Data-driven budget reductions: a case study

Denise D. Novak, Afeworki Paulos and Gloriana St. Clair
Hunt Library, Carnegie Mellon University, Pittsburgh, Pennsylvania, USA

Abstract

Purpose – The purpose of this paper is to describe how a medium-sized university library implemented activity-based costing (ABC) and other broad-based decision-making strategies to make the necessary budgetary cuts and refocus library services accordingly.

Design/methodology/approach – The paper uses ABC to quantify the cost-drive of services in the library.

Findings – Given the current budgetary cuts academic libraries are facing, a rational, data-driven, ABC approach can lead to constructive organizational decision making and outcomes.

Originality/value – The paper demonstrates the value of activity-based costing in assessing services and addressing issues on how libraries can do more with less.

Keywords Academic libraries, Budgets, Activity-based costs, Process efficiency

Paper type Case study

Introduction

Many sectors of the economy are currently striving to cut budgets and improve efficiency in response to the ongoing and deepening recession. Colleges and universities are among those facing decreasing incomes from their various funding agencies. Academic libraries, which have in some difficult years been protected from across-the-board cuts at their institutions, are being included among the campus departments being asked to reduce their budgets. The thesis of this article is that using a data-driven process can provide a more strategic and less destructive means to achieve the required cuts. The main sections include an organization profile and background, literature review, data collection, data analysis, materials budget, expert advice, outcomes, and conclusion.

Profile and background

The case study occurred in a medium-sized private university with about 10,000 students in a variety of locations worldwide. Although the university is highly ranked, the library is medium-sized, and too small to qualify for membership of the Association for Research Libraries.

The library governs itself through a council composed of heads of the various units, elected members from staff and library faculty, the business manager, the dean, and the associate dean. This group makes financial and policy decisions and, through its regular weekly meetings, strives to be a learning organization through discussions, article and white paper reviews, and invited guests on a variety of topics.

The university began communicating with the campus community about the worsening financial situation in early Fall 2008, and the library council began to discuss possible approaches for belt-tightening. Based on a reference interview, the

business reference librarian began to pull together materials that would prepare the council to select a method for achieving budget reductions. The initial literature review and discussion yielded three process alternatives – zero-based budgeting, activity-based budgeting, and benchmarking. Further searching added two more alternatives, balanced scorecard and applied information economics. A detailed and repeated search of the literature identified existing benchmarking data for interlibrary loan and cataloging.

The University required budget reductions – permanent cuts totaling 5 percent over three years, i.e. 2 percent FY 2010, 2 percent FY 2011, and 1 percent FY 2012. The Library Council decided that half of the cuts would be from operations and the other half from the materials budget.

Literature review

Since the 1980s, activity-based costing (ABC) has emerged as an important tool in business. The ABC system relates services, activities and cost. Gradually, ABC has penetrated into non-profit organizations including institutions of higher education. Robert S. Kaplan and other proponents of ABC claim that it has "corrected serious deficiencies in traditional standard-cost systems" (Kaplan and Anderson, 2007). The rationale for using ABC is "to allocate indirect costs to products and services based on the factors that most influence them" (Ellis-Newman, 2003). By emphasizing the question why an organization spends money in the first place, the ABC system has challenged traditional allocation of costs (Kaplan and Cooper, 2006) The ABC approach involves an in-depth analysis of an organization in order to make an "accurate determination of what is 'driving' cost" (Simmons *et al.*, 2006).

Academic libraries that have implemented activity-based costing include Oxford University Library Services, which consists of over 30 federated libraries and services that have used ABC to "meet the University's increasing demands for proven efficiency and effectiveness" (Heaney, 2004). A case study of interlibrary loan services at the Arenberg Library of the Catholic University of Leuven concluded that time-driven activity-based costing is "suited to cope with the increasing cost pressures that university libraries currently experience" (Pernot *et al.*, 2007). The library at the University of Newcastle undertook activity-based costing in early 2000 and subsequently released a detailed report. The University of Newcastle study was not taken as "an accounting process, but rather as a strategic exercise" in order to provide information and feedback on activities that would be useful for decision-making and planning (Information and Education Services Division, University of Newcastle, 2001).

