# Value Disciplines: A Lens for Successful Decision Making in IT

*Applying the concept of value disciplines on campus helps align IT efforts with institutional goals*

By **Marc Eichen**

To succeed professionally, a technology manager in higher education must align institutional goals with the skill set of campus technologists and the resources available for information technology support. Getting a firm grasp on any of these parameters is not easy, however. Resources are often committed to multiyear projects or hidden by opaque budget accounting practices. Skills are not easy to assess, particularly when they exceed the bare minimum required to set up and administer IT services. Yet understanding institutional goals often presents the most daunting challenge, even for experienced IT managers.

Almost all universities support service to their students; almost all recruit faculty committed to scholarship and teaching; and almost all boast facilities that support faculty research and scholarship and provide secure, comfortable learning environments for students. But programs and initiatives welcome in some settings might be considered suspect in others. Strategies that garner strong faculty support in one institution can be considered frivolous or wasteful in another. And initiatives considered cutting-edge in one department might seem passé elsewhere.

In this article I suggest that the three value disciplines described by Michael Treacy and Fred Wiersema[1] provide a lens to analyze and align institutional goals in higher education with critical IT decisions. After describing the three value disciplines and how each could shape IT decisions, I suggest how a technology department might select a particular value discipline, then note the complications unique to this selection in an academic environment. A demonstration follows on how a technology department operating within a value discipline might apply the discipline to hiring a new staff member, implementing a Web front end for a student information system, and purchasing a learning management system.

## Three Value Disciplines

In a seminal article later expanded to a book,[2] Treacy and Wiersema described three value disciplines:

- Operational excellence
- Customer intimacy
- Product leadership

They suggested that in a business context, firms must select and excel at one of these value disciplines as a core operating model, while remaining adept

at the other two. Regardless of a firm's specific core competence[3] or the sector in which it operates—manufacturing, retail, service, or technology—the value discipline shapes the choices made by managers on a day-to-day basis. Employees trained within one value discipline will feel comfortable moving to firms that share this value discipline, even if they move from one sector of the economy to another. The ability of management to choose and excel at one value discipline and communicate this choice so that employees understand and carry it out effectively marks the difference between success (that is, market leadership) and failure.

Applying the same logic in higher education, IT departments must understand and align with the value discipline of their institutions.[4] Further, IT managers must translate this dominant value discipline into IT strategy and communicate it clearly to senior management so that they understand both the choices and the consequences. IT managers must also communicate these ideas to IT staff and the campus community to achieve clarity about IT values and services.

### *Operational Excellence*

Companies that pursue operational excellence provide consumers with products at the lowest total cost.[5] The product line is standardized and limited, with highly reliable products—operational excellence demands zero defects. Procedures for manufacturing pursue the highest level of efficiency, often using IT as a way of tracking inventory and orders. Customer service pursues the highest level of convenience, with the goal of making every customer interaction easy, pleasant, quick, and accurate. Employees in these firms exhibit a high level of teamwork. Wal-Mart, FedEx, MacDonalds, Dell, and Southwest Airlines are examples of companies that pursue operational excellence.

In the context of higher education, operational excellence would focus on providing educational course material with maximum convenience and the lowest possible cost. Public institutions—such as state universities with multiple campuses and large outreach organizations that can provide classes in nontraditional settings, including the workplace or malls—are examples of educational institutions that follow the value discipline of operational excellence. Such institutions typically do not attempt to tailor offerings to meet individual student needs. Instead, they offer standardized instruction that serves a large number of students. These institutions rely on back-end systems to work flawlessly, since a very large number of faculty and students use them at any given time.

IT departments that pursue the discipline of operational excellence focus on computing as a utility. They make a homogeneous set of computing services available to faculty and students at the least possible marginal cost. They seek to make lowest-common-denominator facilities available to the faculty con-

sumer with the least interaction. The customer service these departments provide is delivered by uniform documentation on a small set of well-known and well-supported products. These departments seek to make their customers happy by using technology to provide fast, no-hassle access to this relatively small set of products.

