costs also decreased sharply at first, but then at a much flatter rate during 1997/98 and 1998/99 as a result of a merit staff position that had become vacant and was not filled because the amount of orders being placed at that time did not warrant it. This staffing loss meant that the professional and scientific (P & S) staff member who headed monographs acquisitions needed to devote more time to assigning orders to vendors and processing nonroutine orders—tasks that were formerly undertaken by the less expensive merit staff member.

In 1998/99, the library migrated from NOTIS to Horizon. Technical services experienced a three-month period from December to February during which neither system was available. Time continued to be recorded in ordering activities during this period, since the staff was organizing and managing backlogs of order requests and approval receipts, though few orders were placed aside from rush orders, which were placed via manually typed purchase orders.

The system migration from NOTIS to Horizon was the most disruptive event affecting the Monographs Acquisitions Department at that time; in the following year, time and costs more than doubled. The large increase reflected the need for the staff to catch up with the order request backlog during 1999/2000, since they had not been able to devote significant time to ordering after Horizon had become available in the previous year because of the priority given to processing receipts. The differential in the time spent and in productivity (orders placed also increased, but not at quite the same rate as the time spent in the task) is due to more complex ordering procedures required by Horizon's multiple relationship screens (purchase order, item record, copy record) as contrasted with the simple NOTIS order/pay/receipt record.

In 2000/01, time and costs continued to increase, but at a much lesser rate, despite the fact that the number of orders dropped slightly. This is another indicator of the increased complexity of orders for materials the selectors located on specialized Web sites and which needed to be handled in a nonroutine fashion in the Monographs Acquisitions Department.

### Receiving

Receiving was the cost center that experienced growth in both time and costs, due to several factors (see figures 10 and 11). The previous cost center analysis papers mentioned

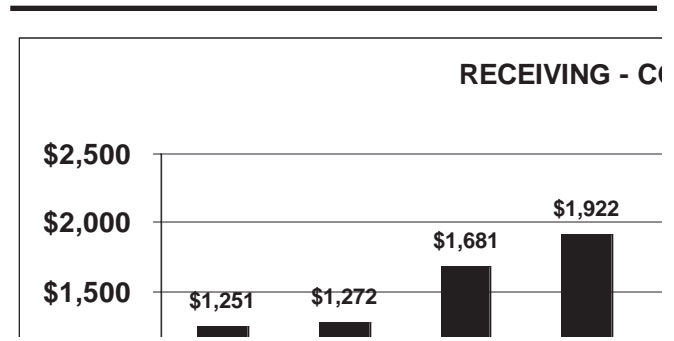


Figure 10. Receiving—Costs

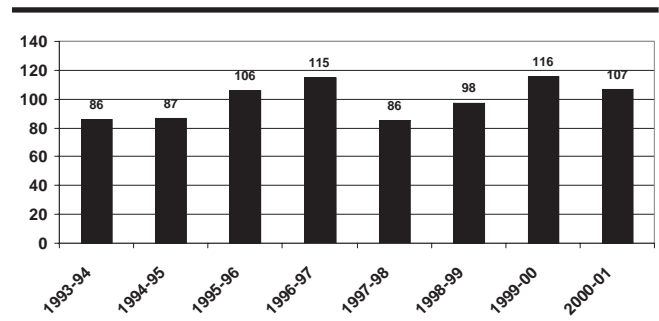


Figure 11. Receiving—Hours

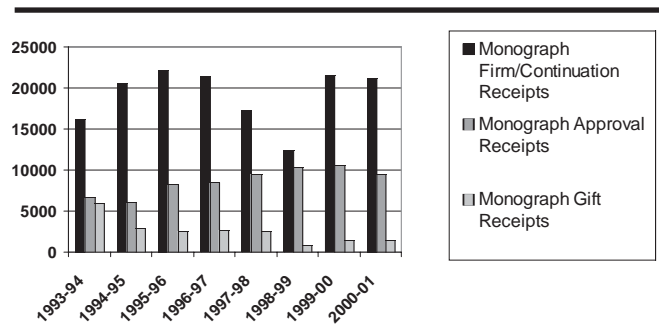


Figure 12. Receipts Defined by Acquisition Type

this finding (Rebarcak and Morris (1996, 71) and Morris, Rebarcak, and Rowley (1996, 305). In the later years covered by this analysis, the trend continued, as is seen in the more detailed receipt statistics, where major technological and ordering initiatives caused the regular pattern of several years of time and cost increases, followed by years of reduction (see figure 12).