Unlike interlibrary loan costs, which are studied with some regularity, studies about materials budget cuts using ABC and other methods are not plentiful. Nonetheless, the literature review yielded a couple of items about collections budget planning that led the library to believe that it was on the right track when considering the 1 percent reduction in material acquisitions (Chan, 2008).

Following the literature review, library council members suggested two additional ideas, i.e. across-the-board cuts, and relatively painless cuts from the operating budget (low-hanging fruit) that would be effective only for short-term reduction. In a general discussion of alternatives, council members shared their experiences with some of the techniques. Two had done zero-based budgeting and found it painful. (Faculty from a

neighboring university shared that this type of review, even without its formal name, continues to be arduous, although it is quite effective.) One member had used the Balanced Scorecard with library school students and did not think it would be useful for the current situation. The high level of statistical knowledge required to use applied information economics seemed to be a barrier. There was consensus among members that some benchmarking would be brought to bear no matter what technique the library used for budget reduction. Because of the mismatch between the university's reputation and the library's size, council members expressed concern about identifying valid benchmark partners.

Each council member voted and gave reasons for the preference. A majority preferred to examine the operating budget expenses (less than 1 percent of the non-materials budget) in the hopes of identifying relatively painless options. The business manager agreed to distribute a detailed report of that budget for discussion, but cautioned that even these cuts would be difficult and contentious.

In its earlier discussions, the council had agreed to some assumptions:

- every attempt would be used to achieve reductions through personnel attrition;
- all library employees would be asked for their suggestions about possible cuts;
- employees would be encouraged to identify themselves when they made suggestions, but an (existing) anonymous suggestion box would be available;
- transparency in the process would be balanced against privacy;
- so-called "sacred cows" could be questioned; and
- the university's request that undergraduate education be protected would be honored.

A majority of the council also favored beginning to learn activity-based costing as a main technique for achieving year one cuts and working through those in year two. A council member who has an MBA agreed to seek a suitable guide to ABC that could be used to understand the process, generate the templates needed, and begin data collection. Under fair use, many articles were distributed for reading, and several other books and articles were selected to fill in details. Some library faculty were reluctant to use tools that had not been adapted especially for libraries. Fortunately, ABC has been used in some international libraries.

The Council favored activity-based costing, because it agreed that a thorough examination of activities would yield opportunities for strategic changes. Members agreed that a library-wide review was the only possible way to streamline essential present and future activities, and, at the same time, identify and cease less productive ones.

Data collection
The ABC coordinator met with department heads separately to discuss the implementation. The meetings revealed that the level of enthusiasm for the implementation was not universal. In addition, some staff members raised concerns including fear of layoffs and other job security issues. All-staff meetings were scheduled to acknowledge, discuss, and allay unease about implementing ABC. The Dean stated that the purpose of the implementation of ABC was not to generate layoffs, as some library employees feared, but to improve efficiency and service. Conversely,

the Dean stated, the library would make use of naturally occurring attrition to reduce costs.

Expert advice was sought from the University Budget Office. Two experts from the Budget Office had a meeting with the ABC Coordinator, Dean, and Associate Dean of Libraries. The Libraries shared what was proposed, including examples of the ABC templates. The two experts said that the Libraries'ABC approach proposal was sound.

Every employee was asked to make a basic ABC accounting of his/her activities. Calendars, e-mail traffic, document production, meeting minutes, and annual self-evaluations were among the sources many library faculty and staff used to obtain data (see Figures 1 and 2). Some individuals did short-term (one to three weeks) self-audits tracking how they spent their time. Issues such as whether to account for 100 percent or the Kaplan-acknowledged 80-85 percent of time were decided based on recommendations in the literature, balanced with the purpose of the study.

ABC data started coming from department heads in May 2009. By August 2009 all data was collected. The next step was to analysis the data.

Data analysis

Between September 2009 and March 2010, the ABC Coordinator, Dean, and Associate Dean met with department heads in the University Libraries to analysis the ABC data. Each department head, the Dean, the Associate Dean, and the ABC Coordinator discussed the ABC data. The data is primarily data of individual employees. Department- or unit-relevant ideas from the list that were generated from Library Council at the beginning of the process were also discussed. These ideas were generated to reduce costs in the Libraries. Some of the ideas were general in nature; others were specific to departments. Following a discussion, a to-do list is generated for action and/or further clarification. Some examples of a to-do list are:

- analysis of approval plan returns;
- assessment of cost of shelf ready for firm orders; and
- analysis of e-reserve data.

