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We Built We Bought We Shared

The Costs of Administrative Service Systems *vs.* the Academic Mission

By Ted Dodds, Steve Fleagle, Laura Patterson, and Eric Denna

In 2002, not even a decade into implementing Enterprise Resource Planning (ERP) software, Robert V. Kvavik and Richard N. Katz estimated that higher education had spent around \$5 billion in this effort.¹ Some in campus IT organizations may say: “Well, that’s not so much. We spend a lot more than that on facilities.” But let’s look at this figure from the perspective of how many full-year scholarships it represents at a typical public university: \$5 billion could provide 500,000 scholarships at \$10,000 each to students across the country. Given the financial pressures on students after a decade of tuition hikes, we would hope that everyone in higher ed would be determined to explore ways of avoiding such an expense so that the money could be put to better use.

We can only assume that higher education has likely spent another \$5 billion in the twelve years since with further implementations and maintenance.² Many colleges and universities implemented commercial packages to address Y2K challenges to their legacy systems. These same institutions are now looking to upgrade the software or replace it with products from new providers. Some of these projects are budgeted at more than \$50 million at a single institution simply to upgrade what had already been installed. We believe it is appropriate, if not imperative, to ask a simple question: “Are there alternatives to spending another \$5 billion, particularly given the much greater cost pressures on higher education budgets today?”

Ted Dodds, Steve Fleagle, and Laura Patterson have discussed this question at two EDUCAUSE events over the past year. The intent was to provide at least three possible answers to the question of which options should be considered today. Fleagle, CIO at the University of Iowa, discussed his institution’s project to build a new student information system (SIS) over a seven-year period (“We Built”). Patterson, CIO at the University of Michigan, explained how her institution adopted PeopleSoft, and she discussed what the university is considering to buy today (“We Bought”). Dodds, CIO at Cornell University, discussed his institution’s adoption and implementation of the Kuali Financial System, illustrating how software can be “borrowed” (“We Shared”).

This article does not present hypothetical arguments for one philosophy over another. These seasoned CIOs talk candidly about what they did with each of these alternative strategies: building-your-own in the modern era; buying and implementing in smarter ways; or joining a higher education consortium that shares processes and software. The hope is that together, these three viewpoints will stimulate a larger discussion around how to minimize the costs of administrative systems so that higher education institutions can invest in their core missions of teaching and learning, service, and research.



University of Iowa

Steve Fleagle

We Built

Where did you start when you made your last big administrative IT investment?

Like many other large universities, the University of Iowa developed its student information system (SIS) using mainframe technology starting in the late 1960s. The components of the SIS were developed independently, both technically and functionally. At the time, there were no obvious connections between the various functional areas. Each of the primary areas—admissions, registration, and financial aid—was developed over the decades and resulted in very complete, but somewhat isolated, applications. By 2004, two things had become obvious. First, the independent nature of the various applications was becoming a barrier to meeting student and administrative needs. Second, the constraint that the technology placed

on the applications—especially in terms of the ability to enhance, extend, and integrate—presented an even bigger barrier. It was clear that we needed better integration and a better platform to improve our efficiency and to provide an enhanced student experience.

What did you decide and why?

When we began our evaluation process of new SIS options, the vendor landscape was full of uncertainty. We had significant questions about whether the systems on the market at the time would be able to be successfully implemented at the University of Iowa. Peers commented that after they had implemented their new SIS, they ended up several years behind in functionality from their previous systems. The functional offices were very wary of taking steps backward in terms of their core business systems.

Altogether, this didn't leave us with many good options for vended solutions.

We also evaluated the Quali Student SIS. But the delivery timeline was far enough into the future that we didn't think we could wait that long. We had pressing business needs, and those needs just couldn't be delivered by the existing systems.

So in 2004, we went through the traditional RFP evaluation process and selected a commercial product. However, early on in the implementation, the functional and technical staff began expressing concerns about functionality, technical architecture, and scalability. After discussions with the vendor and implementation partners, we stopped our implementation project. Shortly after that, the vendor announced that it was discontinuing development and was phasing out support for the product we had selected. Since we had just recently explored the market, we knew there weren't any other commercial or open-source products that would meet our needs. A few years earlier, we had implemented our own student portal and billing system. This had been very successful in terms of functionality and resources consumed. With no other options, we decided we would take the same approach with the remaining SIS modules.

Where are you headed?

Our new SIS is an integrated system consisting of traditional core admissions, student records, financial aid, and billing. It includes additional functionality not included in commercial systems: events management, orientation, advising, and a student relationship-management system. Having a comprehensive integrated system sharing common data and user interface is a tremendous advantage.

