

Serial Cuts vs. Public Service: A Formula

A formula, based on access time, measures the effect of serials budget reduction on public service. It provides librarians with sound justification for major budget cuts.

SERIALS ARE THE SINGLE MOST IMPORTANT SOURCE of current information in science and technology libraries. Recently as serials prices have increased from 10 to 15 percent annually¹ and library allocations have often remained static or been decreased, librarians have continued subscriptions even as the share of money left unencumbered slipped into negative numbers. Most librarians who have enjoyed years of expanding collections and increasing materials allocations have not adequately developed techniques for cutting budgets in the face of inflation and reduced funding.²

Those who have been forced to make reductions in subscription lists may make budget cuts on the basis of intuition, choosing titles which they feel are not being used. Others generalize on the basis of price which titles should be of most importance to users, that is, low-cost titles are most popular and least likely to be used in advanced research and high-priced titles are important international publications.³ Still others have forced faculty members to make the decision after indicating that no books can be purchased if serials are not reduced.⁴

In 1975 the Engineering-Transportation Library at the University of Mich-

igan faced just such a budget crisis. The average serial title cost \$34.80. The overall cost of serials has risen 75 percent in four years and threatened to usurp the total materials allocation. Although it was easy to draw up elaborate lists of titles receiving zero, one, or two uses and contemplate canceling these titles, the judgment of where to stop and for what reasons became arbitrary. What was highly desirable was a way to view the cost of the titles balanced against potential public service cuts. What, for example, would be the effect on our public service of a 20 percent, or even 50 percent, reduction in the budget for serials subscriptions?

After making a detailed analysis of serials use in the library, we have developed a formula which allows for well-advised cuts in the serials budget without serious damage to service.

METHOD

Since September 1974 we have recorded the use of 1,200 current unbound titles and some 1,600 bound titles. All circulations were tallied by title as were all journals cleared from in-building use. While this is not completely accurate as a count of total journal use since some users scan the shelves and replace titles or pick up unshelved journals from sofas and tables, the data reported here have been collected over an eight-month period so that all titles are as-

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sumed to have received fair use.

During this period the 1,200 current titles received 16,585 uses (or 13.8 uses per unbound title), although 302 titles received 0 uses (25 percent of our unbound titles). Bound use accounted for 10,181 uses (40 percent of use was bound, 60 percent unbound), and their use reduced the titles which received 0 use from 302 to 174 titles.

Since journals circulate only for one day from our library and most are used in the library and photocopied (about 5,000 pages per month), a journal request can usually be satisfied within five minutes. Two titles requested per day are not owned and, if pursued, would need to be requested through interlibrary loan.

This service might be as quick as a photocopy from a nearby university with two-to-three-day service, or a five-day wait from the Center for Research Libraries (CRL), or a ten-to-twelve-day wait from the British Library Lending Division at Boston Spa. Since CRL has recently announced its intention to be able to supply most titles in social science and science and technology areas since 1970, we can expect a powerful backup resource to help us.⁵ We shall therefore consider five days (7,200 minutes) to be the average waiting period for titles which can not be supplied locally.

FORMULA AND RESULTS

With the data collected at Michigan in 1974-75 we can express the average number of minutes required to service a journal request as shown in Figure 1.

Table 1 shows the number of titles which received zero to fifteen uses, the cost of these titles (and the number which were free subscriptions), the amount of budget reduction at each step from the \$32,250 serials budget for the 1,200 titles studied, the number of minutes to service a request, and the percent of unsatisfied demand when the formula is applied. The formula is used to derive the number of minutes to service a request as a function of the number of titles cut.

Prior to any cancellations and with use of the formula, an average time of 131.75 minutes is required to service each of the total number of serials which were requested; this figure is used as a base point. For each subscription canceled the average five-minute retrieval time is subtracted from 26,766, and the title is added to the retrieval time for titles not in our collection. Dividing the total demand (26,766 + 480) into the requests which cannot be serviced with each cut gives the percent of unsatisfied demand.

