Monographs Acquisitions: Staffing Costs and the Impact of Automation

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In this article, the authors examine the staff costs involved in monograph purchases by Iowa State University (ISU) Technical Services and explore the impact of automation on these costs between 1990 and 1995. They demonstrate that acquiring a monograph is now comparatively expensive relative to the costs of cataloging. They describe the impact of staff overhead costs on product or service costs and highlight the impact of professional responsibilities on costs. The authors further demonstrate that the automation of monographs acquisitions, in the main, has really only mechanized former manual processes and has done little to change the fundamental principles underlying the work or provide opportunities for innovation. Lastly, although cost data for collection development has not been documented, the authors explore the relationships between collection development and automated acquisitions, relationships that influence costs.

Throughout much of the twentieth century the professional literature has presented surprisingly little relevant cost data about libraries. Leung (1987) noted that the scarcity of cost figures for cataloging was mirrored by inadequate cost data for all other library functions as well. These findings confirmed an earlier study by Dougherty and Leonard (1970) that covered the years 1876–1969. In recent years, however, there has been a growing awareness of the need for cost studies. Such studies have risen in importance because they serve as relative performance barometers for librarians and, more importantly, because they allow for comparisons over time (Leung 1987).

Iowa State University (ISU) Technical Services initiated a time and cost study in 1987 to investigate the impact of automation on services and products. Typically, interest in cost studies has been sparked by two additional factors: heightened institutional expectations for accountability and genuine fiscal restraints. Fluctuations in costs can reflect changes in many aspects of library operations, including organization, policies and practices, adjustments in workflow and the use of automation.

Bedford (1989) suggests three key reasons for conducting cost surveys: (1) to provide a management tool for controlling the costs of technical processing func-

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tions; (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. Kantor (1989) also supports cost studies because of their usefulness for managers. In addition, he asserts that cost information can be used to justify the costs of library operations to those who pay the bills and to motivate both staff and managers into action.

The ISU Technical Services time and cost study substantiates the opinions of others writing on the benefits of cost analysis. The real costs of divisional services are known; therefore, comparisons of the relative costs of different services are possible. A time and cost analysis reveals how administration, meetings, professional service and scholarship, and other overhead staff costs add significantly to service costs. This information enables staff to see more clearly the costs of the services they deliver and to gain a better understanding of the cost implications of practices and policies. Additionally, it helps managers to make decisions on redirecting staff effort, and it allows both staff and management to better understand and accept the need for change.

Organizational Structure for Monographs Acquisitions

Acquisitions at ISU Technical Services is divided into three functional areas: serials acquisitions, monographs acquisitions, and payments. Payments staff handle both monographs and serials, and it is not possible to sort costs by monographs work only. Therefore this analysis excludes the costs of activities associated with payments for monographs. In addition, collection development responsibilities are in the Collections Division, and these costs also are not included.

ISU Library is an unusually centralized system with one branch library and three reading rooms. Because Technical Services functions have never been distributed there is a unique opportunity to look at total technical service activities. No monographs acquisitions functions are delegated to branch facilities. They do not maintain official on-order files or have any responsibilities for claiming or reconciliation of orders.

During the study, staff in the Monographs Acquisitions Department handled all acquisitions tasks, including all order, receipt, and vendor functions. The only exception was pre-order searching. Staff members in the department evaluated vendor services and discounts, negotiated changes, monitored the budget, referred fund allocation problems, and assured expenditure of the budget. The staff involved in monographs acquisitions included library assistants, some students, and a faculty department head. Since the study's completion, the department head position was eliminated, and monographs acquisitions is now a unit of a larger Acquisitions Department. Pre-order searching, then and since the study, is done by copy catalogers in the Monographs Copy Cataloging Department, and the costs are included in the study.

The ISU Library used the CARLYLE online catalog until it migrated to NOTIS in August 1990. Planning for NOTIS monographs acquisitions implementation began in the 1991–92 academic year. Firm orders and their payment were automated in July 1992, and one year later NOTIS monographs implementation was completed with the addition of approvals and standing orders.

In 1994–95, $1,415,000 was spent on monographs. Nearly 27,000 volumes and more than 2,000 nonbook pieces were purchased. Forty-one percent were received because of a firm order, 24% by approval, 21% by approval form orders, and 14% by standing orders. Nearly 3,000 monograph gifts were processed. During 1994 an approval vendor review was conducted, and in January 1995 the Library changed its major domestic approval vendor. Work is progressing to increase receipts by approval.

Methodology

Time and Cost Sampling

Five times each fiscal year Technical Services staff track all time worked for an

entire week. The sample weeks are spaced 10 weeks apart. Staff record their time within broad product and service centers, and each of these cost centers is divided into tasks.

Each Product and Service Center includes all the time associated with that activity except meetings. Since many meetings are not limited to a center, all meeting time is collected under Support Activities.

Position numbers identify staff within the organizational structure and allow sorting of data in different ways. Staff normally complete their time sheets anonymously. The data are never used for individual performance evaluation.

The exact salary for each employee is collected for every sample week, and benefits are included. Hourly salaries are determined, and the task cost by employee calculated. Task times and costs are summed and form the basis for all analysis.

Production Units and Cost Analysis

In order to determine the costs of products and services, production units must be determined. For monographs acquisitions, total receipts are used. Receipts are basically a volume count. For nonbook material, pieces are counted, except for microfiche, in which case a title count is used to prevent inflation of production units. Production statistics are now submitted for the sample week period. Prior to 1994–95, production units were extrapolated from monthly statistics.

The number of items received is divided into staff costs to arrive at a cost per activity. In order to understand relative costs of the varying acquisitions activities, "receipts" is used as the constant pricing unit. This allows the following costs to be calculated and compared: cost per receipt to search orders, cost per receipt to place orders, cost per receipt to claim orders, cost per receipt to receive material, cost per receipt to maintain order records, cost per receipt to solve problems and monitor costs, and cost per receipt for training and documentation.

