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Performance Measurement Revisited

Performance measurement, through unit-cost study programs, can be a beginning step toward achieving the goal of evaluating the value of systems. This article reports the application of such unit-cost studies in the technical service functions at a large state university, and presents three major tables for labor costs in terms of minutes and dollars per volume.

In the spring of 1971, the author published the results of a unit-cost study of the technical services division at Florida Atlantic University. As initially conceived, this project had two major purposes: (1) to determine the direct labor costs of acquiring and fully processing a volume in terms of both minutes and dollars per function performed by level of employee; and (2) to test the efficiency of processing techniques which, at the time, were considered by some in the profession to be radical departures from standard library practices.[1] In the more than eighty responses to the article, some maintained that what was possible at a small, relatively insignificant institution such as FAU would be sheer folly to attempt in a large research library supporting a broad-spectrum graduate program and a research-oriented faculty.

The critics' fears turned out to be unfounded. At the time the article was published, the author was implementing both the unit-cost study program and the processing systems developed at Florida Atlantic University at Arizona State University, an institution five times the size of FAU, with 27,000 students, 1,200 faculty members, and a library collection in excess of 1,000,000 volumes, growing at the rate of over 100,000 volumes a year. Within a year, the bulk of an unprocessed backlog, which exceeded 50,000 volumes, had been eliminated, a huge logjam of faculty book requests had been cleared, and the library had ceased to be a major source of irritation to the faculty, students, and the university administration. Concrete evidence of a rising confidence in the library's ability to perform manifested itself in the increasingly genial and productive meetings of the University Library Committee, a group which had formerly been torn by administrative problems not within its technical capabilities. Processing costs had been cut by 36 percent without tampering with the bibliographic integrity of the public catalog.

During the past five years, an increasing number of academic librarians have become painfully aware of what Earl F. Cheit has called the "New Depression in Higher Education."[2] Book budgets have plateaued or have been drastically cut, new positions have not been forthcoming, and freezes on filling existing and future vacancies have been common. Magnifying the impact of reduced or static budgets is the fact that there has been no discernable leveling of demands for library services. Real progress in making the library a vital and dynamic center for inspiration and information, and an intellectually in-

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spiring place in which to work, cannot be gained during a severe budget crisis unless our labor-intensive organizations can achieve a higher level of manpower utilization than is now generally the case. Public service programs needed in the near future will have to be created through more efficient utilization of the manpower already at our disposal. As Peter Drucker has forcefully pointed out, the present budget crisis is in essence a productivity crisis affecting the nonmanual worker and the knowledge professions. "The only way out of it," he notes, "is for the nonmanual employee, whether he is knowledge worker or policeman, to become more productive."[3]

Concern with productivity does not, and should not imply that the knowledge worker in America is lazy. With respect to libraries, the worker has become a victim of an antiquated organizational structure which is not only unproductive and self-defeating, but intellectually and psychologically debilitating as well. It is for this reason that Drucker, taking the larger view, believes that the present budget crisis is the best thing to happen to higher education in recent years: it provides a golden opportunity for the university to evaluate critically every system and procedure in terms of goals and priorities, and to weed out those which have become obsolete due to technological change and/or the changing needs of society. In the library we need to evaluate every system and procedure in terms of what it contributes to the user, and jettison those which only serve to make the profession comfortable.

Performance measurement can be a beginning step toward achieving this goal. It is particularly effective when applied to any operation which is process oriented and in which data can be easily quantified. The technical services operation meets these criteria ideally. In addition, it is this area of the library which clings most stubbornly to antiquated procedures, and whose only answer to low output is a loud wail for more and more people. Little thought is ever given to whether or not those already on hand are being used effectively. Even less is given to a critical examination of library systems in terms of how well they serve the user. It is for these reasons that technical services will often absorb 50 percent or more of the total personnel budget of a large library. And still, the unprocessed orders pile up and the cataloging backlog continues to grow and oppress those who labor within its ominous shadow.

To librarians who have been forced to trim budgets to the bone at a time when libraries are besieged with rising demands for services, the demand to trim off even more seems insulting. Nevertheless, there is no such thing as an organization in which manpower utilization is 100 percent effective. Moreover, budget trimming by itself is not an adequate response to a long-term budget crisis. In its initial stages it affects only marginal things. When the process goes deeper the result is an across-the-board reduction of program quality rather than a rational decking of priorities. Budget cutting alone seldom, if ever, alters the basic internal systems and procedures of libaries, particularly with respect to the acquisition and processing of library materials.