During 1994/95, the library switched from using several monographs vendors to using one major monographs vendor. This change was accomplished with no negative impact on time or productivity. Time decreased while overall receipt statistics increased during this year; these

findings confirmed the expectation that concentrating orders with one vendor would streamline work procedures. Although time lessened, the costs in this center did rise slightly in this year due to the need for the department's supervisory staff, who normally have little involvement with receiving, to participate in receipt activities because of the transition.

However, the following two years resulted in consistent increases in time and cost in this task area. In 1995/96, this can be accounted for partly by the increased number of receipts processed, particularly in the areas of firm orders and approvals. The increased approval receipts may have increased the amount of time spent in the receipt cost center, but they also resulted in a time reduction for ordering. In 1996/97, time still increased, although the overall amount of receipts had lessened. The most telling factor in this instance was the introduction of PromptCat records for the approval materials. The amount of approval items received in this year actually increased slightly, and the amount of time spent in processing these materials also was affected significantly by the new requirement to evaluate the PromptCat records as part of the workflow in acquisitions. However, the increased cost and time that were experienced by the acquisitions staff and the cost of the PromptCat service itself were balanced by the value-added results of the program. Since these materials bypassed cataloging, they were available to the public more quickly, and catalogers now had time for new services (cataloging electronic resources) and increasing the volume of original cataloging, which resulted in improving patron access in general.

In 1997/98, time and cost in this task area decreased considerably, which reflected an overall decrease in materials received. Approval receipts, by contrast, continued to increase, partially due to continued efforts at refining the approval plan and also as a result of a project to convert standing order series into approval series. The increase in approval receipts did not have a negative impact on the downward trend in time and costs, since the departmental staff had developed expertise in handling PromptCat materials, improving the productivity in this area.

The library migrated to the Horizon system in 1998/99. This transition period put receipts on hold for nearly three months while technical services was in limbo between the two systems. The number of receipts fell to its lowest recent level during this period, but time within this category rose since considerable time and effort were devoted to processing receipts even in the interim period in order to organize the shipments for ready reference and prioritize them for future processing. If it had not been for this staff effort, which was only temporarily necessary due to the long gap between production systems, the amount of time devoted to this task would have decreased at the same rate

as the production units did. The ever-increasing number of approval receipts made up an even higher percentage during this year when ordering was impossible for the interim waiting period, but vendor approval shipments continued to occur on a weekly basis.

In 1999/2000, the Monographs Acquisitions Department rebounded from its backlog of receipts created by the system migration. Productivity (as measured by receipt statistics) increased even more than time and cost from the previous year since valuable staff time was not taken up by the need to organize materials now that shipments were being kept current. The introduction in February 2000 of bar coding at receipt was expected to detract from the efficiency of the receipt process, but had no discernable negative impact on productivity. In 2000/01, time and costs in this cost center dropped in accordance with the similar drop in receipt statistics.

#### Record Maintenance

Productivity within this particular task is difficult to evaluate, as statistics are not necessarily maintained for the various processing efforts that together are referred to as "record maintenance." For example, statistics are kept for claims and cancellations, but not for updating status notes, adding notification requests for patrons, or handling book returns. Statistics also were not maintained for the extensive cleanup projects that became necessary during the conversion of existing orders to the new system. These projects were essential aspects of preparing for and implementing new ILS system, as well as shifting the standing orders to a new vendor.

In 1994/95, time and cost in this task category showed a considerable decrease from the previous year, as staff became more efficient in the online NOTIS environment (see figures 13 and 14). In the area of claiming, in particular, the digitized processes enabled staff to be much more timely in noting missing materials and making claims for them, consequently eliminating the time that staff had formerly devoted to searching for claimable items in the manual order file. In addition, automated claim letters were generated with greater speed and more accuracy when they did not require manual typing.