In addition, the overhead center costs must be apportioned to the acquisitions tasks. These overhead costs are paid leave time (sick, vacation, and holidays) and support activities (administration, meetings, personal, professional work, etc.). Overhead costs can be assigned at both the department or unit level and for the entire division with varying results. The costs are presented in three ways: (1) cost of acquisitions tasks only: no overhead, (2) cost of acquisitions tasks with departmental overhead, and (3) cost of acquisitions tasks with divisional overhead.

One more cost adjustment is made. Faculty and Professional and Scientific staff who work over 40 hours are not paid for these additional hours. Since the methodology calculates costs by multiplying a staff member's hours worked by her hourly salary, the bottom line can include costs not paid. A formula is used to remove the unpaid "over 40" costs. In this analysis the two different costs are referred to as: Costs: Hours Paid; Costs: Hours Worked.

Costs are shown in the dollars paid during the sample weeks and also are adjusted for inflation to 1994–95 dollars.

Results

Over the course of the five-year study, time spent at monographs acquisitions dropped by 15% (an average reduction of 38 hours per week). By 1994–95 monographs acquisitions tasks accounted for 37% of the total time spent at acquisition functions in Technical Services. Serials Acquisitions accounted for 45% of the balance and Payments for 18% (see figure 1).

For this study monographs acquisitions tasks were combined into seven major functions: Searching, Ordering, Claiming, Receiving, Maintenance, Problems and Costs, and Training and Documentation. The results of each will be discussed separately.

Searching

Order searching includes determination of relationships between editions, location and transfer of OCLC cataloging records, duplicates detection, and prelimi-

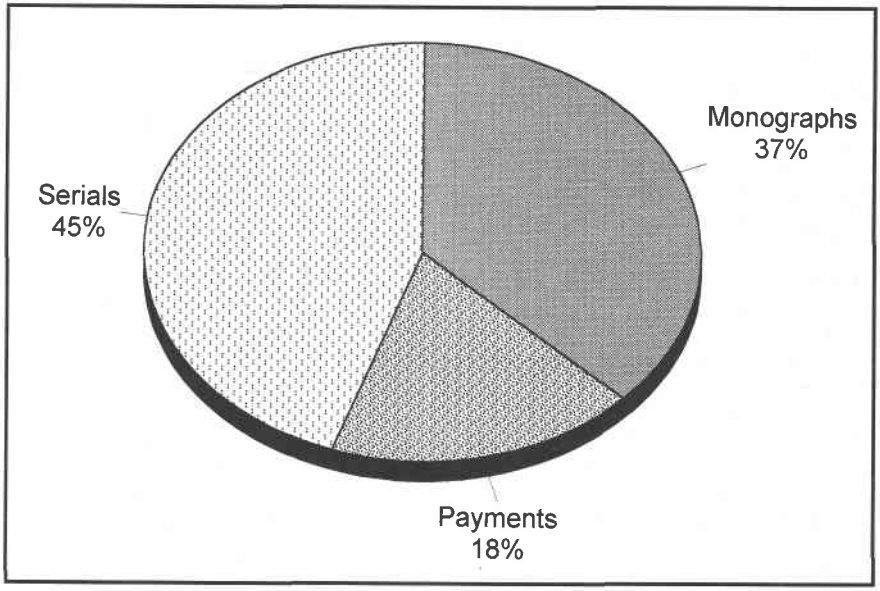


Figure 1. Distribution of Acquisitions Time in Technical Services, 1994–95.

nary cataloging authority work (series and some authors). It is the third largest acquisition task, averaging 12% of the total acquisitions time and under 30 hours per week (see figure 2).

Over the course of the study, the average weekly hours dropped and productivity increased, with the exception of 1993–94. An average of 16 orders an hour are now searched. Ten percent are not ordered mostly because of duplication and are returned to the selector (see table 1).

Ordering

This task includes price and vendor determination, NOTIS record creation, revision and, formerly, typing order records. This is the second largest task averaging about 50 hours per week. (see figure 2). The time devoted to this task dropped greatly over the course of the study until the last year when orders jumped sharply upward, increasing more than 70%. Productivity increased, and currently eight orders an hour are placed (see table 2).

In 1994–95 revision accounted for 21% of the task time, price and vendor determination 11%, and NOTIS record creation the remaining time.

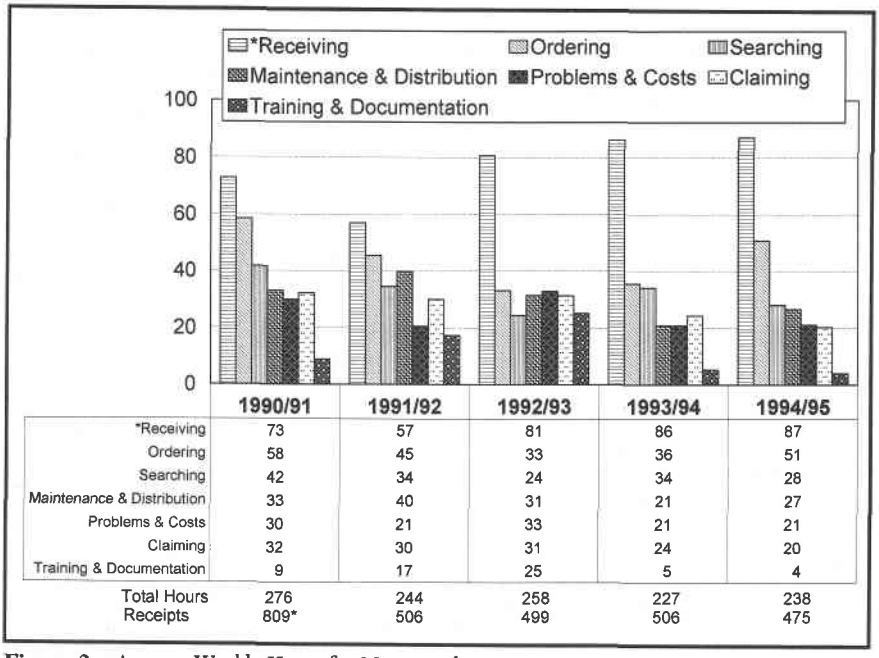
Claiming

Claiming includes correspondence for-

TABLE 1

WEEKLY AVERAGES: SEARCHING

Year	Hours	Orders Searched	Hourly Rate	% of Total Time	Return %
1990/91	42	307	7.5	15.0	16
1991/92	34	253	7.3	14.4	19
1992/93	24	221	13.7	9.6	9
1993/94	34	298	8.6	15.0	9
1994/95	28	446	15.9	11.8	10