The programs needed to streamline library operations and make them more productive will require willpower to initiate and discipline to carry out. Agencies outside of the library are capable of providing both if librarians do not take the initiative. It is clearly in the interest of the profession and its users that the motivation for change be internal, and that the necessary discipline be self-imposed.

Departmental self-measurement was the methodology utilized by the unit-cost study developed at Florida Atlantic

University and is now operational at Arizona State University. The individual departments and the Technical Services Division as a whole define their functions, establish their own productivity goals, and measure achievements in terms of them. The measurement of the program's success ultimately lies in the extent to which this concept is understood by all concerned.

The unit-cost program has now been operational for two years at ASU, and it has been applied to three production years, 1969/70, 1970/71, and 1971/72. In order for the program to have any meaning, it must be reiterated every year; since there are no national standards to measure against, the library must establish a base year against which the productivity of all subsequent years can be measured. At ASU the base year is 1970/71, as that was the year in which new processing systems and procedures were implemented. Table 1 shows the minutes per volume by level of employee by department for each of the three production years subjected to the program. Table 2 shows the costs in terms of dollars.

During the base year, the Technical Services Division processed 154,437 volumes, approximately 52,000 more than the year before, and used 7,270 fewer man hours. The total minutes required to order and fully process a volume dropped from 101.46 to 64.52. In other words, in 1970/71 the Technical Services Division achieved a 36 percent increase in productivity in spite of a 4 percent decline in the number of man hours assigned to it. If the same processing systems and procedures used in 1969/70 had been used in 1970/71, it would have required approximately 46 additional F.T.E.'s to produce the 154,437 volumes actually processed in 1970/71.

In the following year, 1971/72, the cost in minutes to acquire and process a volume rose from 64.52 to 77.08 minutes. Since the total cost in minutes per volume was 12.2 minutes higher in 1971/72 than in 1970/71, it would appear at first glance that there was a significant drop in productivity in 1971/72. This, however, is not the case.

The catalog department bears the burden of the unit-cost study program, as it is the end of the processing pipeline where the number of work units completed is counted. The catalog department catalogs titles, not volumes, but the unit-cost study measures productivity in terms of volumes. Therefore, in order to compare productivity from one year to the next, the number of volumes produced in a given year must be adjusted to conform to the ratio of volumes per title cataloged which prevailed during the base year.

In 1970/71, the base year at ASU, the ratio of volumes to titles cataloged was 2:1. This dropped to 1:1.71 in 1971/72. Had the ratio of the base year prevailed in 1971/72, the 65,754 titles cataloged would have produced 131,508 volumes, or 18,009 more than the actual production count. When this factor is taken into account, the loss in productivity drops to an insignificant 2 percent. Table 3 shows the adjusted costs in minutes per volume.

As can be seen in Table 3, the number of hours worked in the Technical Services Division dropped by 27,516, or 15 percent, between 1969/70 and 1971/72. This is the equivalent of 14.46 F.T.E.'s. The distribution by level of employee is shown on Table 4.

The increased productivity achieved at ASU was the result of a number of minor and several major procedural and system changes. Minor changes included not underlining the first letter of the main entry on the title page, not penciling the call number on the Title Page, and keypunching only the title on the machine readable book card. If these labor savings seem insignificant, it should be noted that for a library processing 100,000 volumes a year, a one-