IT departments that pursue this value discipline would, for example, set up all courses in a learning management system (LMS) prior to the individual faculty member's request. Every course in an LMS would resemble every other course to limit reliance on special training for either faculty or students. When classrooms include electronic media, the IT department provides a standard suite of software and a standard user interface, again to limit the need for specialized training or customization.

To succeed within the discipline of operational excellence, IT departments ask, "Are our systems easily accessible, extremely reliable, and fast?" IT staff can provide a wider range of services only by continually cutting the marginal cost of providing the core services and so seek to leverage existing automated processes. A manager in these departments might ask, "How can we use the same business process and data feed we now employ to establish e-mail accounts to set up individual accounts in our LMS?"

My experience at the City University of New York suggests that its central IT operation (and probably that of other universities of similar size and mission) focuses on operational excellence.[6] When not constrained by crippling budgets, the central IT staff performed most successfully when it provided a limited set of offerings—including intra-campus connectivity, student information services, basic LMS functions, and e-mail—in a streamlined fashion. The central IT staff within CUNY was at a disadvantage when attempting to provide cutting-edge services or high-level customer service for faculty, who were better served by college-based or department-based IT personnel.

### *Customer Intimacy*

As its name implies, customer intimacy–focused firms "continually tailor and shape products and services to fit an increasingly fine definition of the customer."[7] They seek a deep understanding of their customers' businesses[8] in order to tailor offerings to meet each customer's specific needs.

A solution goes beyond the purchase and installation of a particular product. Often it includes understanding a current problem from both a technical and internal political perspective, providing material to sell the solution internally and training for staff to use the solution most effectively. Firms that pursue customer intimacy will customize a solution, install this solution, and take responsibility for the customer's success.

Customer-intimate companies invest in a highly skilled work force and give them great latitude to solve customer problems in the field. They seek to capture an increasing percentage of client spending in a particular area. This doesn't have to mean a customer's buying more of a particular product—it might mean buying more service or training. Customer-intimate firms focus on customers with the potential to show long-term growth in expenditures in a particular domain. Examples of such firms include Home Depot, Nordstrom, and, historically, IBM.

Educational institutions seeking to provide tailored programs or resources that meet specific individual needs, regardless of the cost, follow the value discipline of customer intimacy. When an educational institution tailors a program to meet the needs of one or a few students or crafts a program for the continuing education of a small number of alumni, it is pursuing the discipline of customer intimacy.

IT departments that pursue the discipline of customer intimacy know exactly which faculty use what software and tailor their offerings to the individual. They continually ask, "How can we track what faculty members are doing and anticipate their needs?" The IT director keeps a database of faculty technology users and anticipates users' needs with customer relationship management software. A faculty member who inquired about plagiarism software, for example, might be asked to test a relevant program.

IT departments that follow this discipline attempt to understand—better than the faculty themselves—faculty research and teaching methods as well as the overall way in which faculty use technology. They believe that through this understanding they can encourage faculty to use technology more broadly. They might purchase and support a unique product because it meets the need of a single faculty member. They might invest enormous staff resources to maintain legacy word processing software for an individual or to service faculty home computers. They might offer personal training by a senior staff member so that senior IT staff gain understanding **of** the needs of individual faculty members directly.

Within faculty-driven institutions—where individual research and intellectual interests shape institutional, curricular, and administrative decisions as well as capital investment—IT departments provide an extraordinary level of service through customer intimacy. Faculty in these institutions, in particular, insist on nothing less. A number of articles in this and other EDUCAUSE publications present methods for achieving a high level of customer intimacy, usually under the rubric of increasing customer service.[9] One longer piece outlined the difficulties associated with this model, given the funding and organizational limitations within most colleges and universities.[10]

### *Product Leadership*

Product leadership entails producing an ongoing stream of cutting-edge products or services. Firms that engage in the value discipline of product leadership continue to innovate and stay ahead of their competition. They are "risk oriented and future driven."[11] These companies provide cutting-edge solutions to their customers.