	1990/91	1991/92	1992/93	1993/94	1994/95
*Receiving	73	57	81	86	87
Ordering	58	45	33	36	51
Searching	42	34	24	34	28
Maintenance & Distribution	33	40	31	21	27
Problems & Costs	30	21	33	21	21
Claiming	32	30	31	24	20
Training & Documentation	9	17	25	5	4
Total Hours	276	244	258	227	238
Receipts	809*	506	499	506	475

Figure 2. Average Weekly Hours for Monographs Acquisitions.

mulation, NOTIS claim generation, record updating and, formerly, claim typing. Claiming is one of the smallest activities, requiring about 20 hours per week (9% of total time), and ranking sixth out of the seven tasks. Over the course of the study, its time dropped by over 30% and productivity increased (see figure 2).

Receiving Materials

Receiving includes opening and sorting mail, opening boxes, checking in, posting expenditures, detecting and referring fund problems, solving problems, and sorting for cataloging. It is the most time- consuming task, averaging nearly 90 hours a week, and accounts for 36% of monographs acquisitions time (see figure 2). Unlike the other tasks, it grew over the course of the study and productivity declined. About 6 items are received per hour (see table 3).

Maintenance and Distribution

This task includes pulling, filing, and clearing records, mail preparation, sorting, shelving, and distributing materials,

TABLE 2

Weekly Averages: Ordering

Year	Hours	Orders Placed	Hourly Rate	% of Total Time
1990/91	58	263	4.6	20.8
1991/92	45	183	4.0	18.8
1992/93	33	213	7.0	12.9
1993/94	36	273	7.2	15.6
1994/95	51	411	8.1	21.5

TABLE 3

WEEKLY AVERAGES: RECEIVING

Year	Hours	Receipts	Hourly Rate	% of Total Time
1990/91	73	809	11.0	26.5
1991/92	57	506	9.0	23.4
1992/93	81	499	6.4	31.0
1993/94	86	506	6.0	37.6
1994/95	87	475	5.6	36.1

functions that do not fit elsewhere. It ranks fourth in time, involves over 26 hours weekly and represents 11% of total time (see figure 2). Its time fluctuated over the course of the study but did drop.

PROBLEMS AND COSTS

This task includes cost monitoring, consulting and referring on acquisitions issues, and problem-solving that requires a greater than normal effort. It is not routine problem-solving. This is the third smallest activity, and time fluctuated over the course of the study (see figure 2). It accounts for 9% of total acquisitions time and around 20 hours per week.

TRAINING AND DOCUMENTATION

This includes training time where no work is accomplished (e.g. the time of the trainer, trainee reading documentation). If a staff member is training while performing a task and accomplishing work, the time is counted in the task being learned. This task also includes all time for policy and procedure preparation. This is the smallest activity, representing an average of 4 hours weekly, i.e., less than 2% of total time. Time in this activity declined, but there was major variance over the course of the study (see figure 2).

STAFF COSTS

In table 4, the average weekly staff costs over the years of the study are compared. It shows dollars paid during each year and has not been adjusted for inflation.

It shows the average weekly cost for each of the seven acquisitions activities and provides a weekly total. As explained earlier, the weekly cost is presented in two ways: Hours Worked and Hours Paid.

Hours Paid represents the real costs to the institution. Table 4 also gives the average cost per receipt of acquiring a new monograph. Costs can be seen both with and without staffing overhead applied. In fiscal year 1994–95, the average cost for acquiring a monograph without staffing overhead was $7.38. If the overhead staffing costs (leave and support activities) at the departmental level are apportioned, the cost increases by 47% to $10.85. With the addition of divisional overhead, there is a further 20% price increase to $13.01 (see table 4).

By using receipts as the pricing unit, the relative 1994–95 costs of the seven major acquisitions activities can be compared as shown in table 5.

Receiving is the most costly task, followed in descending order by Ordering, Searching, Problems and Costs, Claiming, Updating and Maintenance, and Training and Documentation. Costs fluctuate from week to week depending on the time spent on tasks and the average salary paid to do the tasks. The five weeks sampled in 1994–95 were:

- September 5–11 Labor Day Holiday
- November 13–19 No meeting week
- January 22–28 ALA Annual Meeting
- April 1–7
- June 10–16

It is possible to compare staffing costs over the course of the study if the costs are adjusted for inflation as measured by the

TABLE 4

WEEKLY AVERAGE COSTS

	1990/91	1991/92	1992/93	1993/94	1994/95
		Task Costs ($)			
Receiving	905	672	1160	1251	1270
Ordering	712	592	449	433	728
Searching	527	435	334	474	437
Problems/Costs	530	369	610	378	422
Claiming	343	340	417	318	306
Updating/Maintenance	278	414	364	227	306
Training/Documentation	157	310	515	98	67
		Totals ($)			
Hours Worked	3452	3132	3850	3180	3538
Hours Paid	3382	3099	3819	3170	3504
Overhead Apportioned					
Departmental	5239	4981	5296	4778	5154
Technical Services	6029	5098	6125	5123	6179
		Cost Per Receipt ($)			
Task only	4.18	6.13	7.65	6.27	7.38
Overhead Apportioned					
Departmental	6.47	9.85	10.61	9.44	10.85
Technical Services	7.45	10.08	12.27	10.13	13.01
		Production Statistics			
Receipts	809	506	499	506	475
Orders	263	183	213	273	411

Higher receipts in 1990/91 due to gifts.
Higher orders in 1994/95 due to domestic Approval vendor change.