Materials budget

The Library Council made the decision that of the 2 percent budget reduction to be made for year 1, the materials budget would be cut by 1 percent. The head of acquisitions and the bibliographers were charged with developing a strategy for permanent reduction of the materials budget.

The head of acquisitions met with the acquisitions accounts manager and bibliographers to brainstorm how to reduce the materials budget with minimal impact on journal and monograph collections. Copies of the current materials budget were distributed to all participants prior to the meeting.

To begin the session, the head passed along two caveats from library council:

(1) that the library hoped neither journals nor the approval plan would be reduced; and

(2) that the dissertation fund would be untouchable because those monies paid for binding and microfilming of student-authored dissertations.

Employee:	Week 1													
Activity	Subactivity	Monday Time spent (in hours)	Monday # of incidents	Tuesday Time spent (in hours)	Tuesday # of incidents	Wednesday Time spent (in hours)	Wednesday # of incidents	Thursday Time spent (in hours)	Thursday # of incidents	Friday Time spent (in hours)	Friday # of incidents	Week Time spent (in hours)	Week # of incidents	Week Time spent per incident (in hours)
Cataloging	**ORIGINAL**											0	0	#DIV/0!
	Analyze/Solve Problems			0.25	1							0.25	1	0.25
	Classification Web			0.25	1							0.25	1	0.25
	OCLC - input data			0.25	1							0.25	1	0.25
	OCLC - searching			0.25	1							0.25	1	0.25
	OCLC - verify headings			0.25	1							0.25	1	0.25
	Work in Unicorn			0.25	1							0.25	1	0.25
	COPY - LC											0	0	#DIV/0!
	Analyze/Solve Problems											0	0	#DIV/0!
	Classification Web											0	0	#DIV/0!
	Work in OCLC	0.25	5									0.25	5	0.05
	Work in Unicorn											0	0	#DIV/0!
	COPY - MEMER											0	0	#DIV/0!
	Analyze/Solve Problems	0.25	10	0.5	12					0.25	3	1	25	0.04
	Classification Web	0.25	5	0.25	7							0.5	12	0.041666667
	Verify Authorities	0.25	15	0.25	12	0.25	5			0.25	7	1	39	0.025641026
	Work in OCLC	0.25	15	0.75	12	0.25	5			0.25	7	1.5	39	0.038461538
	Work in Unicorn	1.5	15	0.75	12	0.25	5	0.5	7	0.5	7	3.5	46	0.076086957
Miscellaneous												0	0	#DIV/0!
	Book Sorting/Shifting	0.5	1			0.25	1			0.5	1	1.25	3	0.416666667
	Locate Rush Books					0.25	1					0.25	1	0.25
	Statistics	0.25	2	0.25	1	0.25	1					0.75	4	0.1875
	E-Mail	2.5	4	1	3	1.5	4	1.5	4	1.75	5	8.25	20	0.4125
	Training Library Staff	1.5	1									1.5	1	1.5
	Work on Committees			0.5	1	0.5	1					1	2	0.5
Meetings	Campus											0	0	#DIV/0!
	Off-Campus											0	0	#DIV/0!
	Library							1	1	1	1	2	2	1
Supervision												0	0	#DIV/0!
	Staff			0.75	2			0.5	1	1	3	2.25	6	0.375
Special Projects												0	0	#DIV/0!
	Work on blue tag books.			1	10	3	25	2	20	2	25	8	80	0.1
	Catalog Special Collections							1	15			1	15	0.066666667
Professional Development												0	0	#DIV/0!
	Work on article					1	1	1	1			2	2	1
	Attend Conferences every year for approximately 5-8 days/year.											0	0	#DIV/0!
	Propose and prepare poster sessions for ALA Annual Conferences for approximately 10-15 hours/year.											0	0	#DIV/0!
Totals		7.5	73	7.5	78	7.5	49	7.5	49	7.5	59	37.5	308	