Treacy and Wiersema suggested that these firms focus on a particular area of expertise within which they are willing to invest in high-risk ventures that they

believe will give them a strong competitive edge. Employees of these firms are expected to think creatively and work in highly flexible, often shifting organizational structures. Rewards are based on an employee's ability to innovate and to bring innovative concepts to market as products. Examples of firms that pursue the discipline of product leadership include Johnson and Johnson, Intel, and, historically, Bell Labs.

Academic institutions that pursue the value discipline of product leadership seek to hire and retain faculty who are true innovators and leaders in their fields. They encourage these faculty to incorporate cutting-edge methodology and results within their teaching. They encourage cross-disciplinary work as well as work that can be spun off in commercial applications.

IT departments that align with product leadership make the latest technologies available to faculty. Since these technologies are often "bleeding edge," IT departments should offer the "buyer beware" caveat to faculty and student users that these technologies might not work as initially described, might differ significantly from release to release, or might not be supported or even available in the future.[12] Note that the rubric of product leadership does not commit an IT operation to a particular technology—just the opposite, in fact. A commitment to product leadership commits the IT department to offering an ever changing menu of cutting-edge technologies.

## Selection and Alignment with a Value Discipline

Treacy and Wiersema asserted that a firm must choose a single value discipline and excel at this discipline while remaining adept at the other two. They suggested that choosing a single strategy is key because it will shape every subsequent operational decision.

Following this logic, I would argue that IT departments within higher education likewise must choose a single value discipline while remaining adept at the other two. In a resource-scarce environment, this choice will determine the technology emphasized and its implementation.

**Successful IT departments will align the chosen value discipline with the needs of their constituency**

The choice will shape the staff competencies rewarded and will provide a baseline for customer expectations. Successful IT departments will align the chosen value discipline with the needs of their constituency, whether a university, school, or department.

University environments are not monolithic decision structures, however, nor are they homogeneous in their IT requirements. And IT managers, while making this choice, must remain vigilant and respectful of local variation. Where they serve multiple constituencies, IT departments may have to excel at different value disciplines for different customers. A business school, for instance, might want an IT department to offer operational excellence, following a public utility model for IT that stresses delivery of a homogeneous product at the lowest possible cost. Demand for this discipline rests on the belief that a homogeneous technology environment will best serve the needs of students and faculty in that school and that most users will be able to use the standardized technologies provided with little or no additional coaching or assistance.

At the same institution, the science department might demand product leadership, with the faculty and administration insisting on the most cutting-edge hardware and software even if it entails instability and problems with long-range support. Faculty in the humanities, on the other hand, might require customer intimacy. In that case, the IT staff would have to understand faculty computer usage (which software and hardware they use) and their instructional goals and styles and choose among IT investments to meet their needs.

Of course, it's facile to suggest that science departments will always want product leadership and humanities departments will always demand customer intimacy. Often specific faculty and a unique collective history shape the value discipline a department or school requires. A department of religion might, for instance, demand cutting-edge technology to store, describe, catalog, and present images of religious icons. A science department might demand operational excellence or customer intimacy if the faculty believe they have sufficient technical expertise to customize and deliver their own technological solutions.

Further complications and challenges arise when individual faculty are anomalous within their departments or schools in requiring particular value disciplines. A department that requires operational excellence but has one or two faculty who demand cutting-edge technology will strain the resources (and the patience) of a university technology staff (as well as their deans or department chairs).

Still further friction and complications arise when the technology staff at one hierarchical level must perform with one value discipline while other technology staff must perform with a different value discipline. For example, the university might "own" the computer network and provide operational excellence in terms of reliability and robustness on that network as well as facilitating ease of connection and security. At the same time, school- or department-based personnel might be required to develop or maintain a set of applications that meet the unique needs of that department, even if they strain the security restrictions of the university network.

More generally, schools within the same university, often served by a single technology staff, diverge on their value discipline requirements, placing enormous demands on the IT staff. Staff who put a premium on their ability to deliver—and in some cases develop—cutting-edge technology will have little patience for staff who invest in developing a relationship with individual faculty to deliver the best overall solution. Staff who excel at rolling out and maintaining low-cost, highly available systems will be suspicious of cutting-edge applications that service a small handful of users and have little likelihood of being replicated on a large scale.