During the next two years, the amount of time expended in this task area decreased slightly and plateaued. However, time and cost increased dramatically in 1997/98. This was because of a temporary loss of overall efficiency when the aforementioned key merit staff position became vacant and was not filled. As a result, record maintenance activities had to be reassigned among the remaining staff members. In addition, there was a massive effort to prepare the NOTIS vendor address file for conversion to Horizon, required since NOTIS had allowed vendor addresses to be

created without creating vendor codes, and this was not possible in Horizon.

During the implementation year of 1998/99, there was a drop in time levels recorded for this activity, which primarily reflected the inability of staff to update records while between systems for nearly three months. The time level was still fairly high compared to most of the previous years because of pre-implementation projects to prepare for the migration and post-implementation projects to clean up records that had migrated to the new system incorrectly. One crucial project had prepared NOTIS fund codes so that the information in them could be converted into two separate fields—budget codes and subject codes. This innovation eliminated the need to constantly update fund records, a task that had plagued both collection development and acquisitions staffs associated with the ordering and payment functions.

In 1999/2000, time had decreased by half, to a level below previous years. Costs dropped even more significantly, since the implementation year had required more effort on the part of the higher-salaried section head to initiate, oversee, or accomplish various Horizon-related projects. However, time and costs increased again in 2000/01, as the department was able to resume a more normal level of activities in record maintenance. Claiming had taken a backseat while activities such as receiving and ordering were given higher priority in order to diminish the backlogs that had built up during the system migration. During this year, routine and systematic claiming was resumed, and a considerable backlog needed to be cleared in this activity as well. In addition, one of the library's back-issue suppliers went out of business, requiring a number of cancellations.

#### Other Acquisitions Cost Centers (Payments; Monitoring and Analysis; Other)

The cost centers of payments and monitoring/analysis were little used by monographs acquisitions staff when filling out their weekly timesheets. Although these cost center categories were available for use by all technical services staff, most of the responsibility for work in these areas fell outside of monographs acquisitions and in the payments unit. No analysis was performed on the statistical data in these cost centers since the amount of time spent in them by monographs acquisitions staff was too low to be statistically meaningful. No analysis was performed on the data in the cost center of "other" either, although the staff did attribute significant amounts of time to this cost center. In this case, institutional memory about the nature of the activities included in this cost center over the years has proved to be uncertain, rendering analysis impossible.

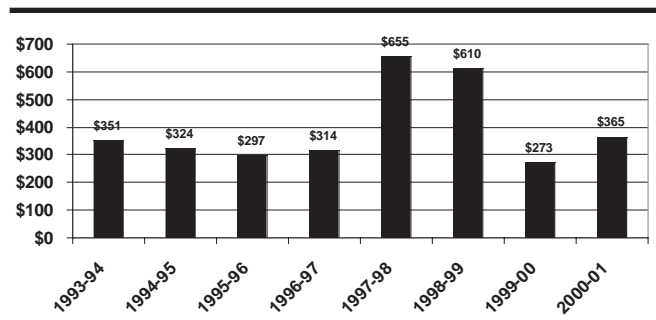


Figure 13. Record Maintenance—Cost

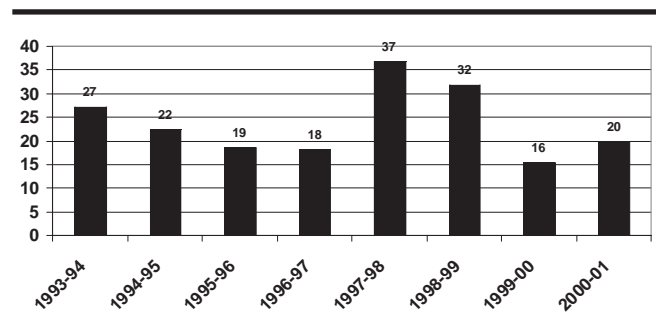


Figure 14. Record Maintenance—Hours

#### Comparative Trends Noted in the Current Analysis

A comparison of two particular years of analyzed data—1993/94, the year prior to the changes described in the present analysis, and 2000/01, where the present analysis concludes—is useful. The comparison offers a snapshot of how the Monographs Acquisitions Department was affected by its transition from a recently mechanized environment to an environment poised to take advantage of the greater flexibility of a new generation of library automation, and by the introduction of ordering initiatives designed to improve productivity.