Of course, there are many titles that receive no use at all (those which can

$$\frac{[26,766 - (1N_1 + 2N_2 + 3N_3 + \dots + jN_j)] 5 + [480 + (1N_1 + 2N_2 + 3N_3 + \dots + jN_j)] 7,200}{(26,766 + 480)} = \text{average no. of minutes to service a request}$$

26,766 = total serials use supplied in library

5 = no. of minutes to service in-library request

480 = no. of requests referred outside library

7,200 = no. of minutes required to service requests outside library

$1N_1$ = no. of titles receiving 1 use \times 1 use

$2N_2$ = no. of titles receiving 2 uses \times 2 uses

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jN_j = no. of titles receiving j uses \times j uses

Fig. 1

The Formula and Explanation

TABLE 1
SERIALS USE DATA IN THE ENGINEERING-TRANSPORTATION
LIBRARY AT THE UNIVERSITY OF MICHIGAN

No. of Uses	No. of Titles	Free/Paid Titles	Cost of Titles	Budget Reduction from \$32,350	No. of Minutes to Service Request	Percent of Unsatisfied Demand
0	174	F = 73 P = 101	\$2,547	\$29,803	131.75	2%
1	87	F = 33 P = 54	1,902	27,901	154.73	2
2	85	F = 22 P = 63	2,852	25,049	199.62	3
3	58	F = 15 P = 43	1,729	23,320	258.79	3
4	43	F = 6 P = 37	1,211	22,109	290.99	4
5	30	F = 8 P = 22	998	21,111	330.61	5
6	48	F = 6 P = 42	1,516	19,595	406.00	6
7	23	F = 6 P = 17	932	18,663	449.17	6
8	15	F = 4 P = 11	918	17,745	480.86	7
9	18	F = 2 P = 16	634	17,111	523.64	7
10	22	F = 3 P = 19	826	16,285	587.55	8
11	13	F = 2 P = 11	698	15,587	625.31	9
12	10	F = 3 P = 7	1,040	14,547	657.00	9
13	13	F = 2 P = 11	793	13,754	701.63	10
14	12	F = 1 P = 11	295	13,459	746.00	10
15	10	F = 3 P = 7	178	13,281	785.61	11

be recorded as ON_0 in the formula shown in Figure 1); they can be cut without causing a reduction in service. For instance, in our library we can cut 174 titles with no change in service time.

Using the data in Table 1 we can work the following example, shown as Figure 2, illustrating what happens if titles receiving one and two uses are cut. Note that before the cuts we could not service 2 percent of the serial demand.

After the cuts, the unsatisfied demand was 3 percent so that we have actually reduced our current service by 1 percent and saved \$7,301.

Figure 3 shows the data when plotted. When the service reduction of 8 percent is implemented, we have reduced our current service by 6 percent, eliminated the free subscriptions in each category, and cut 50 percent of our paid subscriptions (\$16,285). The curve which re-

$$\frac{[26,766 - (1 \times 87 + 2 \times 85)] 5 + [480 + (1 \times 87 + 2 \times 85)] 7,200}{26,766 + 480} = 199.62 \text{ minutes to service request}$$