It is incumbent on the technology management team to understand the value discipline demanded by each academic unit as well as specific faculty members. The technology management team must also understand the anomalies, such as why a particular faculty member might require customer intimacy even though the department requires operational excellence.

## Value Disciplines Shaping Technology Decisions

To understand the potential importance of value disciplines and how they might work in practice, consider three key decisions: hiring staff, implementing a Web-based front end for a legacy student information system, and choosing and implementing a learning management system.

### *Hiring Staff*

Hiring staff represents a long-term commitment to the individual hired and signals the skills that managers want to strengthen within their departments. Hiring interviews often focus on technological competence. Considerable effort has gone into assessing technical competence within an interview setting. The current fashion is to use some type of problem-solving or game framework.[13] This encourages a reasonable freshness in the interview process. Applicants can compete against each other in areas and skills that parallel those required in the prospective job. The method I suggest here complements this approach,[14] as it assumes technical competence and focuses on its application.

Technology managers know that technical competence is only the first filter applied to job candidates. If you need someone to run your Linux-based e-mail system, it is certainly important that they have experience in this area. But how do you distinguish among the finalists, all of whom have the foundational technical skills? In my experience, you seek a candidate who is comfortable working in an organization that shares the value discipline of your technology department. With this in mind, you might give a candidate the following scenario to consider:

*Your department is responsible for administering e-mail for more than 4,000 students and faculty. It is time to present new budget proposals. You must prioritize among a number of distinct projects:*

*a. Purchase a new Linux e-mail server to add capacity.*
*b. Purchase a second, redundant Linux e-mail server.*
*c. Develop a new e-mail client, which promises to deliver added functionality that a small number of faculty have requested.*
*d. Contract with a consultant to develop supplementary multimedia documentation that can be distributed to incoming students.*
*e. Contract with a consultant who can better customize and integrate various e-mail clients such as legacy Netscape clients, Eudora, Outlook Express, Outlook, and OWA.*

*Please outline how you would prioritize these choices and explain your rationale.*

A one-to-one mapping does not exist between a value discipline and a technology choice. In this scenario, several choices map into a particular value discipline, and several might serve more than a single value discipline. The rationale behind the choice is key. For instance, the discipline of operational excellence would be served by (a) or (b), obviously, but (d) might also fit if the rationale was to provide standard documentation to a large number of users. At the same time, (d) might serve the value discipline of customer intimacy if the rationale was to respond to the special needs of a unique group of students (for example, providing documentation in a foreign language with appropriate cultural examples to assist new, non-English speaking students).

Another strategy is to ask the following question:

*Please describe what you consider the critical purchases in your current department during the past two years. How do these reflect the underlying priorities in the department? If you could make these decisions now, how would you change them, if at all?*

With this free-format question, you can probe for divergence between the values in the applicant's current department and his or her individual value discipline. Such divergence in values can signal why an applicant might want to make a lateral move from one organization to another.[15]

A final question might be:

*A faculty member in the art department would like the IT staff to develop a Web browser that more faithfully renders sculpture. This would include three-dimensional rendering of sculptural pieces as well as more accurate rendering of color, including very high color bit density. How would you evaluate the proposal? What would be the important considerations in deciding whether your department should undertake such a project? If you were asked to direct such a project, how would you evaluate it in terms of your own career goals and achievements?*

Here again, it is key to probe how the applicant views this type of project, whether cutting-edge or meeting the needs of a small segment of faculty. Given how the applicant views the project, would he or she be comfortable undertaking this project for the department or in a managerial capacity? An individual who would relish this challenge would probably fit well into a department that follows the discipline of product leadership or customer intimacy.