Replacing the legacy system with an internally developed system was a six-year project with an out-of-pocket cost of \$3.2 million. This took longer than typical vended SIS implementations, but it was also much less expensive, since

we used mostly internal resources and didn't have software licensing or ongoing maintenance costs.

With the new SIS, the Admissions Office was able to streamline its applicant processing to reduce the admissions decision time from 2 weeks to 48 hours for over 15,000 applicants. The office was also able to replace a commercial customer relationship management (CRM) and call center capabilities with integrated functionality. The savings and efficiencies exceed the licensing costs. Besides generating over 4.2 million e-mails and 360,000 letters, the call center team efficiency doubled, and the quality contacts for admitted student phone campaigns increased by 50 percent. The Registrar's Office implemented a paperless course drop/add process for the first week of classes. In the fall of 2013, more than 5,300 students electronically added over 8,000 and dropped over 8,800 courses, removing the need for advisor/instructor

signatures while eliminating the long lines at the registration center. We also implemented an automated course wait-list process integrated with registration and electronic notifications, replacing instructor paper-based systems.

Our new SIS allows financial aid staff to check student eligibility before releasing aid to billing, thus eliminating paper flow with automated tasks based on specific criteria, and allows real-time simulations for awarding, requesting, and disbursing aid. The new SIS automatically creates session-based costs of attendance using tuition and fees tied directly to a student's major. Our financial aid system does 100 percent of verifications and allows us to distribute financial aid award notifications the first week of March, earlier than any of our peers and weeks earlier than were able to do with the legacy system.

The integrated advising system provides a custom advising summary page,

allowing advisors to review their entire caseload from a single screen and to track which advisees have registered or made enrollment changes. The updated degree audit is easier to read, and the audits are now triggered by enrollment changes so that students and advisors always have up-to-date information.

Overall, we are very pleased with the results of our new SIS. After trying to buy, followed by exploring a shared solution, we've found that our build option has provided us with a cost-effective solution. However, that might not be true for all situations. Ten years later, the environment and also the

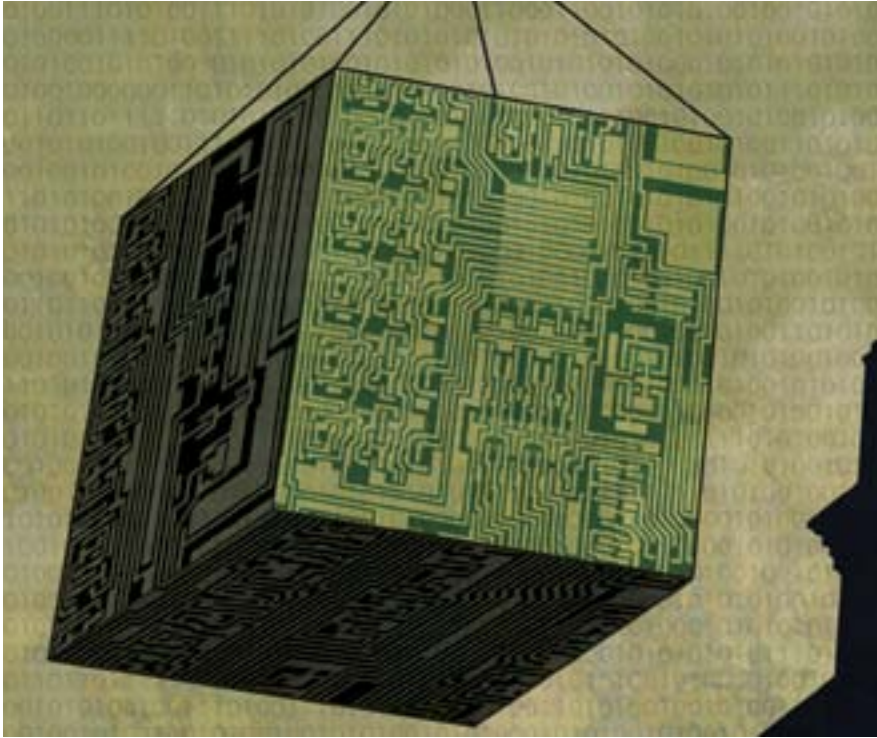
options available are much different. I'm not sure that today even we would make the same decision that we made in 2004.