Consumer Price Index for Urban Wage Earners and Clerical Workers. Figure 3 shows that weekly costs dropped from $5,860 to $5,154, or 12%. That decline correlates to the 15% time reduction. The same adjustment is made for the per-receipt cost in figure 4.

In the analysis that follows, the cost with departmental overhead ($10.85 per receipt) will be used.

ANALYSIS OF RESULTS AND THE IMPACT OF AUTOMATION

COSTS

Over the course of the study costs dropped by 12% when adjusted for inflation but time dropped by 15%. While positions were cut, there were also many reclassifications that raised salaries. With automation, the clerical tasks were eliminated and staff worked more independently. To use automation effectively, processing should be completed at first handling whenever possible. This requires staff to have a broader knowledge, work with little revision, and solve more problems.

The $10.85 cost to acquire a monograph volume came as a surprise to ISU Technical Services because it is as expensive as cataloging, a cost that is being questioned nationally. Cataloging costs are by title and acquisitions by volume, so com-

TABLE 5

COST PER RECEIPT 1994–1995

	Hourly Wage ($)	Task Only ($)	Overhead Apportioned Departmental ($)	TS ($)
Receiving	14.58	2.65	3.90	4.67
Ordering	14.35	1.52	2.23	2.68
Searching	15.62	.91	1.34	1.61
Problems/Costs	19.95	.88	1.29	1.56
Claiming	15.09	.64	.94	1.13
Updating/Maintenance	11.50	.66	.94	1.13
Training/Documentation	16.17	.14	.20	.24
Totals		7.38	10.85	13.01
Percent increase			47%	76%

parisons are a little tricky. The following monographs cataloging costs cover all cataloging, including original.

1994–95 CATALOGING COST PER TITLE	
Task only	$6.30
Departmental overhead	11.10
TS overhead	11.41

Cataloging has a lower task cost at $6.30 per title compared to $7.38 per volume for acquisitions. Cataloging has a higher overhead because of the higher percent of faculty involved. That issue will be discussed later. In addition, $10.85 is not the entire cost of monographs acquisitions, because it excludes all staff costs of selecting materials as well as the costs of paying and maintaining audit trails.

An acquisitions cost calculated on a per-receipt basis is sensitive to the total work environment and must be used with care. When adjusted for inflation, fiscal year 1990–91 shows the lowest per-receipt cost (see figure 4), but the highest weekly staff cost (see figure 3). The major factor in lowering the per-receipt cost in 1990–91 was the number of gifts processed. Gifts require the least staff processing time, and their addition is not controlled by the acquisitions budget. In addition there was an even split between approval and firm orders. Firm ordered materials require the most staff time and therefore carry a higher per-receipt staff cost. Over the last four years approval receipts at ISU have dropped by one-half. ISU changed approval vendors in January 1995, and approval coverage is expected to increase. This is expected to reduce the acquisitions staff costs not only in technical services but also in collection development.

While the lower costs of approvals can be deduced from the data, the ISU time cost study is not reliable at this level of specificity, primarily because the staff who handle approvals also handle gifts. During the five sample weeks of 1994–95, there was only one week when no gifts were processed. During this week only, comparison of costs for approval processing versus firm order processing revealed a 40% higher processing cost for firm orders. While this sample is too limited to make a valid comparison, the results do reflect what was expected, and furthermore, the findings are reinforced by studies done by Stevens (1996) and by Cargill and Alley (1979). Another caveat worth remembering when making comparisons of this kind is that staff specialize by order

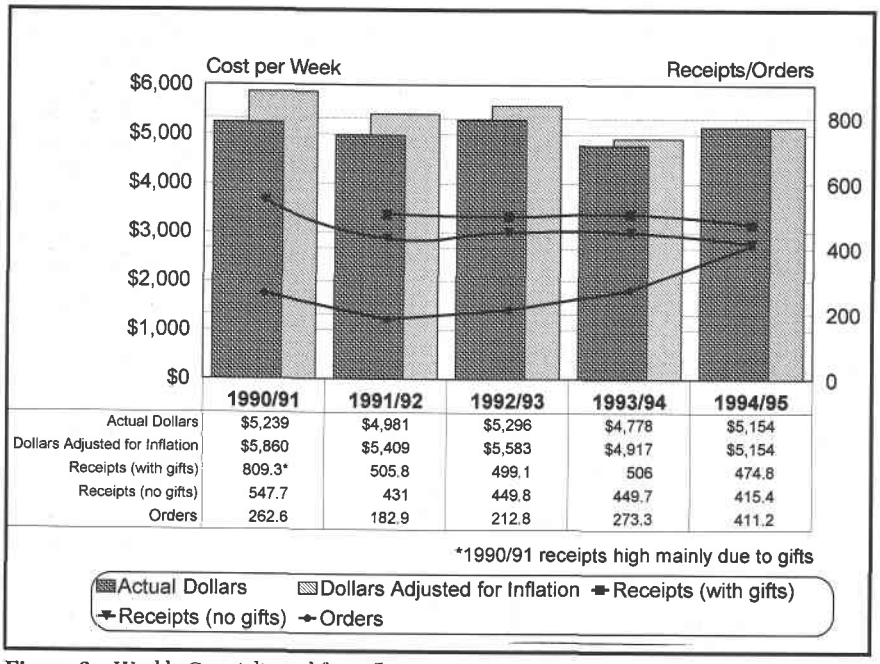


Figure 3. Weekly Cost Adjusted for Inflation.