### *Implementing a Web-Based Registration System*

A majority of academic institutions rightly view the student information and class registration systems as vitally important IT responsibilities. The student information system (SIS) often serves as the system of historical record, archiving courses, instructors, and grades for every student and section of every course. Many such systems are home-grown, mainframe applications developed during the days when students gathered to register for classes that fit their schedules. For schools that have not purchased a commercial SIS with a Web front end, grafting a Web interface onto an existing legacy system offers enormous benefits. In addition to increasing convenience for students and faculty, an SIS can save institutions money in terms of part-time staff and computer system resources while increasing the availability, speed, and responsiveness of registration and student satisfaction with the registration process.

The technical requirements of a Web-based portal are well known,[16] and a Web-based implementation could fit into the operational excellence discipline. What about the disciplines of customer intimacy or product leadership? For customer intimacy, we would expect the system to augment the information available to students and provide information to faculty as well. For instance, a Web-based front end can provide degree audit information so that a student can assess the courses required for a particular major or concentration. Students can see how the courses already taken for a major might qualify them in a different major. Or, given constraints such as taking or not taking courses in an evening program or a summer session, they can determine the most expeditious path to a degree. Faculty might be notified when a section they are teaching has filled. They also could be advised of the academic records of students who have enrolled in a particular section.

In terms of product leadership, a Web-based SIS could be implemented to automate waiting-list or lottery functions. In these cases, students would register for courses while applying a number of contingencies to the registrations. A student might register for a course in Shakespeare's plays, for example, only if the evening section of Movement in Drama is not available. A student might enter a lottery for admission into a small section of Video Production and select it as a first choice, or register for the Advanced Sculpture course only within a certain time block or with a particular instructor.

A Web front end to the SIS might contain all these features, of course. The features to implement first or in which to invest the most resources would represent the value discipline of the institution and the technology department.

### *Choosing a Learning Management System*

The choice of an LMS represents an institution-wide commitment. Such systems are costly, mission critical (with ramifications for the day-to-day activities of a core institutional mission—teaching and learning), and highly visible to every constituency (students, faculty, and staff). They require attention to detail and a high level of focus and expertise on the part of system and help-desk staff to make them work in a reliable and accessible manner.

Educational institutions with multiple constituent units—some requiring product leadership, some requiring operational excellence, and some requiring customer intimacy—must choose an LMS that can be tailored to work in all three value disciplines. An LMS implementation that would stress operational excellence, for example, would be intimately tied to the campus's SIS and to the registration process. As soon as they registered, students would populate the course within the LMS. During the add/drop period, students could add and drop courses either in the LMS or the registration system, and an XML (or similar) conversation between these systems would assure synchronization. Privacy settings, chosen by students, would be reflected in the LMS. If students wished to have their official university pictures available to members of classes they were taking, for example, the photos would be accessible. E-mail and demographic information including name changes would be reflected by a similar conversation between systems.

An LMS implementation stressing customer intimacy would permit customization by individual faculty or students. This customization would go beyond the look and feel of the user interface to help an individual understand his or her learning style and tailor the presentation of course material to best meet the individual's needs. A student who learns best through a structured, "written expressive" style could take multiple-choice tests after each lecture to achieve the required focus and structure.[17] A student who learns best aurally could download or stream lectures reviewing or explaining different concepts. Visual learners could review visual outlines or multimedia presentations of material. While the instructor might control the content, breadth, and sequence of these learning materials, an LMS stressing customer intimacy would check a student's learning style, suggest learning objects that fit best with this style, enable students to choose among the learning objects associated with a particular course, remember these selections, and establish a default choice in future courses.

An LMS that stressed product leadership would enable instructors, with the help of technical staff, to build their own cutting-edge learning objects. These objects would not necessarily be available to other courses or other instructors. Rather, they would be specific in content and application and would reflect the needs of a specific instructor in a specific course. Building sophisticated educational simulations played either in or outside regular classes is one example of a cutting-edge application.

## Conclusions and an Example Action Plan

Value disciplines provide a tool to understand institutional culture and a method for shaping IT planning to best reflect institutional priorities. As a final example of how the value disci-

pline rubric could be applied, assume you have just been hired as a senior IT manager in a mid-size public university. The provost has received complaints from faculty, staff, and students regarding the e-mail system and suggested, in a most collegial manner, that one of your first tasks is to "fix the darn thing." How might the value discipline rubric help you?