Our strategy has been—and continues to be—to analyze each opportunity and make the best decision, considering all factors. We do not give strong preference to on-premise solutions, and we also

are not a "cloud first" campus. We buy software and services when doing so is cost-effective and meets our needs; we also choose to develop our own systems when the total analysis determines that to be the best option. As cloud-based systems become more available and more cost-effective, we do see the trend moving in the direction of integrating best-of-breed systems. One of the great advantages of cloud services is their rapid deployment and provisioning. So when a cloud-based solution makes sense, we and many other institutions have found that the transition can be relatively rapid.

The IT environment, the role of information technology in higher education, and higher education itself are experiencing significant change. There are many solution choices, and the best options aren't always clear. This challenging situation is the one thing that probably won't change in the short term.

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University of Michigan

Laura Patterson

We Bought

Where did you start when you made your last big administrative IT investment?

In the late 1990s, the University of Michigan published an IT plan called “The Strategic Data Plan.” Based on input from hundreds of faculty and staff, the plan looked to the university’s future and what was needed in its administrative systems. With the emergence of the Internet, the World Wide Web, and increasing competition for faculty, students, and research funding, the plan urged building a robust data infrastructure that would enable data-driven decisions and streamlined, end-to-end business processes. The vision described in the plan was to capture data at the source of creation and then share it across the university with those who had a need to access it to complete the university’s

business. The goals were for increased efficiency in business processes and a shared information infrastructure that enabled data-driven decision-making. At that time, the university had several student systems and multiple financial systems running on its three campuses. Shadow systems abounded and were considered the authoritative source of information for the university’s critical business processes. Recognizing that building an information infrastructure to support all of the university’s core business processes and delivering on the vision described in the plan would take a decade, the IT organization recommended considering a “buy” approach instead of a “build” approach. This was a bold move for a university that had built “in house” all the technologies in use at the time and that had little-to-no

experience in negotiating for and deploying packaged software.

What did you decide and why?

Responding to the university community’s urgent requests for better information to guide decision-making and for improved business practices to lower operating costs, we decided to move to an ERP system for the financial, human resource, and student administration systems. Furthermore, we opted for a single provider in order to make it easier to integrate the data from the three core business areas into a single data warehouse environment with a common set of reporting tools. We implemented more than twenty modules of software (including general ledger, purchasing, accounts receivable, accounts payable, asset management, inventory, recruit and hire, human resource management, benefits administration, time-keeping, payroll, student recruitment, admissions, financial aid, curriculum management, student records, registration, advising, student accounts payable, student billing), a data warehouse, reporting tools, and web-based self-service for students, employees, and staff in a three year period (1998–2001) and spanned three campuses and the academic medical center, including the hospitals. Since that time, we have made additional university-wide investments in research administration and fundraising systems. Although we selected different vendors for those business processes, we were able to leverage the infrastructure and our earlier experiences in implementing the big three ERP systems. We deployed the same data warehouse environment and reporting tools for all systems. The engagement with the campus community for the transition from current to future state and the project management tools were the same, regardless of vendor, making the big, university-wide implementations more efficient and effective than if we had been starting from scratch, building the systems on our own.

The “buy” approach was both strategic and intentional when we made the decision, and although the implementations were difficult, the value on the investment has exceeded our expectations many times over. As a result of having the shared information infrastructure, the university developed a culture of data-driven decision-making (before business intelligence and analytics were in vogue), which is a critical capability in the complex, competitive higher education landscape today.

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Using the information we have about our administrative practices, over the past twelve years we have driven more than \$295 million of expenses out of our operations, far exceeding the cost of

the software and its maintenance. The reduced operating costs have enabled us to keep tuition increases lower than would have been possible otherwise.

The savings have been reinvested in financial aid and in the academic mission of the institution.

We stay current in the software that we run, allowing us to take advantage of new features and functions and to continuously improve our administrative practices. We are able to meet emerging, growing compliance requirements at minimal cost. In addition, the campus IT, purchasing, and legal departments have developed capabilities in software licensing, purchasing negotiations, data protection, and vendor exit strategies.

These skills are critical for the next generation of technologies of cloud and at-scale computing, and our experience over the past ten years positions us well to make the transition.

Where are you headed?

The world is experiencing a paradigm shift toward technologies that are consumer-driven, social, mobile, and at-scale. The University of Michigan has launched a new IT strategy: Next-Gen Michigan. This strategy includes a “cloud first” strategy, which means we will look first to the cloud for infrastructure, platform, and applications services. Our highest priorities are the technologies needed to advance the missions of teaching, research, and knowledge preservation in a global, engaged, at-scale world.