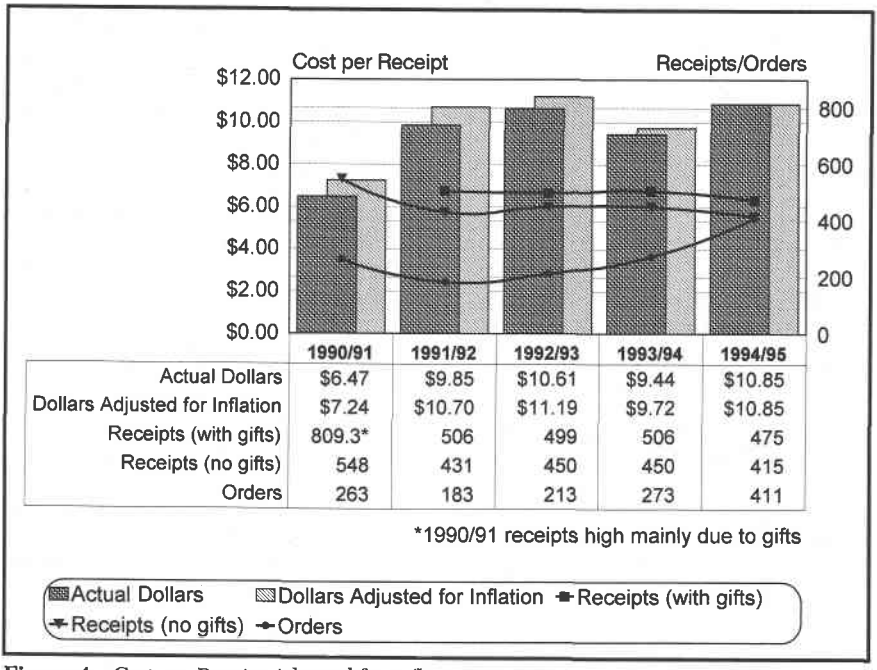


Figure 4. Cost per Receipt Adjusted for Inflation.

type, and there are very few staff involved. At this detailed level of costing, the effectiveness of individual staff members can shape costs significantly.

Controlling Monographs Acquisitions Costs

While librarians at ISU intend to refine the NOTIS implementation of monographs acquisitions further and expect to push down costs, there are limitations. Hewitt (1989) points out that decision-making authority and the potential for self-determination are severely limited. He identifies four outside influences that impinge directly on acquisition's ability to meet day-to-day objectives:

- Acquisitions goals are set by collections development policies
- Output standards are set by cataloging
- Performance demands are set by users and public services
- Procedural requirements are set by accountants and auditors

Acquisitions staff must adapt and accommodate to the following unique operating conditions and expectations:

- Primary workload is determined by the number and types of orders placed
- Different types of receipts can increase labor intensity (e.g., firm orders as opposed to approval orders; foreign as opposed to domestic)
- Turnaround time is based on external factors: delivery service, vendor response, publisher turnaround, availability of item
- Fiscal calendar determines what is done and when
- Perceived and real accounting practices
- Inadequate software applications to support collections fund accounting expectations

Implementing automated acquisitions at ISU was complex for many of these reasons. There are many stakeholders throughout the library system, which makes it difficult to change policies and procedures. In addition, implementing NOTIS without any significant enhancements derived from local programming presented a rather inflexible system for handling monographs acquisitions. Finally, the need for fiscal control and an audit trail limited experimentation. Thus implementation with slight variation mimicked the manual system. In comparison, when cataloging was first automated in 1977 with the introduction of OCLC, it was an activity completely controlled by Technical Services. This made it possible to revamp the entire workflow to optimize the use of an online system. Over the intervening years, continuing local refinement and national developments helped reduce cataloging costs.

Fund Accounting

As Phelps (1991, 35) has pointed out, "one of the problems in attempting to analyze the financial impact on technical processing of an integrated online system is the fact that the system both saves and adds costs." When the process involves library staff beyond technical services such as collection development, the potential for cost trade-offs is even greater. This became evident soon after ISU implemented the NOTIS acquisitions module. In order to accommodate system requirements a new process had to be devised for transferring money among the funds for purchasing monographs.

The fund structure developed internally for handling monographic purchases with the new automated system very closely resembled the previous one because Collection Development staff were familiar with that approach. The new fund names, their codes, and designations for types of monographic order—direct or firm orders, approvals, and monographic continuations—were already familiar and reduced the need for staff training. Nevertheless, the application of this design to fund management in the automated environment revealed that the system lacked flexibility as compared to the existing procedures. The automated acquisitions system does not allow expenditure or commitment of funds from an account when there is insufficient balance to support the transaction. Hence, funds now had to be transferred from one account to another in order to prevent the automated system

from refusing to process an order or receive a volume against an account that was already very heavily spent or encumbered. A procedure for interfund transfers was developed to enable Collection Development librarians (fund managers) and acquisitions staff to release orders and receive new material and for payments staff to track these transfers on the new system.

The procedure described above for initiating and tracking interfund transfers added new steps to the workflow, both in Technical Services and Collection Development. Sometimes these transfers involved more than one fund manager, but often a fund manager needed to move money from one fund under her purview to another for which she was also responsible. Yet in so doing, other staff became involved in order to track this activity in the automated system. For example, a selector might need to move money from her monographic firm order account to the corresponding approval account or vice versa. Although each task involved in this new procedure was not tracked for the purposes of this study, an analysis of the activity during the first three fiscal years in which this new interfund transfer procedure was available suggests that it is a new cost factor.

During the first fiscal period in which orders for monographs were processed through the automated system only 4.8% of the money tracked on the system was involved in an interfund transfer; during the second year this increased to 26.2%, and by the end of the third year just under one-third (33.2%) of the money handled on NOTIS for monographic purchases had also been included in an interfund transfer. Further analysis shows that in each of the three years the largest amount of money was transferred from approval lines to monographic firm order accounts; these data support conclusions also drawn from the cost-study analysis about the increase in firm order activity. Interestingly, many fund managers had to transfer funds among their own accounts. By the third year for which data were available, 12.4% of the interfund transfers represented activity among accounts managed by the same collection development librarian. Not only do these data suggest budget planning issues to be explored, they also represent a new real cost to the library for carrying out this work.