The two pie charts in figures 15 and 16 visually represent the percentage of time spent by monographs acquisitions staff in acquisitions activities alone (excluding time spent in support service cost centers for activities such as vacation, sick leave, meetings, and administration). Monitoring and analysis, as well as payments, are tasks that are rarely performed in monographs acquisitions, and they are statistically insignificant. Consulting and problem solving also take up nearly the same percentage of time in 2000/01 as they did in 1993/1994; however, the proportion of time spent in training and revision, searching, record maintenance, and in "other" has been reduced. Receipt activities were always the most time-consuming process in monograph acquisitions, but now they consume an even larger percentage. Ordering also has increased its percentage.

Figures 15 and 16 display acquisitions activities as a whole, without the context of comparing the actual hours and salary costs associated with these activities. Despite the department's loss of a full-time staff position, as well as of a faculty supervisor whose costs were largely absorbed by tasks associated with administrative overhead, the amount of time associated with productivity remained stable, reflecting the decline of nonacquisitions-related activities for the staff, who were able to focus more of their work time toward acquisitions. Whenever opportunities for paring down time and costs arose, opportunities also arose for utilizing the newly available time. New responsibilities were assigned to the staff in the form of new initiatives (such as PromptCat) or expanded use of new technologies to produce more complex or flexible reports or to speed up the processing of orders. Although staff productivity in terms of time remained constant overall and costs certainly rose, the productivity and implied value of the service also increased. In table 1, the representation of chronological units associated with the cost centers' time divided by the production units is in terms of one-hundredth of an hour, not in minutes.

Using monographic receipt statistics for the same two years (1993/94 and 2000/01) as the represented production units, and dividing these units into the salary costs for the acquisitions cost centers, offers a more objective comparison. All of the costs in table 2 reflect real salaries, including benefits paid, and are not adjusted for cost-of-living increases. If they were so adjusted, they would indicate less cost inflation. The overhead costs mentioned in the table reflect the costs the monographs acquisitions staff members spent in nonacquisitions activities (meetings, administration, automation, professional work, etc.) and on leave. These costs are proportionally added to the cost of the acquisition tasks. The costs for departmental overhead similarly reflect the cost of these nonacquisition activities of the department level administration, proportionally divided among the activities of the entire department, not just monographs acquisitions. The dollar amount of technical services overhead reflects the costs associated with the assistant director for technical services as well as the technical services support staff, proportionally divided among the activities of the entire division.

**Changes Implemented in Monograph Acquisitions Processes**

In general, the Monographs Acquisitions Department experienced increased efficiency and was able to streamline its work processes during the analyzed years by taking advantage of technological opportunities and by working closely with vendors. However, some of the new initiatives that were pursued required increased staff effort and, as