Given that we have stayed current in our administrative systems and continue

to drive value from them, we will remain in those systems for at least the next five years while we make big investments in the technologies that our faculty need for leading-edge research, collaboration, big data, and engaged, digitally-enhanced learning. We will build a robust ecosystem of infrastructure, tools, and applications for research, teaching, learning, and knowledge preservation while we closely follow vendors' emerging offerings for cloud-based administrative systems. We are experimenting with and learning about cloud-based administrative offerings by deploying small systems for single administrative processes; the first we have tried is a cloud-based system for travel and expense reporting. We also use cloud services for our collaboration platform for e-mail, calendars, productivity tools, and personal storage. We will make the move to cloud ERP-level systems as the market matures and after our shared learning, collaboration, and research infrastructure is complete.

Higher education is in a period of disruptive change. Resources are shrinking while costs are increasing, the demand for accountability is high, campuses are global, and technology is driving new paradigms for research, teaching, and learning. The mission of the University of Michigan is to create and disseminate new knowledge and to prepare the leaders of tomorrow. When we can purchase and adopt existing proven products, we will do so. We will invest our precious IT and intellectual capital in those things that do not yet exist—and especially in solutions that advance our core mission and allow our faculty to innovate. Creating administrative software is not the purpose of our universities, and given the choice of building it ourselves or acquiring it from those whose mission is to develop business software, we believe it is best to look first to the market. We will continue to buy, but we will choose to build when doing so differentiates us from other markets, gives us competitive advantage, or enables us to maintain control of our intellectual capital.



Cornell University

Ted Dodds

We Shared

Where did you start when you made your last big administrative IT investment?

What do you mean, start? We never stopped! Seriously, this is a tough question to answer because Cornell has made a series of big investments in administrative IT services over the course of many years. It seems unlikely that this trend will slow down anytime soon.

There is a certain irony and a tiny bit of frustration in this situation. Like most other CIOs in higher education, I believe that a big part of the CIO job is to allocate the largest possible portion of our limited IT resources to support core academic functions. Assuming a fixed pie, we are thus required to minimize expenditures on critical utility functions—such as administrative systems—

while maintaining an appropriate quality for those services.

It's a delicate balance. Administrative systems are embedded in all of our operational processes. If they are not effective, everyone notices. Believe me. *Everyone* notices. Conversely, when they function correctly, people generally ignore them. Members of the campus community, who can shop and bank online, understandably believe that the university's information systems should work just as well, be as accessible, and be as easy to use as their services at home.

What did you decide and why?

Cornell has been affiliated with the Quali Foundation since the earliest planning days of the Quali Financial System (KFS). We implemented KFS in July 2011. At

present, we are preparing for the launch of Quali Coeus, for research administration, in 2015. Recently, we joined a number of other schools in an effort to modernize and simplify the user interfaces of these systems, especially those that are faculty-facing. We have a deep belief in the power of collaboration and sharing, and a long-standing tradition of working with other institutions toward common goals. Adopting the community-source approach is a natural step in the evolution of that tradition.

Cornell is a remarkably complex place. We are a private Ivy League institution that is also the land-grant university for the state of New York. In some sense that leads us to function as two companies with different needs for capital allocation, staff benefits, and so forth. We

are geographically diverse as well: main campus in Ithaca; two campuses in New York City; a presence in Doha, Qatar; and a wide assortment of outposts across the state, country, and world.

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That inherent complexity is reflected, to a degree, in our approach to administrative systems. Weill Cornell Medical College, which accounts for one-third of the university's operating budget, is located in New York City and has a suite of administrative systems that differ from those at the Ithaca campus. The recent founding of Cornell Tech, also in New York City, adds another dimension of complexity, with a new campus that is all about technology innovation and entrepreneurship and is generally challenging the traditional rulebook for IT needs.

As a consequence of this complexity, we not only share—we also buy and subscribe. Our purchased commercial systems are similar to those in use at many colleges and universities. They include Oracle's student system and contributor relations system and Blackboard's course management system. These systems have been in operation for many years. But our strategic direction is toward the cloud, where we are among the earlier adopters of Workday's human resource and payroll software-as-a-service (SaaS) offering. We launched this service in March 2013.