TABLE 1

LABOR COSTS (MINUTES PER VOLUME) TECHNICAL SERVICES DIVISION
1969/70—1971/72

	1969/70 (102,308 vols.) Total Hours	1969/70 (102,308 vols.) Minutes Per Volume	1970/71 (154,437 vols.) Total Hours	1970/71 (154,437 vols.) Minutes Per Volume	1971/72 (113,499 vols.) Total Hours	1971/72 (113,499 vols.) Minutes Per Volume
Acquisitions						
Professional	4,590	2.69	2,700	1.05	3,666	1.94
Subprofessional	13,125	7.70	8,126	3.16	8,704	4.60
Clerical	14,062	8.25	13,765	5.35	19,021	10.06
Student Assistants	8,402	4.93	5,979	2.32	3,461	1.83
Total	40,179	23.57	30,570	11.88	34,852	18.43
Bibliographic Search						
Professional	1,800	1.06	1,800	.70	Functions transferred to	
Subprofessional	18,750	11.00	13,819	5.37	Acquisitions and Catalog	
Clerical	3,750	2.20	—	—	Departments	
Student Assistants	11,726	6.88	5,887	2.29		
Total	36,026	21.14	21,506	8.36		
Cataloging						
Professional	19,170	11.24	19,666	7.64	18,638	9.85
Subprofessional	28,751	16.86	26,809	10.42	25,183	13.31
Clerical	24,375	14.30	30,691	11.92	29,292	15.48
Student Assistants	8,271	4.85	8,979	3.49	12,517	6.62
Total	80,567	47.25	86,145	33.47	85,630	45.26
Physical Preparation						
Professional	0	0	0	0	0	0
Subprofessional	3,375	1.98	1,688	.66	0	0
Clerical	4,967	2.91	5,156	2.00	8,201	4.34
Student Assistants	710	.42	2,465	.96	1,925	1.02
Total	9,052	5.31	9,309	3.62	10,126	5.36
Serials						
Professional	0	0	1,800	.70	1,438	.76
Subprofessional	3,907	2.29	8,756	3.40	0	0
Clerical	2,295	1.35	4,650	1.81	11,758	6.22
Student Assistants	1,280	.75	3,300	1.28	1,995	1.05
Total	7,482	4.39	18,506	7.19	15,191	8.03
Grand Total	173,306	101.66	166,036	64.52	145,799	77.08

TABLE 2

LABOR COSTS (DOLLARS PER VOLUME)
1969/70—1971/72

	1969/70 (102,308 vols.) Total Dollars	1969/70 (102,308 vols.) Dollars Per Volume	1970/71 (154,437 vols.) Total Dollars	1970/71 (154,437 vols.) Dollars Per Volume	1971/72 (113,499 vols.) Total Dollars	1971/72 (113,499 vols.) Dollars Per Volume
Acquisitions						
Professional	23,540	.23	13,941	.09	20,639	.18
Subprofessional	31,500	.31	22,649	.15	25,770	.23
Clerical	27,400	.27	31,107	.20	48,226	.42
Student Assistants	12,971	.13	9,206	.06	5,678	.05
Total	95,411	.94	76,903	.50	100,313	.88
Bibliographic Search						
Professional	7,800	.08	8,900	.06		
Subprofessional	39,500	.39	31,622	.20	Functions transferred to	
Clerical	7,400	.07	0	0	Acquisitions and Catalog	
Student Assistants	17,573	.17	9,408	.06	Departments	
Total	72,273	.71	49,930	.32		
Cataloging						
Professional	88,840	.87	101,192	.66	107,832	.95
Subprofessional	63,770	.62	66,459	.43	68,275	.60
Clerical	46,456	.45	65,359	.42	67,308	.59
Student Assistants	12,590	.12	14,471	.09	20,598	.18
Total	211,656	2.06	247,481	1.60	264,013	2.32
Physical Preparation						
Professional	0	0	0	0	0	0
Subprofessional	7,425	.07	3,780	.03	0	0
Clerical	9,550	.09	11,593	.08	20,815	.18
Student Assistants	996	.01	4,219	.03	3,309	.03
Total	17,971	.17	19,682	.14	24,124	.21
Serials						
Professional	0	0	8,600	.06	9,130	.08
Subprofessional	8,220	.08	19,822	.13	0	0
Clerical	4,450	.04	9,290	.06	29,504	.26
Student Assistants	1,904	.02	5,778	.04	3,435	.03
Total	14,574	.14	43,490	.29	42,069	.37
Grand Total	411,885	4.02	437,486	2.85	430,519	3.78