Figure 1.
ABC data/faculty sample

www.man

Employee: Activity	Sub activity	Tuesday Time spent (in hours)	Tuesday # of incidents	Wednesday Time spent (in hours)	Wednesday # of incidents	Thursday Time spent (in hours)	Thursday # of incidents	Friday Time spent (in hours)	Friday # of incidents	Saturday Time spent (in hours)	Saturday # of incidents	Week Time spent (in hours)	Week # of incidents	Week Time spent per incident (in hours)
DISCHARGE ITEM														
	Scan Item barcodes		15		22		20		36		36	0	0	#DIV/0!
	Sensitize Item													
	Sort Items													
	Check Item (barcode)													
	Loading Carts													
CHECKOUT ITEM														
	Desensitize Item		13		20		20		29		29			
	Verify Transactions													
	Scan ID cards													
	Scan item barcodes													
	check books out to users											0	0	#DIV/0!
												0	0	#DIV/0!
SUPERVISION & OPERATION OF CIRCULATION DESK														
	Circulation desk time	2	28	1.5	42	2	40	4	65	5	50	1.15	6	0.191666667
	Problem Solving - Patron related	1	5	0.15	1							0.15	3	0.05
	Problem Solving - Material related	0.15	3					0.05	1			0.25	1	0.25
	Supervising Students	0.2												
	Taking Fines	0.05				0.1	3			0.05	1			
	Reconciling Fines Drawer	0.05												
	Emailing (General)	0.3		0.3		0.45		0.3		0.3				
												0	0	#DIV/0!
												0	0	#DIV/0!
OVERALL BUILDING SUPERVISION														
	Building security & orderliness	0.1		0.1		0.1		0.15		0.05		0.5	0	#DIV/0!
	Accountability for the release & collection of building keys											0	0	#DIV/0!
	Open Building	0.15				0.15		0.15		0.15				
	Close Building							0.2		0.2				
STACKS MAINTANENCE														
	Shelving													
	Shifting													
	Shelf-Reading													
	Locate Items for patrons at desk	0.15	2	0.2	3			0.5	12	0.1	2			
	Tracers							0.4	8	0.3	4			
	Missing books													
	Process outcome for tracers and missing books											0	0	#DIV/0!
COORDINATING STUDENT EMPLOYEES														
	Training/Evaluating													#DIV/0!
	Time Sheets	0.1				0.1		0.1	2	0.1	1	0	0	#DIV/0!
	Scheduling											0.5	3	0.166666667

(Continued)

Figure 2.
ABC data/staff sample

CLAIMS RETURNED												
complete paperwork							0.15	1			0	0	#DIV/0!
enter in workflows							0.1	1			0.1	1	0.1
search stacks							0.15	1			0.15	1	0.15
process outcome							0.15	1			0.15	1	0.15
contact patron							0.1	1			0.1	1	0.1
											0	0	#DIV/0!
OVERDUES PROCEDURES											0	0	#DIV/0!
produce Notices of University Debt	1.5	8			1	8					4.5	24	0.1875
process NUDS fines/fees payments in Workflows	0.3	8	2	8									
process daily fines/fees payments in Workflows	0.15		0.45	8	0.15		0.15		0.15		0.75	0	#DIV/0!
notify patrons via email of NUDS bill													
resolve overdue and fines/fees problems	0.3	2			1	4	0.2				1.3	6	0.216666667
monitor eslb email account	0.2		0.2		0.2		0.2		0.2		1	0	#DIV/0!
send processed NUDS to Hunt for posting			0.15		0.15	16					0.3	16	0.01875
send processed Clearances to Hunt for posting							0.15	1			0.15	1	0.15
RECALLED BOOKS													
produce recalled book report	0.1		0.1		0.1		0.1		0.1				
search stacks					0.2	5							
produce recall reminder and email					0.3	5							
monitor eslb email account and patron account					0.15								
PATRON CORRESPONDENCE													
receive and process material returned via USPS													
receive and process payments received via USPS											0	0	#DIV/0!
read, resolve and respond to patron inquires via email	0.3	4	0.3	3	0.3	4	0.3	2	0.3	1	0	0	#DIV/0!
OTHER UNIVERSITY BILLING													
prepare bills as advised for E&S filled colleague			1	5			0.4	5			0	0	#DIV/0!
process 30 day overdue bills based on Unicom report											0	0	#DIV/0!
MAINTAIN STATISTICS											0	0	#DIV/0!
compile fines statistics	0.1		0.1		0.1		0.1		0.1		0.5	0	#DIV/0!
compile overdue notices statistics											0	0	#DIV/0!
											0	0	#DIV/0!
Totals	7.2	88	6.8	112	6.55	125	7.9	166	7.1	124	11.7	65	

*** Desk time hours includes - Discharge/Checkout items sub activities

Figure 2.

