

# CAN COLLABORATION RESCUE IMPERILED IT BUDGETS?

By Martin Ringle

Several years ago, with her customary insight, Diane Balestri said: "Collaboration becomes especially seductive to contemplate whenever costs are high and expertise is scarce. Information technology would appear to be a perfect case in point."<sup>1</sup>

A perfect case indeed. The cost of supporting information technology in colleges and universities is high and promises to rise substantially in the next few years. Technical expertise, especially among smaller institutions, is not only scarce but exceedingly vulnerable to upsurges in the IT job market. If ever there was a time to explore the benefits of inter-institutional technology collaboration,

the time is now. It is not surprising, therefore, to see so many alliances forming and flourishing. From the largest research universities to the smallest liberal arts colleges, institutions are seeking partners with whom to meet the challenges of developing, evaluating, supporting, and affording new technologies. The question of how collaboration may help to address the last item—the cost of new technology—is especially intriguing given the ways in which the financial landscape of higher education technology is evolving. This article will explore the changing profile of IT budgets and look at areas where collaboration may—and may not—be of assistance. Although the issue is addressed from the perspective of a small, private

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liberal arts college, many of the points hold true for a wide range of higher education institutions, both large and small, public and private.

### The Rise and Fall of Fungibility

With information technology in constant flux, chief technology officers (CTOs) and others in higher education understand that the key to success is *agility*—the capacity to respond in a timely fashion to changes in user needs and technical offerings. Many different factors promote technological agility, for example, a well-designed network that can be upgraded in efficient increments, or a “rapid deployment” training mechanism that allows users to stay current with software revisions. By far the most critical determinant of agility, however, lies in *budgetary fungibility*—the degree to which funds intended for one purpose can be reassigned and used for other purposes. Budgetary fungibility should not be confused with *discretionary spending*, in which undesignated funds are used to address ad hoc needs. Budgetary fungibility is not determined by the discretion of the fiscal agent; it is dictated by the degree to which expense items themselves permit reassignment of funds.

All technology budgets are fungible to some degree. Some line items—for example, staff development—place few constraints on how, when, or to what extent funds must be used. Hence, the reallocation of those dollars within a given budget cycle is relatively easy. Many other items—such as maintenance contracts—require funds to be spent in specific amounts at specific intervals.

Over the past three decades, as technology budgets in higher education have grown larger and more complex, fungibility has waxed and waned. In the late 1970s, most college and university IT budgets had few expense items and practically no fungibility. Monthly contract payments were made to a single provider—usually IBM—for hardware, software, maintenance, and repair. Life was exceedingly simple for the generation of founding computer center directors (though it didn’t seem that way at the time).

During the 1980s, the proliferation of minicomputers, the advent of microcomputers, and the rise of local and national

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networking caused technology budgets to swell and fungibility to rise significantly. IT officers, enjoying new financial freedom, found themselves confronted by an array of technical priorities. By the end of the decade, technology environments in higher education had undergone radical transformations, due in part to the ability of IT officers to move funds away from legacy strategies and to use them to pursue new approaches in instructional, research, and enterprise computing. The retirement of mainframes, the shift to distributed network environments, the infusion of low-cost desktop software, and many other changes were aided by—and in turn further promoted—IT budgetary fungibility.

Within the past few years, the direction of the curve has again changed, heading toward a decline in fiscal maneuverability. The retreat could not have come at a worse time, given the cost-cutting pressures on IT budgets brought about by recession.<sup>2</sup> The combination of less fungibility and lower overall funding created a one-two punch that has left many IT operations struggling. And even though IT budget cuts may be bottoming out, the decline in fungibility appears to be headed even lower.

Why? There are at least four factors contributing to this trend:

- Equipment replacement policies
- Network defense activities
- Mission criticality expansions
- Software licensing changes

Each item plays an important role, but the last one—modifications in the way that software packages are licensed and paid for—promises to have the most significant impact.

## Steady-State Hardware Replacement

A recurrent theme of the 1990s was the need to establish clear policies and financial commitments for the regular replacement of personal computers. What had long been viewed by business officers as an infrequent capital expense emerged as an annual operating requirement. Institutions were pressed to find ways to accom-

modate this new and sizable budget item. A poll of CTOs at private liberal arts colleges taken in 1996 suggested that fewer than one-fourth of their institutions had allocated sufficient funds to underwrite PC replacement at regular intervals.<sup>3</sup>

By 2003, the picture had changed dramatically. Among liberal arts colleges, nearly three times as many reported budget commitments for the scheduled replacement of desktop and other computer equipment.<sup>4</sup> At some institutions, the budget discipline was a matter of internal policy, though others relied on lease agreements to ensure regular equipment rotation. In both cases, the systematic replacement of computers became firmly entrenched at the same time that flexibility in the use of equipment funding diminished.