TABLE 3

ADJUSTED LABOR COST (MINUTES PER VOLUME)
1969/70—1971/72

	1969/70 (102,308 vols.) Total Hours	1969/70 (102,308 vols.) Minutes Per Volume	1970/71 (154,437 vols.) Total Hours	1970/71 (154,437 vols.) Minutes Per Volume	1971/72 (131,508 vols.) Total Hours	1971/72 (131,508 vols.) Minutes Per Volume
Acquisitions						
Professional	4,590	2.69	2,700	1.05	3,666	1.67
Subprofessional	13,125	7.70	8,126	3.16	8,704	3.97
Clerical	14,062	8.25	13,765	5.35	19,021	8.67
Student Assistants	8,402	4.93	5,979	2.32	3,461	1.57
Total	40,179	23.57	30,570	11.88	34,852	15.88
Bibliographic Search						
Professional	1,800	1.06	1,800	.70		
Subprofessional	18,750	11.00	13,819	5.37	Functions transferred to	
Clerical	3,750	2.20	0	0	Acquisitions and Catalog	
Student Assistants	11,726	6.88	5,887	2.29	Departments	
Total	36,026	21.14	21,506	8.36		
Cataloging						
Professional	19,170	11.24	19,666	7.64	18,638	8.50
Subprofessional	28,751	16.86	26,809	10.42	25,183	11.48
Clerical	24,375	14.30	30,691	11.92	29,292	13.36
Student Assistants	8,271	4.85	8,979	3.49	12,517	5.71
Total	80,567	47.25	86,145	33.47	85,630	39.05
Physical Preparation						
Professional	0	0	0	0	0	0
Subprofessional	3,375	1.98	1,688	.66	0	0
Clerical	4,967	2.91	5,156	2.00	8,201	3.74
Student Assistants	710	.42	2,465	.96	1,925	.87
Total	9,052	5.31	9,309	3.62	10,126	4.61
Serials						
Professional	0	0	1,800	.70	1,438	.65
Subprofessional	3,907	2.29	8,756	3.40	0	0
Clerical	2,295	1.35	4,650	1.81	11,758	5.36
Student Assistants	1,280	.75	3,300	1.28	1,995	.91
Total	7,482	4.39	18,506	7.19	15,191	6.92
Grand Total	173,306	101.66	166,036	64.52	145,799	66.46

TABLE 4

HOURS EXPENDED BY LEVEL OF EMPLOYEE
1969/70–1971/72

	Total Hours 1969/70	1971/72	+ or –	F.T.E.
Professional	25,560	23,742	– 1,818	– 1.05
Subprofessional	67,908	33,887	–34,021	–18.74
Clerical	49,449	68,272	+18,823	+10.37
Student Assistants	30,389	19,889	–10,500	– 5.04
TOTAL	173,306	145,790	–27,516	–14.46

minute reduction in the time it takes to process a volume is the equivalent of .91 F.T.E.'s in terms of labor savings.*

The category of minor changes also includes all measures that resulted in a more efficient utilization of personnel, particularly at the professional level. Table 5, extracted from the technical services unit-cost studies, provides an excellent example.

Almost 40 percent fewer professional hours were expended in 1970/71 as compared with the previous year, but these were far more efficiently utilized. For instance, in 1969/70 slightly more than one-half F.T.E. professional was absorbed by subprofessional routines, i.e., assigning vendor and fund numbers, revising typing, signing purchase orders, and bursting forms. With respect to the latter, more than two weeks of professional time was devoted to this simple function during the year. This is an example of how a small leak will, in time, result in a sizable puddle. In 1969/70 only 29.4 percent of the professional hours in the department were expended on administration and supervision; in 1970/71 the figure rose to 78.6 percent.

The last category of minor procedural changes included eliminating obsolete files. Two glaring instances were discovered in the catalog department which absorbed approximately the labor of a half-time person.

* Computed on the basis of the ASU standard work year for a nonprofessional employee (1,830 hours).

The major changes which resulted in increased productivity were as follows:

(1) Eliminating establishing the main entry prior to placing an order.
(2) Splitting the catalog into its three component parts, author, title, and subject.
(3) Color highlighting in lieu of typing added entries at the top of the cards and filing behind headers in the subject catalog.
(4) Leaving the call number in the lower left hand corner of the card.
(5) Using the title catalog as the "on order" file.