$$480 + 87 + 170 \div (26,766 + 480) = 3\% \text{ unsatisfied demand}$$

Fig. 2

Elimination of Titles Receiving One and Two Uses

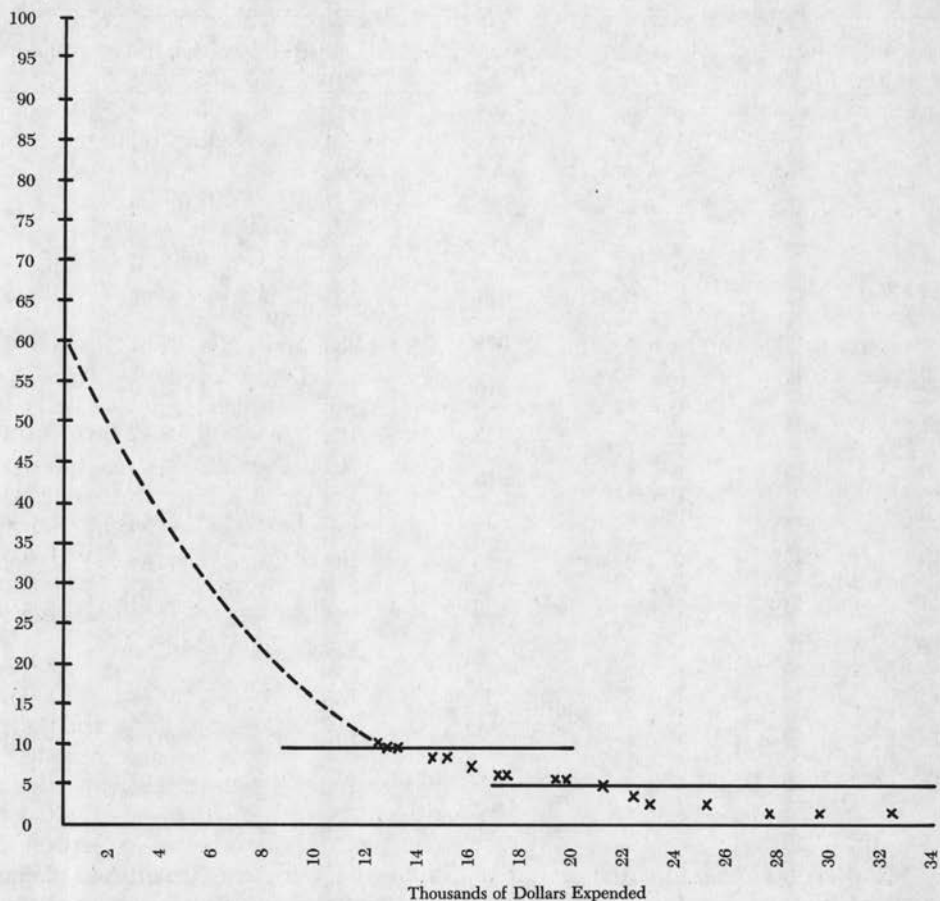
Percent of Demand not
Locally Satisfied

Fig. 3

Local Service Reduction/Budget Cuts

sults from this formula indicates that, even if all serial subscriptions were cut, we could satisfy 40 percent of the serial demand from our bound journal collection. The part of the curve drawn between the plotted data and the 60 percent unsatisfied demand is simply drawn as a smooth extrapolation of the plotted data.

The formula is actually "over fair" since it assumes that any titles cut would have no back issues available either so that no user could be satisfied for a

dropped title. Since, in fact, we shall continue to hold all bound volumes, especially during the next few years, when the run would be almost current, fewer actual requests from CRL will need to be made.

Continuing compilation of use data has tended to confirm the patterns established in the 1974-75 study. After presenting to the faculty the list of titles which would be cut and the formula by which the decisions had been made, we received very limited concern for indi-

vidual titles. We have, therefore, based on the formula, implemented serials cuts in 1976 to the level of 5 percent service reduction (\$11,239 savings). We shall continue to compile use data, account for all interlibrary loans, and tabulate user complaints which may be generated in an effort to measure the effectiveness of our approach.

SOME GENERALIZATIONS

This set of data is specific to Michigan and peculiar to the College of Engineering which we serve. Some generalizations about the use of our titles, however, may prove useful to others.

Little-Used Material

This material can be generally grouped in the following three categories:

Free titles: Of 193 current free titles, 190 of them received fifteen or fewer uses, and 102 received zero use. Many of these titles are in foreign languages or are gifts from American corporations, societies, universities, or research groups.

Foreign titles: Foreign-language titles accounted for 10 percent of the budget and 1.5 percent of the use. Fifty-six German titles received 273 uses, while twenty-two French titles received 31 uses, and thirty-eight Russian titles received 37 uses.

Translation titles: Requiring 22 percent of the budget, these forty-seven titles, mainly translations from Russian, received 1.6 percent of the use.

Heavily Used Material

This material showed considerable difference in user intent since current use often reflected casual browsing, and

bound use reflected scholarly purpose. In both cases, however, heavy demand can be supplied by very few titles.

Current title use: 50 percent of our current journal use can be supplied by twenty-five titles. The cost of these popular journals is \$485, or .7 percent of the budget. These titles included browsing materials such as *Aviation Week*, *Audio*, *Car and Driver*, *Yachting*, and *Popular Electronics*, along with research titles, such as *Computing Surveys* and the *Journal of the Water Pollution Control Federation*.

Bound journal use: As Gordon Williams and Derek de Solla Price have pointed out, a small group of titles will serve most research needs.^{6,7} In our study 160 of the 1,600 bound titles supplied 80 percent of the user need. Most heavily used were *Computing Surveys*, *Journal of the Water Pollution Control Federation*, *Industrial & Engineering Chemistry*, *Hydrocarbon Processing*, and *Communications of the ACM*.

CONCLUSION

As librarians enter into cooperative agreements and increasing reliance on networks while their budgets do not keep pace with inflation, they will move from considering size of collection and acquisitions locally available to calculating the amount of time required to access huge quantities of information from other facilities. They must concurrently develop tools for measuring cost-effectiveness of the materials they buy and continuously evaluate by sound methods the utility of the library collection they are building. The serials formula developed here provides one such measure.

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Acknowledgment: James Danky, State Historical Society of Wisconsin.

The author gratefully acknowledges the assistance of Stephen Slovasky and Grace Miller in the preparation of this series of issue covers.

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