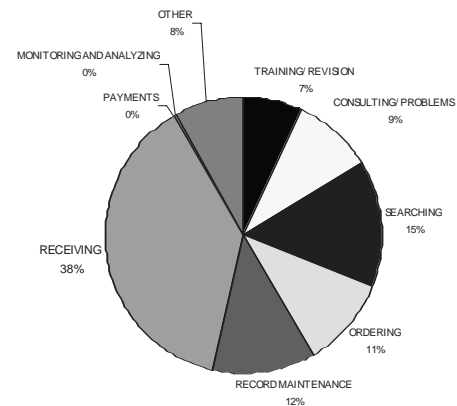


Figure 15. Monograph Acquisitions—Time Percentage 1993-94

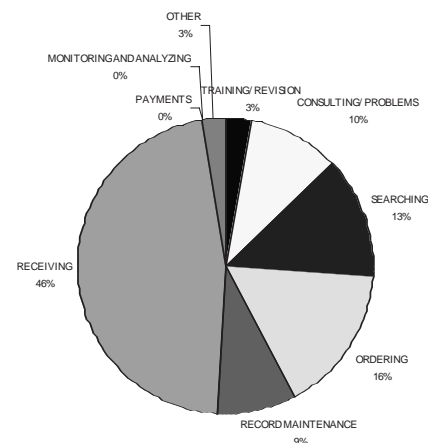


Figure 16. Monograph Acquisitions—Time Percentage 2000-01

such, added to the complexity of the acquisitions work processes. In these instances, the administrative staff felt the library was adding value to the products produced within the cost centers, while simultaneously increasing the amount of time for the processes.

PromptCat

PromptCat (and increased approval plan use generally) represented a form of outsourcing in which the Iowa State University Library chose to participate. However, the library did not take advantage of all of the kinds of outsourcing offered by the vendor. No physical processing of materials was outsourced, since the library's collection development staff still valued its ability to return unwanted approval items. The Monograph Acquisitions Department did a scratch review of the 1999/2000 approval plan returns and found that the library had received and returned

**Table 1.** Weekly Average Production Units/Receipts Average Time Per Task (Hours Divided by Production Units)

Task	1993/94	2000/01
Training/Revision	0.03	0.01
Consulting/Problem-Solving	0.04	0.04
Searching	0.06	0.05
Ordering	0.04	0.06
Record Maintenance	0.05	0.03
Receiving	0.16	0.17
Payments	0.00	0.00
Monitoring/Analysis	0.00	0.00
Other	0.03	0.01

**Table 2.** Average Cost Per Task (Salary Cost Divided by Production Units)

	1993/94	2000/01
Weekly Average Production Units/Receipts	\$309.34	\$414.21
Training/Revision	0.48	0.24
Consulting/Problem-Solving	0.68	0.91
Searching	0.81	1.10
Ordering \$0.45	1.39	
Record Maintenance	0.63	0.59
Receiving	2.26	3.49
Payments	0.01	0.00
Monitoring/Analysis	0.00	0.00
<b>Total Cost Per Unit</b>	<b>\$5.76</b>	<b>\$7.95</b>
Added Cost For Unit Overhead	3.06	1.80
Total Cost Per Unit with Dept. Overhead	0.00	0.98
Added Cost for TS Overhead	0.87	0.58
<b>Total Cost Per Unit with All Overhead</b>	<b>\$9.69</b>	<b>\$11.31</b>

approximately \$16,000 worth of material deemed as unsuitable to ISU collection needs. The library's internal physical processing of material still was valued for its flexibility and its responsiveness to selector requests. The implementation of PromptCat processing meant that monographs acquisitions staff time temporarily increased in the receipt cost centers, until the added steps were fully absorbed by the staff member performing them and the amount of receipt time reverted to its normal level of efficiency. However, this temporary time increase and the continued dollar cost from PromptCat for the vendor and utility processing and products were offset by significant and continuing cost reduction to the library in that the catalogers no longer had to process most of this material. The catalogers now had the time to pursue new initiatives, such as the newly emerged need for cataloging of electronic materials. The materials that were cataloged using the PromptCat process were received fully cataloged and thus were more quickly made available to the public without the delay caused by going through the in-house cataloging processes. The experience of acquiring outsourced services and going through the ini-

tial shakedown period also has benefited the library in its preparation for considering future outsourcing opportunities.

#### Approval Plan and Consolidation into One Major Vendor

The approval process was already in place, but it was expanded during this period, first, by consolidating plans and using one major vendor, and, second, by altering standing orders so that they also were received on approval. Selectors assumed they might wish occasionally to reject items that had previously come automatically in a series. Even after the initial start-up period when the criteria needed constant refinement, whenever a time-reduction discussion focused on eliminating the approval review process, there was some concern from selectors. They felt that they would lose the opportunity to reject unwanted items (for which their subject area would bear the cost), the ability to reassign wanted items to more appropriate subject areas, and the ability to keep current with publishing developments within their subject discipline.