Many institutions committed to aggressive replacement cycles now face the difficult task of retreating from their replacement policies. Those bound by lease agreements are further constrained by the timing of their contracts and by the entry cost of shifting to outright purchases. The alternative—leaving untouched those funds allocated for equipment replacement—prevents those resources from being applied to greater advantage elsewhere in the IT budget.

The very success of the effort to put equipment replacement on a sound financial footing, to establish a strict discipline by “locking” the use of the funds, thus has contributed to the decline in overall IT budgetary fungibility.

## Network Defense: The Rising Cost of Distractions

At many colleges and universities, the busiest time of the year for IT organizations is the end of summer, when students return and classes resume. August 2003, however, was exceptionally chaotic thanks to a two-pronged assault on network security. At Reed College, for example, students, faculty, and staff received the following message:

We need your help. As you may be aware, we are in the midst of several virus attacks that are sweeping the en-

tire Internet. These viruses, including Blaster and SoBig, have the potential to disrupt your use of email, clog the campus network, and cause many other sorts of mischief. Working together, however, we can minimize these headaches. We are scanning all email sent to Reed in order to filter out virus-infected email. Yet over 5000 attempts are being made each minute to find weaknesses in our network defenses!

Quarantining and treating affected computers and shoring up network defenses consumed at least five weeks of staff time, disrupted account setups and other important tasks, delayed the implementation of major projects, and cost tens of thousands of dollars for new hardware and software to defend the campus network against such attacks. At larger universities, the average price tag for dealing with this episode was nearly \$300,000.<sup>5</sup>

Not to be outdone by viruses and worms, spam also rose to unprecedented levels. By some estimates, the number of spam messages received by workers more than doubled between July 2003 and May 2004.<sup>6</sup> Once again, colleges and universities found themselves forced to divert substantial staff and budget resources to the development of more elaborate spam-filtering strategies.

While worms, viruses, and spam occupied much of our attention, trouble continued to brew with legal concerns regarding the illicit sharing of intellectual property and regulatory concerns related to FERPA, HIPAA, and the Graham-Leach-Bliley Act. Higher levels of access control, traffic monitoring, and other measures were introduced to protect institutions from litigation, adding still more expense items to IT budgets.

So what do network intrusions, spam assaults, copyright infringement claims, and privacy exposures have in common? The answer is simple: they are all *distractions*, draining scarce resources from IT budgets—resources that would otherwise be used to enrich technology services for students, faculty, and staff. Preventing a virus from attacking a computer, forestalling the delivery of a spam message,

blocking an illicit file transfer, or denying unauthorized access to personal information do not directly advance the use of computing for instruction, research, or administrative operations. Every dollar spent on defenses against such threats becomes part of the nonproductive overhead of providing technology resources. And that overhead is growing rapidly. Although the amount spent on these distractions has yet to be precisely determined, a poll of CTOs at liberal arts colleges indicates that the distractions cost for their institutions is somewhere between 10 percent and 15 percent of the total IT budget.<sup>7</sup> The impact of the rising cost of such distractions, particularly for smaller colleges, is substantial. In many cases, funds to cover such expenses are not explicitly budgeted; hence they are drawn from a variety of existing line items. Since these distractions cannot be ignored without imperiling the viability of network access and other computing resources, IT organizations have no choice but to divert funding, thereby adding to the decline of IT budgetary fungibility. The alternative, seeking increases of 10–15 percent in the IT budget, is hardly a realistic option at a time when institutional budgets are struggling to deal with shortfalls in public funding, endowment income, and other revenue sources.

The problem of paying for distractions-based overhead is further complicated by the fact that users, though sensitive to the frustrations caused by spam, viruses, and such, are less willing to lobby with senior administration for funds to address these problems than they are to advocate for resources or services directly related to their own instructional or research needs. The burden of dealing with the cost of distractions tends to fall directly, and exclusively, on the shoulders of the IT organization.

### **The Growth of Mission Criticality**

Some years ago, I was involved in a meeting between the president of a liberal arts college and the CEO of one of the nation's top computing companies. During the course of the conversation, the CEO, in an effort to make a point about the value of user-friendly desktop equipment, asked, "What are your mission-critical software applications?" The president responded without hesitation: "We don't have any.