Each of these models—sharing, buying, subscribing—has its own set of advantages and disadvantages. One of the attributes of the SaaS or subscribing model is the maintenance model, which imposes a level of discipline that makes it impossible to fall behind on new software releases, a problem we have experienced with some of our other systems. Workday issues an "update" to its core system two

times per year. All customers of the SaaS service must adopt the updates more or less at the same time. There is no opt-out clause. Like many other new Workday users, we found it quite challenging to shift from the big effort of implementing Workday to the new effort of planning for the first update. But as we get used to the cycle, we are building a repeatable process that will be absorbed into normal operations. This is a better model than the giant technical upgrades that have characterized the commercial ERP space for years. It also allows us to implement business practice improvements in a more timely manner. And although the community-source approach also largely liberates us from massive upgrades, we have chosen to perform a technical upgrade of KFS soon after implementation of Kuali Coeus because we want to use the same version of middleware—Kuali Rice—in both KFS and Kuali Coeus.

Across all of these models, one constant remains: resource constraints. We have an extremely talented but relatively small staff who implement and support administrative systems. Whereas the expense of software maintenance is a growing burden, the majority of the costs of any IT project relates to people, whether campus staff or external contractors. The common limiting denominator is fungible capacity, be it staff or capital.

Where are you headed?

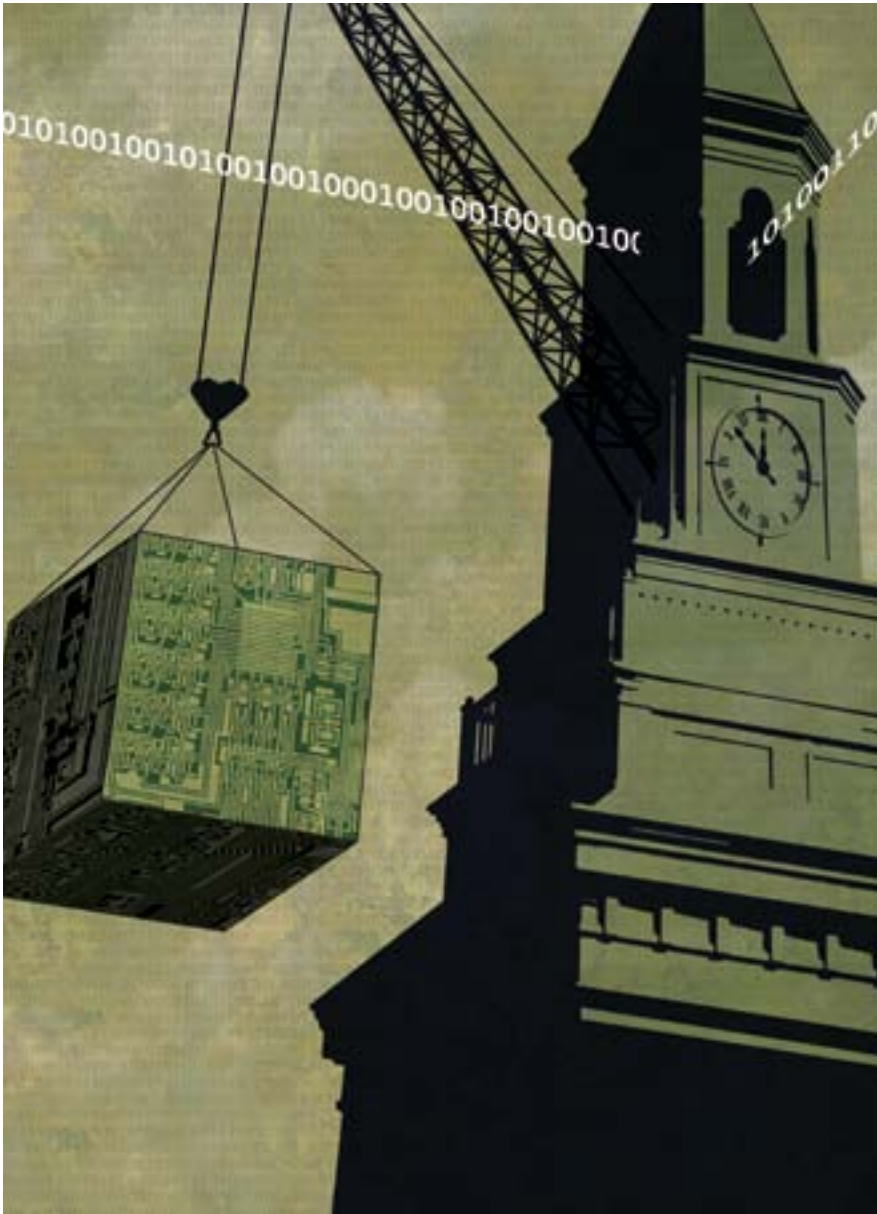
We envision that over time, more administrative systems will shift to a cloud-based or externally hosted/supported model. Our experience thus far suggests that even though these models are not necessarily less expensive in dollar terms, proportionally less management time is needed to manage the accountability of an external service provider than to deliver the service itself. Accountability doesn't change. Offering a reliable and effective set of administrative software services is the responsibility of the CIO, no matter who or what company actually provides the service.