The savings in (1) can be substantial, as much of the information obtained in the "pre-cataloging" processing has to be revised after the material arrives. In addition, there is the perennial problem of the catalog department accepting bibliographic information generated by another department. A considerable amount of wasted time can be avoided if the acquisitions department confines itself to determining if the library has an item, if it is on order, or if it exists, and leaving the descriptive cataloging to be performed by the catalog department after the item arrives. Following this procedure, cost in minutes per volume for searching and verifying dropped from 7.78 minutes in 1969/70 to 4.21 minutes per volume processed in 1970/71, a decrease of 45 percent. Since the total cost in minutes per volume for the catalog department

TABLE 5

ANALYSIS OF PROFESSIONAL HOURS
ASU ACQUISITIONS DEPARTMENT
1969/70–1970/71

	1969/70	1970/71
Administration and supervision	1,350	2,124
Review requests and selection aids	990	115.2
Search and verify bibliographic information	0	165.2
Assign vendor and fund number	622.5	79.2
Revise typing, sign, and mail purchase orders	330	0
Burst order forms	82.5	0
Receiving routines	0	18
Process faculty inquiries	210.5	0
Order O.P. titles	105	0
Miscellaneous activities	150	0
	4,590	2,700

also dropped significantly (29 percent), obviously changing procedures did not just shift costs from one department to another.

Items (3) and (4) (color highlighting instead of typing added entries and leaving the call number in the lower left hand corner of the card) produced a labor savings of 53 percent in producing card sets. In a test environment at FAU in 1969 (simultaneous production of 100 card sets by typing added entries at the top of the card, and 100 card sets by color highlighting) the labor savings amounted to 71 percent. The difference between the test figure and that derived from the ASU unit-cost study probably was due to the fact that supervision in an actual working environment cannot possibly approach the level that is possible in a test environment. The FAU study showed what is possible. The ASU cost study showed what one library actually achieved.

Quantitative analysis can be a powerful tool in the administrator's kit to increase productivity in those areas of the library which are process oriented, upgrade the quality of the work performed, and provide a better and more satisfying working environment as well. At ASU, increased productivity and more complete cataloging have gone hand-in-hand. As the unprocessed backlog melted away it was possible to provide, as a routine matter, analytics for all titles in series, something that was a hit or miss affair during the years when the catalog department was unable to cope with the volume of material coming into the library. The author catalog is being read, corrections made, and hundreds of new header cards are being added. Subject entries for new serials are being prepared for the first time in a number of years, and work is progressing on eliminating any gaps in this area. Pockets of "difficult" material which had been gathering dust in obscure nooks and crannies for months or even years have been cleaned up. Time has been found for thinking about and planning for the future, and the entire staff of the catalog department recently participated in a complete departmental reorganization designed to make the best possible use of talent at all levels.

Criticism aimed at the unit-cost study program is the accuracy of the data, particularly with respect to the distribution of an employee's time over the range of functions for which he is responsible. The margin of error seems to be tolerable, as supported in an article by R. K. MacLeod, who analysed an almost identical cost study program designed for the South Shore Mental Health Center in Chicago. On the subject of the accuracy of the data, Mac-

Leod concluded that "even a rough idea of the cost of a program is so useful that arguments about precision are reduced to the level of quibbles."[4]

Because of its very nature, it is probably impossible to initiate a unit-cost study program without producing a measurable amount of adverse reaction on the part of those working in the technical services division, particularly among the professional members of the staff. On the other hand, when correctly used, the unit-cost study program can enhance staff development and staff self-esteem. Through participating in an ongoing unit-cost study program, each member of the technical services division has an opportunity to analyze both his own and his department's efforts and make suggestions for system streamlining. Through this process, the creative energies of the group are channeled into significant contributions toward redesigning systems. Leadership may crop up in places which do not coincide with the power structure. In such cases, if the power structure listens and capitalizes on what it learns, it will recognize that "good employees" need not be "yes men," that creative discussion, not an intolerable level of interpersonal conflict, has a chance to develop.

Christopher Morley once observed that "there is no squabbling so violent as that between people who accepted an idea yesterday and those who will accept the same idea tomorrow." Some form of performance measurement, or accountability, will become a standard administrative tool in libraries and a part of the normal working environment of every librarian in the near future. If we can avoid expending precious energies on useless and unproductive intramural squabbling and divert them toward designing performance measurement procedures of, by, and for librarians, we will not only be working in the best interests of the profession, but those of the communities that support and sustain libraries as well.

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