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Our mission is to educate our students. Computers are helpful but not essential.”

Although that may have been true at one time, today it is abundantly clear that virtually all administrative tasks, along with a wide range of teaching and research activities, require extensive and reliable access to technology services, even at small colleges. High availability and integrity of data, once a necessity for only a handful of business processes, are now considered nonnegotiable requirements for countless curricular and research purposes as well as for nearly every administrative operation, from student recruitment to institutional advancement. In practical terms, this means that higher education IT organizations are increasingly expected to provide fault-tolerant data resources, universal network accessibility, 24x7 help-desk support, business continuity in the face of routine calamities (such as power outages or hurricanes), and prompt recovery from disasters (such as earthquakes or terrorist attacks).

For large universities, with hundreds of IT staff and with IT budgets in the tens of millions of dollars, meeting these requirements poses a substantial resource challenge. For small colleges, with much smaller staffs and budgets, the challenge is nearly insurmountable. As of 2004, for example, fewer than 5 percent of private liberal arts colleges acknowledged having IT business continuity or disaster recovery plans or maintaining 24x7 (or even 24x5) help-desk operations.<sup>8</sup> Nevertheless, the pressure to acquire new technologies and to devote staff positions to address the expansion of mission-critical IT operations continues to rise.

To the extent permitted by their resources, colleges and universities have responded to this pressure by introducing sophisticated data-backup strategies, installing uninterruptible power supplies and auxiliary generators, devising emergency-preparedness protocols, and most important of all, designating “core” staff positions to protect mission-critical infrastructure components. All of these costs fall into the domain of non-fungible expenses, but the core staff positions pose the greatest problem for budget flexibility.

Whereas IT staff assigned to applications programming, desktop support, documentation, training, and other tasks may be increased or decreased as the institution’s needs and finances change, staffing for network management, security, central systems administration, enterprise database access, and other mission-critical tasks must be protected. As the number of these positions has grown, the budget resources they require have been all but removed from play.

## Software Licensing: Ownership Had Its Privileges

Hardware replacement, network defense distractions, and mission-critical staffing each contribute to a loss of financial fungibility, but by far the most worrisome threat to IT budgets comes from changes in commercial software licensing. In March 2004, an article in *InformationWeek* stated: “According to a survey of both software vendors and major business customers by IDC, the long-time model of perpetual licensing—where software rights are purchased up front—will soon be replaced by subscription-licensing plans, in which vendors and customers adopt a pay-as-you-go arrangement that extends over several years.”<sup>9</sup>

As enterprise technologies have become more complex and more mission-critical, colleges and universities have increasingly turned to the (perceived) stability of commercial packages. The “off-the-shelf” approach to software is now dominant in areas such as course management, business operations, e-mail, Web services, asset management, and a wide range of productivity tools. Smaller colleges, lacking sufficient staffing to develop and maintain their own software, have become particularly dependent on commercial packages.

Until recently, many software products—from the enterprise to the desktop level—could be purchased with perpetual usage rights. Although institutions may have been encouraged to contract for upgrades, bug fixes, and other forms of support, they were not required to do so. If an institution elected to reduce, drop, or renegotiate the cost of an annual contract,

it nonetheless retained the right to use the software indefinitely. This flexibility helped many colleges and universities preserve uninterrupted computing operations in the face of budgetary ups and downs.

As the software market matured, however, it became increasingly obvious to vendors that the flexibility enjoyed by customers was at odds with long-term revenue goals. Optional contracts were gradually replaced by “required” service agreements. Still, some customers managed to find ways to circumvent such agreements, especially during economic downturns. Vendors thus needed a more radical approach.

In hindsight, the move to a subscription model was inevitable. Sooner or later, vendors were bound to realize that they could increase long-term profitability and revenue predictability by “renting” software rather than selling it. Indeed, this holds true for virtually any piece of intellectual property. The “pay-as-you-go” model changes the basic concept of a software package from that of a *durable product* to that of a *consumable utility*, one akin to electricity, water, or cable TV. In this model, software may be used only as long as regular payments are made—with the unhappy consequence that fungibility for software licensing all but disappears.