Fund accounting formerly was separate from the acquisition tasks, done as an end process in the Library Business Office. Over-spending within fund accounts occurred because the system did not prevent it. Since fund accounting now occurs before an order can be placed or a book received, inadequate funds in an account stops the acquisition process. The interruption not only increases handling costs but also slows the acquisition process.

Searching

As noted before, Technical Services order searching includes detection of duplicates, determination of relationships between editions, location and transfer of OCLC records to supply bibliographic descriptions for order records, and some preliminary authority work. In 1992–93 the number of duplicates found during Technical Services pre-order searching declined dramatically (see table 1). Two main factors influenced this reduction: changes to the withdraw and replace procedures, and the implementation of automated acquisitions. Automated acquisitions speeds entry of order requests into the online system and allows remote checking. Both features assist selection work and reduce wasted time in generating unneeded order requests.

In 1994–95 order searching prevented the unnecessary ordering of an estimated 2,000 monographs and the later work of handling unwanted titles. It prevented the expenditure of an estimated $12,000 in staff costs to order and receive these titles. In addition the precataloging work completed during pre-order searching speeds the cataloging process upon receipt.

At ISU, selectors still generate a paper order request that must be entered into the system. Acquisitions systems that automate order requests at the point of selection will reduce unnecessary work and assist selectors and users. Recent ISU studies demonstrate that slightly over 90% of the order requests have an OCLC

record to transfer into the NOTIS system at the time of order searching.

Online acquisitions increased the number of orders searched per hour, and thus, the cost of order searching declined. The ISU data show a puzzling drop in productivity during 1993–94. All investigation has failed at determining the cause.

Ordering

With automation, the effectiveness of ordering increased dramatically as demonstrated by the increase in the hourly order rate (see table 2). The use of OCLC cataloging records to create order records reduced the order creation time and improved accuracy. As noted, over 90% of the monographs ordered in 1994–95 had an OCLC cataloging record at the point of pre-order search. Order placement accounts for 20.7% of total costs, with 12.2% being the actual NOTIS record creation, 5% revision and 3% price and vendor determination. As expected, revision time dropped dramatically in the automated environment. In the year preceding automation 12 orders were placed for every hour of revision. By 1994–95, 57 orders were placed for every hour of revision.

Receiving

Receiving accounts for 35% of the total cost of acquiring a monograph. In the year preceding automation, with receipts slightly higher, receiving accounted for only 23% of the cost. This dramatic increase was a surprise, but understandable once analyzed. The analysis identified work transferred to receiving and bottlenecks in the online environment.

Problem-solving during receiving has grown as has the referral of materials to selectors. Both factors stop the receiving activity and increase handling. Bibliographic problems identified in receiving used to be corrected later by catalogers, but automated acquisitions requires earlier problem resolution. Changes in procedures unrelated to automation also increase handling. Selectors no longer automatically review all approval form selections when received, and their requests to see individual titles upon receipt have increased. As noted earlier, automated fund accounting as implemented at ISU complicates and delays receiving and increases the work of selectors as well. Receiving functions require review to determine how greater efficiency can be achieved.

More items are received on each invoice now. This reduces the number of vouchers produced, added, assembled, and signed (and the number of invoices created). There is a cost savings for the Treasurer's Office when fewer checks need to be cut.

Claiming

Claiming continued to be a variable activity after automation, with time varying substantially from week to week. With automation it became a less labor intensive activity (see figure 2) as well as an enormously more productive activity. The number of claims sent increased by over 100% after automation.

Maintenance and Distribution

As expected, automation dramatically changed record maintenance activities. The time spent filing and pulling records dropped from 14 hours a week to 2. This type of dramatic reduction in clerical activities changed the nature of job descriptions and the assignment of tasks. The time spent at mail preparation and material sorting, shelving, and distribution showed no change.

Problems and Costs

Problem resolution and costs, primarily handled by the most qualified staff, has the highest hourly cost. Over the course of the study the time spent monitoring costs remained fairly constant. More time was spent in 1994–95 because of the change in approval vendors and the associated cost analysis. While problem solving and consulting time dropped, this decrease appears to have resulted from a

change in management practice rather than automation. During the first year of NOTIS implementation, there was a striking increase in problem solving and consulting.

Training and Documentation

NOTIS implementation initially increased the time spent at these tasks. The year before and the year after implementation saw a large increase in time, but afterwards training and documentation decreased. Since automating, the clerical level positions were eliminated and staff were reclassified to higher levels. Higher level staff traditionally show lower turnover rates and thus training time declines.

Relative Task Costs

While the bottom line cost per receipt varied among weeks, the relative costs of the seven activities is quite consistent. During all five weeks receiving was always the most expensive task per receipt, and training, the least expensive. Ordering was the second most expensive task in 4 of the 5 weeks sampled. The task with the greatest variance was problems and costs. During the week when meetings were at a *minimum*, the lowest per-receipt costs were achieved.

In every year, receiving was the most expensive task. The first year of NOTIS implementation, 1992–93, shows the greatest fluctuation from the norm. Training and documentation grew to the third most costly activity from its normal bottom ranking. Solving problems and costing rose to the second ranking from its lower rankings. In 1991–92 maintenance rose from sixth to fourth, indicating the preparation and clean-up work necessary for automation.

Overhead Staff Costs

Overhead staff costs (leave and support activities) are not unique to monographs acquisitions or technical services. They exist in every part of an organization. It is an important cost to examine when evaluating how to reduce costs. In 1994–95 departmental overhead raised the cost of monographs acquisitions by 47%. When the entire divisional overhead costs are applied, the costs increased by 76% (see table 4).