#### Bar Coding

Bar coding was absorbed very easily into the receipt activities of the Monographs Acquisitions Department. No discernable increase in time or loss of productivity was associated with the incorporation of this minor task. It resulted in less need for paper forms to accompany material being processed and enabled staff in cataloging and processing to quickly call up records by "wandering" in the bar codes rather than keying in search queries. It was a task that would have needed to be done later in the process anyway. It was a value-added element to integrate this step into acquisitions activities at the earliest possible opportunity in the workflow.

#### Reports

One outcome of the system migration from NOTIS to Horizon was the ability to take advantage of the more flexible report possibilities in Horizon. Getting to the point of providing effective collection development reports required a tremendous effort on the part of both the information technology and acquisitions staffs. Numerous clean-up projects within monographs acquisitions were defined and accomplished. These eliminated problematic system conversion glitches and also added to the amount of time staff members spent in the cost center of record maintenance. Furthermore, the information technology staff subsequently devised new linkage capabilities that enabled a more flexible manipulation of the data for the creation of

management reports. These required further clean-up projects by the monographs acquisitions staff and also added to the complexity of all ongoing ordering and receipt procedures because of the need to consistently maintain crucial fields for flexible future reporting. The results of these efforts benefited the library's selectors, who finally were able to receive effective reports on expenditures and commitments for monographs orders in their subject areas at the end of 1999/2000. But this also meant that monographs acquisitions staff were required to spend more time on each of their tasks in order to accomplish the more complex procedures.

#### Fund Structure

An outcome of the migration to the Horizon system, which undoubtedly benefited the staff, was the elimination of the need for fund transfers. This was the result of the decision to decouple fund codes from subject codes, and this decision influenced the way in which NOTIS information was converted to Horizon during the migration. In the NOTIS environment, the budget allocation for purchased monographs was divided among hundreds of fund codes, which were mandated by the need to define expenditures along subject lines and also by type of order. Even at the beginning of the fiscal year, there was the potentiality for a fund with a low allocation to become overcommitted, or even overexpended, if orders had been placed but not received and invoiced in the previous fiscal year. Once an overcommitment limit was reached, all future ordering activity associated with that fund code would be halted by the NOTIS system until a selector made a decision to transfer money from another fund into the fund that was running short. If the overexpenditure limit was reached, then receipt activity was similarly halted, since payments generally were required at the point of receipt.

These work stoppages became daily occurrences toward the end of the fiscal year and were very disruptive for order and receipt processing, as well as frustrating for the selectors who found their time taken up by the need to analyze their fund areas and to authorize fund transfers at this relatively minor level. While planning for the Horizon system was still in its early stages, a philosophical decision was made to define the budget allocation to match the university's basic allocation, which was all that was necessary in order to adhere to university auditing standards and balance library accounts. The subject code element was recognized as purely internal to library needs and could be managed by defining it as a separate field that could be manipulated for flexible management reports. Thus, ordering and processing receipts could now take place within the overall acquisition budget and without any artificial limits. Selectors were given a reasonable substitute for monitoring their subject areas, one that improved on the past by its on-demand availability

because the new reports could be run at any time, whereas the NOTIS reports were produced on a monthly basis. This change in fund definition, which was instituted at the time of the system migration, benefited staff from the monographs acquisitions, payments, and collections areas.

#### Revision

Another change prompted by the system migration was the diminished need for revision. Revision became less and less viable, since the proper place for it was in the midst of complex automated steps, where it was inconvenient to stop in order to have the reviser review the processed material. In addition, automation makes typographical errors less likely, as does importing OCLC copy cataloging prior to ordering or receiving the cataloging records as part of the PromptCat process. The complexity of the changed acquisitions processes called for the reclassification of staff positions, which resulted in staff staying longer since they had less economic incentive to search for higher-grade jobs and also because they experienced more job satisfaction with a greater level of responsibility and authority. The retention of experienced staff was a factor in the decision that revision, as such, was no longer necessary and that self-revision would become the new expectation. The section also realized greater time efficiency by having material processed through fewer hands due to the greater autonomy of the staff.