During the economic downturn of the past few years, colleges and universities discovered, to their dismay, how easily pay-as-you-go fees could be increased. For example, a March 2004 survey of private liberal arts colleges reported an average increase of 20 percent in annual licensing fees for a popular courseware management system, despite the fact that inflation was roughly 1.5 percent and many IT budgets were shrinking.<sup>10</sup>

As with so many enterprise systems, the possibility of reacting to such increases by dropping the product (or threatening to do so) is virtually nil. Viable alternative packages involve comparable annual fee structures, and more important, the cost of switching from one system to another is prohibitive. As vendors well understand, the magnitude of investment

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in licensing, staffing, implementation, and user training acts as an effective deterrent to product abandonment. For vendors, this is wonderful news: customer retention rates are climbing higher and higher. For colleges and universities, on the other hand, this creates a near-total loss of negotiating leverage. With such a high cost for pursuing alternatives, institutions have little choice but to continue paying their subscription fees, regardless of rate increases. In addition, some vendors have reduced IT budgetary fungibility even further by shifting the foundation of subscription rates from the number of concurrent users to the number of *possible* users. By doing so, they remove an institution's ability to alter rate payments to accommodate fluctuations in actual usage needs or budgetary resources.

The net effect of these licensing changes is to tie up a portion of the IT budget in charges that are unconstrained, steadily rising, and non-fungible. When taken in conjunction with the factors mentioned earlier, changes in the licensing model foreshadow IT budgets over which technology officers have less and less control—budgets whose lack of fungibility will make it increasingly difficult for institutions to keep up with new technologies and to address changes in users' needs—that is, the lack of budgetary fungibility will further decrease the institutions' agility.

## Can Collaboration Help?

Lest we get too discouraged by these observations, it is worth bearing in mind that IT budgetary fungibility was in a similarly sorry state twenty years ago and that the forces prompting changes then are still very much alive today. It should not be surprising to see the pendulum shift within the next few years—aided, perhaps, by inter-institutional collaborations.

Support for IT collaboration in higher education is booming. Presidents, provosts, and other administrators enthusiastically endorse technology partnerships, and foundations are contributing tens of millions of dollars to promote collaborative initiatives. Yet sometimes overlooked in all this optimism are the facts

that numerous collaborations fail to achieve their goals and that successful collaborations must overcome significant obstacles. Not every IT problem can be addressed through collaboration.

Of the four factors contributing to the decline in IT budgetary fungibility, three are good candidates for collaborative strategies. One—equipment replacement—is not. Ten to fifteen years ago, when there were dozens of competitors in the microcomputer industry and when profit margins were high, collaborating to achieve lower price points was a terrific strategy for institutions of all sizes. Today, with a handful of competitors dominating the market and with comparatively thin profit margins, the chances of achieving significantly lower price points through consortial negotiation are minimal. In fact, group agreements may actually create a disadvantage, since such arrangements tend to involve multi-year commitments that prevent participants from taking advantage of price reductions (or product changes) that occur in the open market during the contract period.

This is not to say that collaboration on all types of hardware purchases should be avoided; opportunities certainly exist for network equipment, high-end servers, and many other devices. But the sizable investments that colleges and universities are making to refresh institutionally owned desktops and laptops are not likely to be reduced through collaboration. Recovering flexibility in this area of the IT budget requires different approaches, including a reconsideration of replacement policies, the avoidance of leasing agreements, and changes in users' equipment needs.

The other fungibility factors—network defense, mission-critical staffing, and software licensing—are great candidates for collaboration. Regarding the first two factors, the challenge of establishing network security, coping with network assaults, developing spam controls, and dealing with privacy and intellectual property issues requires staffing expertise and technology that stretch—and often exceed—the resources of small colleges. Several collaboration mechanisms can help to ease some

of the network defense and mission-critical staffing problems occasioned by limitations in IT budget size and flexibility:

- *Peer workshops*: regular meetings for technical staff to identify common problems, share solutions, and work as a group with outside IT specialists
- *Security teams*: inter-institutional groups to work on vulnerability assessment, network defense strategies, and implementation plans
- *Policy teams*: inter-institutional groups to develop policy templates for intellectual property guidelines, fair use, spam, privacy, and other issues
- *Joint training sessions*: cost-sharing to bring in trainers for technical staff and end-users
- *Cross-sourcing*: contract arrangements for programming (or other work) by staff members within partnering institutions
- *Coordinated product evaluation*: distribution of costs to acquire and test new technologies
- *Shared consulting*: joint coverage of consultant costs for activities such as business continuity planning, P2P strategy definition, and regulatory compliance

But perhaps the most important strategic area of collaboration lies in the realm of software licensing. As mentioned earlier, the shift to subscription pricing for commercial software makes colleges and universities dangerously vulnerable to annual cost increases. The explosive growth in open source software, however, may introduce a valuable degree of negotiating leverage, since it provides, at least in principle, a low(er)-cost alternative to available packages. Whether or not institutions actually adopt open source packages in great numbers may not prove to be critical. The mere threat of a viable alternative may be enough to persuade some vendors to rethink their business plans. If not, then a proliferation of open source products may spawn a new generation of commercial vendors whose revenue policies are more sensitive to the fiscal realities of higher education. Regardless of which way the story plays out, the open source

movement offers a basis for optimism regarding the long-term fate of software licensing costs.