In figure 5, overhead costs for all of Technical Services are presented. Product and service centers represent 56.8% of Technical Services labor costs (acquisitions, cataloging, catalog maintenance, volume processing, conversion, automation), while overhead centers are 43.2% (leave 14.8%, support activities 28.4%). Figure 6 shows the same data for the two departments used in this study (Monographs Acquisitions and Monographs Copy Cataloging).

Leave is a cost area over which an institution has little control. Although one might assume that the cost for support activities could be easily reduced because an institution has considerable control over them, achieving this is difficult. ISU Technical Services has attempted to reduce these costs, but with limited success. Administrative costs have dropped due to reductions in administrative positions. However, the drop in administrative costs has not been as steep as the drop in positions, reflecting the fact that tasks are being reassigned to non-administrative staff rather than eliminated. Meeting time has also increased, except for 1992–93 when "No Meeting Week" was introduced. With fewer administrative positions, there is a greater emphasis on team management and thus more meetings.

ISU librarians have faculty status, with major expectations for research and scholarship and professional service. Over the course of the study, there was no reduction in professional activities even though Technical Services faculty positions dropped by 25% (from 16 to 12 positions). Faculty expectations, in fact, increased during the study period, and this phenomenon is clearly revealed by the data. Fewer people are spending more time at professional activities. When determining costs, anything done by faculty is very expensive, because of the heavy professional, service, and publication expecta-

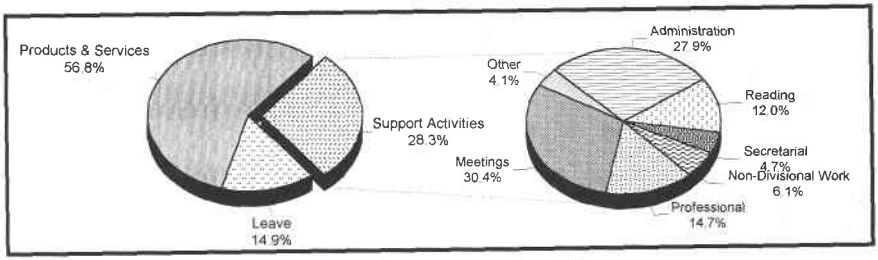


Figure 5. Technical Services Weekly Average Cost, 1994–95.

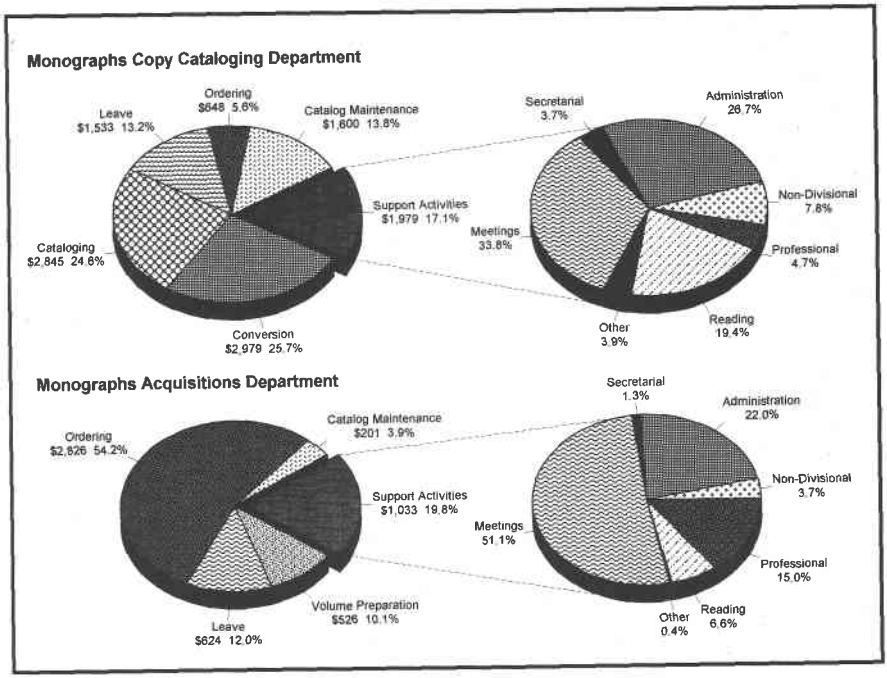


Figure 6. Departmental Weekly Average Costs, 1994–95.

tions. The time spent on these activities must be included in their direct service or product costs. For example, original catalogers, who are faculty, spend only 39% of their time cataloging. The remainder of their time must be calculated as overhead costs, which in 1994–95 increased the cost of original cataloging for a monograph by 170%. The higher cataloging overhead costs as compared to acquisitions overhead show the impact of staffing levels on costs.

Another growth area, general reading, applies to an ever increasing number of staff. It is necessary to keep abreast of the rapid changes in information technology. At the beginning of the study, general reading accounted for 2.4% of total Technical Services costs. It grew to 3.4% by 1994–95.

With the automation of acquisitions completed and with greater authority and responsibility invested in higher classified staff, the Serials and Monographs Acquisitions departments were merged and a department head position eliminated in January 1996. This will lower overhead costs.

Future Implications

Beyond Mechanized Manual Processes

This study reveals that ISU Technical Services incurs considerable staff costs when it acquires a monograph. In fact, the full costs of acquisitions are not reflected in this study, since all selection, payment, and audit trail staff costs were excluded.

Automated acquisitions has mechanized formerly manual processes. It has taken past practices and allowed them to be performed better and faster, but the tasks themselves have remained virtually unchanged. Most of the automated enhancements support acquisition tasks. For selectors automation has done little more than improve the precision of financial information and provide immediate status information. It is time to move on to the second stage of technology adaptation, in which technology revises what is done, and things never done before become possible.

Developers of integrated library systems need to give greater attention to both the selection and the acquisition processes. Circulation and interlibrary borrowing data should be readily available in meaningful reports to support collection development. Library systems should allow the smooth transfer of information from users through the library selection and acquisition processes to vendors.