#### Reclassification of Staff

Reclassification of staff at ISU did not have an immediate impact on costs, which came as a surprise, since such a result had been assumed, based on one of the previous papers (Morris, Rebarcak, and Rowley 1996, 307). This phenomenon was attributed to the structure of the merit staff pay steps at Iowa State University. The reclassified staff tended to have been long-time library employees, who had already reached the top of their classification's pay scale; they were called "red-circled" since they had reached the highest step and were unable to continue to rise. Reclassification resulted in the staff being assigned to a higher level of pay, just above that of their previous salary; however, this step was generally a lower step than they had occupied in the lower classification level. Although the staff did not experience a large financial benefit from the process immediately, they did reap a long-term benefit in entering a classification that restored to them a degree of mobility from the step at which they were red-circled. The reclassifications did have a major impact on the cost analysis of monographs acquisitions activities over the long run. The costs associated with the production unit analysis (see table 2) showed a significant rise, although the times associated with the same analysis were generally stable. The deferred costs associated with the

reclassifications, as well as general cost-of-living inflation, were clearly responsible for this phenomenon.

#### Task Redefinition

The cost center of record maintenance experienced the greatest amount of change in terms of the staff tasks that were assigned to it. During the earliest days of this study, much staff time within this cost center was spent in the filing and pulling of records required by a manual system. Due to automation, the need for these particular tasks lessened over time, while new record maintenance activities grew in importance. After the new task breakdown was implemented in June 1996, claims and cancellations (formerly their own categories) fell into this cost center. This task redefinition is one example of how automation changed the work environment.

#### Future Areas for Improvement and Enhancement

At the present time, improvements to the monographs acquisitions process remain unrealized in many areas. Statistics are still taken from manual counts, and the library therefore not only does not take advantage of some of the ILS capabilities, but burdens staff unnecessarily as well. A thorough review of the Horizon system's statistic-gathering ability and internal statistic-keeping needs is required. In addition, potentially fruitful areas to explore are the use of online order request forms and electronic data interchange of orders. Both of these initiatives would eliminate rekeying of information and duplication of effort. The latter initiative also would reduce mailing costs and improve the order fulfillment rate by speeding the entry of data into the vendor database. Neither measure has proven easy to accomplish, due to the need for involvement by numerous entities, both within the library and with vendors. Another area that the library still needs to address adequately is the expectation of users that the library can easily acquire material that they see listed on book dealer Web sites such as Amazon. In this case, the university is still in transition from a paper-based environment involving purchase orders and checks to one that allows flexible use of university credit cards.

#### Conclusion

A system migration and implementation of new vendor services provided monographs acquisitions with the opportunity to make long-advocated changes in acquisition processes that would reduce staff effort in monographs acquisitions and other areas of library staffing, and would provide an improved product for the library staff and for users. While these changes were successful, as borne out by

the cost and time analysis, they were limited to technical services work processes alone. Further evaluation of the future of monographs acquisitions workflows will need to take a more radical and broad-based approach to realize continued time and cost reductions, since the process of acquiring monographs for a large research library involves other library units before the acquisitions staff begins its work.

The transition from the selection decision to the outgoing order requires multiple reviews of the same information from the unique perspective of each of the various units involved; the selection will be searched to determine if the library already owns the item or if its bibliographic information needs to be searched for. Future efforts to reduce the quantity of staff tasks or improve the final product will need to analyze the work processes of all of the players in this process in order to determine if re-engineering or adding further innovations to the work processes or the work structure would have any benefits to offer.

Disadvantages may outweigh the advantages in making future changes and, if the analysis leads to this conclusion, then the workflows of the existing order flow have to be validated or justified. Serious analysis and research into the entire structure is clearly necessary and will require staff to be objective in the analysis of issues and willing to leave their present "comfort zones." Suspending the technical services cost and time study was unfortunate, since the analyzed information on staff time and activities has greatly benefited the library in making major changes in the past and in assessing the impacts of those changes. Nonetheless, the time and cost studies have provided the Iowa State University Library with valuable information and tools to evaluate and improve its workflow processes.

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