Some may think that smaller colleges have little or no role to play in the open source movement. After all, aren't the technical expertise and staffing needed to undertake major software development initiatives available only to institutions like MIT, Stanford, Michigan, and Indiana (the Sakai Project partners)?<sup>11</sup> Perhaps so, but the promise of open source lies in the ability of users to customize as well as to mix and match component modules. Although it may be impractical (or impossible) for a single smaller college to launch an effective customization effort on its own, groups of colleges may be in a position to marshal the resources needed to tweak open source products to meet their needs.

Some steps in this direction have been taken by the Mellon-sponsored NITLE initiative and other groups.<sup>12</sup> But vast potential remains to be tapped. Presidents, provosts, chief financial officers, and those in charge of technology at liberal arts and other smaller colleges may dis-

cover great opportunities and significant benefits in this arena.

### Necessary Ingredients

Choosing the right partners and projects, making the appropriate commitments, and setting realistic expectations are keys to the success of collaborative efforts. Colleges and universities that want to take advantage of collaborative opportunities must recognize that initiating such activities tends to place an additional burden on IT organizations, many of which are already stretched to capacity. For such a project to be successful, senior officers must understand the true costs and benefits of collaboration, and the institution must make a clear commitment to the project. It is especially important for institutions to allocate or obtain special funding to cover project costs such as coordination, face-to-face meetings, technical consulting, and other essential items. Since smaller colleges often lack the resources to make such investments, extramural funding can play a make-or-break role in determining whether or not collaboration is feasible.

Many funding agencies and foundations have already recognized this fact. Some, most notably the Andrew W. Mellon Foundation, have provided extraordinary support for collaborative IT initiatives. More needs to be done. Helping colleges and universities pursue effective technology collaboration, whether on open source software, security, privacy, or any of a growing number of other mission-critical areas, is by far one of the most valuable investments that funding agencies and foundations can make in higher education today.

As James Hilton, the associate provost for academic, information, and instructional technology affairs at the University of Michigan, suggested at a recent meeting of CIOs: "Collaboration is the educational challenge for the 21st century. Universities that figure out how to incorporate collaboration into their DNA will be the leaders." And, one might add, colleges and universities that fail to collaborate will find themselves bringing up the rear, especially in the realm of technology. *e*

### Notes

1. Diane Balestri, "Collaborations Great and Small," *EDUCAUSE Review*, vol. 35, no. 5 (September/October 2000): 62.
2. Kenneth C. Green, "2003 Campus Computing Survey," 3, reports that cuts in academic computing budgets more than tripled between 2000 and 2003. (See <<http://www.campuscomputing.net/>>.)
3. Martin D. Ringle, "Forecasting Financial Priorities for Technology," *CAUSE/EFFECT*, vol. 20, no. 3 (fall 1997): 22-29.
4. EDUCAUSE Core Data Service, 2003 statistics for the same liberal arts colleges referenced in *ibid.* (See <<http://www.educause.edu/coredata/>>.)
5. Andrea L. Foster, "Colleges Brace for the Next Worm," *Chronicle of Higher Education*, March 19, 2004.
6. Eric Chabrow, "Spam Costs Keep Rising for Business," *InformationWeek*, June 8, 2004.
7. Author's e-mail poll of sixty liberal arts colleges, July 2004.
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9. Gregg Keizer, "Software Licensing Said to Be Set for Dramatic Shifts," *InformationWeek*, March 23, 2004.
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11. See <<http://www.sakaiproject.org/>>.
12. See <<http://www.nitle.org/>>, and see Scott E. Siddall, "Westwood in Small, Liberal Arts Colleges," report at the Common Solutions Group/Westwood Advisory Council meeting, University of Virginia, May 6, 2004, <[http://siddall.info/talks/wac/index\\_files/v3\\_document.html](http://siddall.info/talks/wac/index_files/v3_document.html)>. See also <<http://web.reed.edu/wisp>> for information about the Web Integration and Sustainability Project (WISP) of Reed, Vassar, Swarthmore, and Occidental Colleges.