If acquisitions is to move to the second stage of technological adaptation, local system enhancements are not sufficient. Bibliographic utilities, book vendors, and librarians need to forge alliances to enhance cooperative activities and reduce duplicative activities; such a process would be similar to what has happened with cataloging.

Can bibliographic utilities and vendors develop new products that change local selection responsibilities? Is it possible for selection to become a more cooperative activity between vendors and bibliographic utilities, with local review varying according to local requirements? Is it possible to profile the automatic receipt of most materials so collection development can focus on newly emerging areas and on maintaining collections where a university's mission requires uniqueness or unusual breadth? Can bibliographic utilities and vendors working together develop selection profiles based on university programs? Can local acquisitions patterns be compared by disciplines to other institutions and to publishing output?

Need for Restructuring

Rowley and Black (1996, 23) point out that while changing scholarly communications is having a major impact on the collection development mission, "collection development is one of the least addressed and yet highly critical areas in designing the future of information management and access." Their analysis shows that in most ARL libraries, collection development has changed little since the 1970s. While the authors find greater reliance upon technology and refinement of work at the task level, they explain that "refinements at the task level fall short of the restructuring required to support an efficient and effective response to the challenges ahead." The analysis of automated acquisitions at ISU corroborates these findings.

Could the acquisitions process and responsibilities be restructured, as Rowley and Black suggest, so that professional staff can "take on a greater role in the production of knowledge, at times contributing to the design of information products and other times functioning as a publisher or distributor" (p.27)? Selection duties are almost exclusively a professional responsibility, as cataloging once was. The ISU data demonstrate the high overhead costs associated with professional staff. If cooperation could forge new tools to support a more automated selection process, could review of receipts be delegated to a different level of staff, similar to the evolution of copy cataloging? If this were possible, professional collection development skills could be channeled to new areas resulting from the change in scholarly communications.

The "Stanford University Libraries Redesign Report: Redesigning the Acquisitions-to-Access Process" (1995) describes a major restructuring, and it will be important to analyze the results. This major undertaking is focused on Technical Services and does not appear to include the selection process. The redesign does forge broader alliances with vendors to increase efficiencies and is seeking greater assistance from bibliographic utilities in the provision of cataloging copy.

While the Stanford redesign effort concentrates on technical services, Sasse and Smith (1992), in their presentation at the 1991 Feather River Institute, examined the entire acquisitions process from selection through receipt. They pointed out the need for a bibliographer's workstation that would pull together local data and link selectors to external vendors and networks. They identified the opportunity for more mechanization of selection and new roles for collection developers, including user needs evaluation and a more active role in the creation of information.

Strengthening Cost Analysis as a Management Tool

The ISU experience corroborates the opinions of Kantor (1989), Bedford (1989), Leung (1989), and others concerning the role that time and cost analysis can play in making important management decisions. While it is important to look at library effectiveness based on cost studies, the power of this management tool would be strengthened with more knowledge of user needs and behavior. In order to determine whether a service warrants the cost of providing it, more must be known about how users value the service. As automation reduces staff contact with users, encourages new user groups, and speeds the pace of change, new user needs and behavior emerge. Librarians have relied too long on impressions of users' needs based on service contacts. "It would clearly be in the best interests of the users of libraries and of librarians if the findings of research could become a larger and more visible element in the decisions we make in managing libraries" (Hewitt 1983, 131). In addition, Penniman (1990) emphasizes the importance of costs and benefits to decision makers and notes that the libraries that compete less well, in either the private or public sector, are those "least prepared to express their value and contributions in terms understood by the their funders" (p.11).

Taylor (1986) examines the addition and assessment of value in the entire information arena. He sees information systems as formal processes encompassing both technology and people who add value to information. In his view, the total cost of the information process includes both the cost of providing information to the user and the cost of using the information provided. While acknowledging the oversimplification, Taylor believes generally that as information provision costs go down (e.g. library costs), user costs go up. The value-added approach emphasizes the need to look at user benefits and costs. The library acquisition process is a major component of providing information to users. Determining whether the cost is worth the value requires a better understanding of how the selection process provides what users need and to what degree that process gives the user the ability to access information in a timely manner.

Conclusion

The time and cost analysis at ISU sheds much light on the implementation of NOTIS monographs acquisitions, gives new insight into relative acquisition costs, and identifies policies and procedures that need further review. The study shows that following automation, staff time for monographs acquisitions dropped more than costs. The results are being used to understand the costs, to identify how they have changed, and to analyze workflow to reduce costs further. This analysis shows that automation can both save and add costs; however, the overall effect has been cost reduction and improved services.

We discovered very high technical

services staff costs involved in acquiring a monograph. We also found an automated environment that greatly mimics the former manual system with little opportunity for reductions in the Collection Development workload. Changing the acquisitions process has proven difficult because of the number of stakeholders involved and because of limitations of the automated system. Considering the significant additional costs of selection, payments, and audit records, monographs acquisitions is a more costly activity than cataloging. ISU acquisitions costs are probably similar to the acquisitions costs of many research libraries. Those libraries with more sophisticated acquisition systems or the programming support to enhance the NOTIS system probably are operating more effectively.

Since the library community and the book industry are clearly in the process of redefining their products, services, and procedures, tracking changes in operational costs becomes even more critical. Additionally, time and cost studies will assist the private sector in addressing both market needs and business opportunities more effectively. Just as the costs of cataloging were reduced by national cooperation, acquisitions requires more integration with bibliographic utilities, local systems, and vendors. This type of study will help us work together to reduce duplication further, lower staff costs, and find new ways to approach monographs acquisitions.

It is evident that to this point the monographs acquisition process has only been mechanized, and the tasks themselves have really not been altered in any meaningful way. We have simply improved the way we perform the same jobs. Future automation developments, in conjunction with restructuring, should support evaluation of what we do, rather than how we do it, and provide the opportunity to do things never done before. In addition to automating operations and doing new things, librarians must do a better job of evaluating the services provided and be able to articulate the value of those services.

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