Acquisitions personnel suggested binding and database budgets as candidates for reduction. With the decision to move the majority of journals to electronic format, the numbers of paper journals sent to the bindery had decreased substantially, thus creating a cost saving by reducing that line item in the materials budget. There had not been a review of the databases to which the University Libraries subscribed for some time, and the group decided to have a small group to review the databases, with the exception of Proquest, EBSCOhost, and Lexis Nexis.

Subsequent discussion generated other ideas:

- standing orders;
- monograph budgets;
- microfilm/microfiche;
- big-ticket items;
- little-used print reference books (based on statistical data);
- annuals (purchase every *other* year);
- a percentage decrease for each fund; and
- dollar targets for bibliographers to achieve at their discretion.

Action items

- *Database redundancy task force* – A small task force of bibliographers was formed to review the library's database subscriptions. The task force resolved to survey library faculty and staff about database use, and to inform the equation for possible cancellations with electronic usage statistics. Survey and use data yielded a short list of least-used products, which was shared among acquisitions staff and bibliographers in preparation for the next decision-making meeting.
- *Microfilm/microfiche* – After discussing the list of potential cancellations and surfacing additional suggestions, bibliographers turned to possible microform cancellations. All bibliographers were asked to review the microform subscriptions and provide a list of possible cancellations to the head of acquisitions. Based on the lists that were submitted, 32 under-utilized microform titles were selected for cancellation.
- *Bindery expenditures* – The University Libraries have moved to e-journals almost exclusively. With the exception of some titles in the fine arts (i.e. design, art and architecture) the majority of subscriptions are electronic only. Additionally, the group agreed to base paperback book-binding on circulation statistics, further reducing the need for a large bindery budget. In consultation with the acquisitions accounts manager, it was decided that a large part of the bindery budget would be reduced.

By the end of the meeting in mid-June 2010, consensus was reached and it was decided to cancel one database, nine standing orders for books in series, and 32 microform subscriptions, effective in fiscal year 2010.

Consultative processes like these enabled acquisitions staff and bibliographers to make informed strategic decisions, meeting the university's mandate to reduce the materials budget without significantly weakening library collections (see Table I).

University libraries	FY 2010	FY 2011	FY 2012
Required budget reduction amounts (in round numbers)	216,000	216,000	108,000
Proposed department reductions			
Elimination of vacant Head of Arts and Special Collections			
Elimination of one Hunt Reference information assistant			
Cancelled LivePerson chat license			
Reduce administrative travel			
Reduce interlibrary loan budget			
Reduce memberships budget (DLF)			
Reduction in vacant Associate University Librarian position			
Library materials budget			
2010 reductions	216,000		
Elimination of Human Factors Researcher position			
Net reduction of E'S Library positions and staff transfer			
Net reduction of Hunt Circulation positions and staff transfer			
Reduction in computer replacement cycle			
Library materials			
2011 reductions		216,000	
Library materials budget			
Elimination of vacant Cataloger position			
2012 reductions			108,000

Table I.
FY 2010-FY 2012 budget reductions for academic units

Expert advice
As the dean began to talk with the university provost about this process for achieving budget reductions, the library discovered that the campus has a number of resource persons for data-driven decision making. One, who was consulted early in the process, indicated that a consulting contract would be welcome. Another, the head of the budget office, had experience in industry and was willing to offer preliminary advice at no additional charge, as the library's budget was one that was supervised in that office.

These consultations with the head of budget and with a cost specialist were informative. An initial question was whether the library would want to collect this data longitudinally and if so, what databases might be appropriate for that purpose. The library thought that would be too labor-intensive for the whole organization at this time. A lengthy discussion of indirect costs and how they might be apportioned and viewed was most helpful. The library decided to review the operations budget to see how each line might be handled. The library also began to consider spreading the costs of the library administration across the various departments and thus the various activities. An added benefit of these last two initiatives would be that individual salary and benefit data could be masked that would be applied to the activity sheets.