In the spring of 2014 we launched the

IT@Cornell Strategic Plan, our first truly campus-wide IT strategy. Our objectives in the administrative information systems space focus on improving the overall value proposition, better usability, and greater emphasis on business intelligence and analytics. These objectives led to investments in the Kuali usability project and the creation of a new Office

of Data Architecture and Analytics (ODAA).

Two years ago we created a small office—initially one person, now two—with the role of looking outward from the university in search of new service offerings that might be of value to Cornell. For the most part this has meant cloud services (e.g., Cornell was among



the first members of the Internet2 Net+ initiative). In fact, our list of cloud services is large and growing. Aside from the biggies—Workday, Office 365—we have nearly forty services supporting diverse functions ranging from CRM to e-signatures, to instant classroom polling, to parking management, to research computing. And those are just the ones I know about. More recently we have been exploring crowdsourcing companies (e.g., TopCoder) that manage what amounts to a fixed-price software auction. It is early days yet, but we have

had several good experiences with this approach, as have many of our colleagues elsewhere.

With our general strategy set out in the IT@Cornell Strategic Plan, our focus now is on executing and refining the strategy. A current development centers on demand management and coordination. Our Planning and Program Management (PPM) team is now acting as a single front-door to all administrative system requests. Working closely with our services division and campus stakeholders, PPM is rolling out a

flexible demand-management approach that relies on “just enough” process to match the size and complexity of a given project.

As a part of these plans, one of the most important priorities for the Cornell IT community is to envision and reshape the skills of our wonderful staff. We have many excellent people who have abundant skills that they apply in service to the university every day. With the IT industry changing more quickly than ever before, the skills that make our organizations successful today may be different from the skills that will be needed tomorrow. That’s why an IT Career Framework was central to our strategic plan. We are currently conducting an inventory of individual staff members’ IT skills so as to develop a database of who has which skills and where they are located across the university. In concert with this inventory, we are engaging campus IT leaders to develop a vision of the skills they will need in three to five years. Those two pieces will allow us to chart a path toward the development of appropriate, and sometimes new, skills for providing IT services at Cornell.

And so, as usual, after we have considered all the pieces and parts of the wide-ranging topic of administrative systems, it all comes down to people.

Going Forward

We started this article by asking whether there are alternatives to spending another \$5 billion on ERP software and administrative services, particularly given the rising cost pressures constraining higher education budgets today. As the preceding viewpoints illustrate, the answer to that question is “yes.” In fact, we have more than one option for addressing the cost challenges associated with enterprise/administrative systems. We have at least three: build-your-own; buy smart; share processes and software. But each has its advantages and its disadvantages, which IT leaders will need to evaluate in light of their institution’s strategy, resources, and priorities.

How the software and services are acquired is

not the strategic issue. The key is what leaders *do* with the software and services. The actual cost matters less than the value that an institution can drive out of the investment made. Leaders must work to change business processes, establish strategic contracts for purchasing, provide self-service, and redesign service offerings. This is the only way that administrative service systems—whether built, bought, or shared—bring value.

What makes the most sense for IT organizations going forward? We hope that sharing our experiences will help foster an open discussion of this second question. As we seek to improve the way we do our work in our colleges and universities, we can learn a lot from each other and can avoid repeating the same mistakes or re-creating the same wheels. Together, we can find ways—including the best way for an individual institution—to reduce the costs of

administrative service systems, thereby allowing more resources to be applied to the core academic mission of higher education. ■

Notes

1. Robert V. Kvavik and Richard N. Katz, "The Promise and Performance of Enterprise Systems for Higher Education," *ECAR Research Study*, vol. 4, 2002, <http://net.educause.edu/ir/library/pdf/ERS0204/rs/ers0204w.pdf>.
2. See, for example, David Trevvett, "Enterprise Application Projects in Higher Education," *ECAR Research Report*, August 2013, <http://www.educause.edu/library/resources/enterprise-application-projects-higher-education>, which notes: "Specifically, the 123 institutions that reported implementation cost data in this survey had spent in the aggregate over \$320 million implementing the reported systems and currently spend more than \$39 million every year operating them" (p. 3).

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