Because of the strategic importance of this work and because the library will use the information in preparing for future advisory board visits, the library decided to move all the ABC activity forms, which had been produced in Excel, into an Access database; from there, the library will be able to manage them and work with them comparatively.

The greatest and most valuable insight from the library's advisors was that, in many cases, the library does not need to go through the costing steps. As the library looks at resignations and as people move into new positions, it can examine the duties there based on the time it takes to perform them. The library can then look for both the time and the expertise needed to fill a vacancy without having to add on and compare the costs; however, in some cases, where the library wants to benchmark with other studies in the literature or with data gathered from comparator institutions or to consider outsourcing alternatives, it will have to work its way on through to actual cost figures.

The cascading vacancies draw the focus of change to individual departments. The first shift in jobs occurred just as the library was thinking about which technique to consider. The head of that unit commented wryly that doing the change itself was easier than filling out the ABC forms. The second and third vacancies were both in another area and were concurrent with the collection of the ABC data, which was used informally in the redesign of jobs and in the decision-making. The fourth vacancy will be analyzed with the completed ABC time estimates.

Outcomes

Implementation of ABC, assessment of materials budget by selectors and discussion of list of ideas of cost reduction led to some changes in budget allocation and services in the Libraries. Some examples are:

- the Access Services department reassigned responsibilities of an existing staff member when the department's ILL staff person left the department;
- assessment of activities and services of a particular branch library (Mellon Institute) led to a revision of the need for a separate branch;
- implementation of shelf-ready for approval plan; and
- the Library Information Technology department decided to replace desktops and laptops in a four-year instead of a three-year cycle.

Conclusion

The University Libraries has effectively implemented the activity-based costing approach in order to address the budgetary reduction that was mandated by the University. The process also led to the reassessment of some strategic issues, such as the rethinking of the viability of the Mellon Institute as a branch library and allocation of staffing in some departments. The process also led managers and the library administration to a thorough revision of services that are provided by the University Libraries.

The University Libraries now has the necessary data to make informed decisions on strategic and tactical issues regarding services it provides to the university community. The economic news continues to be difficult; the rational, data-driven approach of activity-based costing has given a constructive turn to organizational decision-making. The Libraries can now allocate its resources to the most relevant

services. As Joseph Matthews put it "as librarians gain awareness of the true costs of providing a service, they can make choices to better utilize limited resources" (Matthews, 2007).

References

Chan, G.R.Y.C. (2008), "Aligning collections budget with program priorities: a modified zero-based approach", *Library Collections, Acquisitions, and Technical Services*, Vol. 32 No. 1, pp. 46-52.

Ellis-Newman, J. (2003), "Activity-based costing in user services of an academic library", *Library Trends*, Vol. 51 No. 3, pp. 333-48.

Heaney, M. (2004), "Easy as ABC? Activity-based costing in Oxford University Library Services", *The Bottom Line: Managing Library Finances*, Vol. 17 No. 3, pp. 93-7.

Information and Education Services Division, University of Newcastle (2001), "Activity-based costing: a study to develop a costing methodology for library and information technology activities for the Australian higher education sector", Department of Education, Training and Youth Affairs, available at: www.dest.gov.au/NR/rdonlyres/2E695832-4B00-47D9-8C6B-52D0F1AC557F/4653/libraries.pdf (accessed July 20, 2009).

Kaplan, R.S. and Anderson, S.R. (2007), *Time-driven Activity-based Costing*, Harvard Business School Press, Boston, MA.

Kaplan, R.S. and Cooper, R. (2006), *Activity-based Costing: Introduction*, Harvard Business School Press, Boston, MA.

Matthews, J. (2007), *The Evaluation and Measurement of Library Services*, Libraries Unlimited, Westport, CT.

Pernot, E., Roodhooft, F. and Van den Abbeele, A. (2007), "Time-driven activity-based costing for inter-library services: a case study in a university", *The Journal of Academic Librarianship*, Vol. 33 No. 5, pp. 551-60.

Simmons, C., Wright, M. and Jones, V. (2006), "Full costing of business programs: benefits caveats", *International Journal of Education Management*, Vol. 20 No. 1, pp. 29-42.

Corresponding author
Denise D. Novak can be contacted at: dn22@andrew.cmu.edu