Your first task, of course, is to understand the real problem. If the institution has a functioning trouble-ticket system, you would review the e-mail-related tickets and contact the users who registered complaints within the past month. When talking with these student, faculty, and staff customers, listen carefully to the issues raised. First you want to hear them describe the problem in their own words, probing to see which value discipline might best meet their needs. Next you want to provide paired alternatives that outline how the IT department might approach the problem. Each pair would essentially ask whether, given their complaints, the IT operation should focus on operational excellence or customer intimacy, operational excellence or product leadership, customer intimacy or product leadership. For example, the e-mail system was not working for a senior faculty member in the sciences, and she called the provost's office to complain. After reviewing her trouble ticket and hearing her describe her complaint in her own words, a summary of your questions might be,

*Professor Sampson, from what you've described and what I've read in our help-desk logs, we didn't respond to your issue until late the next business day. Am I understanding this correctly? And you believe this problem is symptomatic of our general unresponsiveness? Suppose we had a choice of devoting additional staff to the help desk or adding a systems administrator for the e-mail system specifically. Which would best meet your needs? Suppose we had a choice of changing our e-mail system so it provided integrated instant messaging or adding staff to the help desk. Which would best meet your needs?*

Although each question targets this professor's specific issue with the e-mail system, you are focusing on a choice between the value disciplines in a way that will help guide a strategy for solving the problem. For this particular professor, the paired questions reveal that customer intimacy is the most important value discipline. She may, in fact, tolerate some level of inefficiency if her questions are answered and her problems dealt with in a personal and timely fashion. If this pattern is consistent among faculty, you would want to suggest additional help-desk support to the provost rather than an overhaul of the e-mail system.

The value discipline rubric provides a lens for senior technology managers in higher education to analyze and understand their institutions. This lens also provides a way of shaping basic, key decisions that every technology manager must face, such as hiring staff and purchasing and implementing institution-wide systems. It demonstrates that within a specific educational context, innovation is provided not only by what technologies are chosen but also by how those technologies are implemented. *e*


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## Key References

As higher education managers move through their careers, they are asked to focus less on the nuts and bolts of technology and more on the business of higher education and how IT fits into the educational vision for their campuses. Along with this article, the following references may encourage IT managers to reflect on these issues.


M. Treacy and F. Wiersema, "Customer Intimacy and Other Value Disciplines," *Harvard Business Review*, January/February 1993, pp. 84–93; expanded in M. Treacy and F. Wiersema, *The Discipline of Market Leaders* (Cambridge, Mass.: Perseus Books, 1995).

This *Harvard Business Review* article by Michael Treacy and Fred Wiersema, which they later expanded into a book, makes the case for focusing on one of the three value disciplines. The authors based their argument on in-depth interviews with corporate decision makers. The book has more extensive case studies of firms in each of the three value disciplines.

D. Leonard, *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation* (Cambridge, Mass.: Harvard Business School Press, 1995).

Dorothy Leonard made a strong case for the argument that a firm's competitive advantage lies in the ability to learn and innovate and turn this innovation into continuing ways to differentiate themselves from their competition. Her book touches on the ways in which corporate culture shapes managerial and physical systems.

P. G. W. Keen, "Information Systems and Organizational Change," *Communications of the ACM*, Vol. 24, No. 1, 1981, pp. 24–33.

In this article, Peter Keen discussed the difficulties of using information systems to encourage organizational change and the likelihood of organizational resistance during times of rapid innovation.

New York for their cooperation and input. Particular thanks go to Denise Ondishko for suggesting this line of inquiry many years ago.

## Endnotes

1. M. Treacy and F. Wiersema, "Customer Intimacy and Other Value Disciplines," *Harvard Business Review*, January/February 1993, pp. 84–93; expanded in M. Treacy and F. Wiersema, *The Discipline of Market Leaders* (Cambridge, Mass.: Perseus Books, 1995). Wiersema followed up on this work in two directions, first by focusing on customer intimacy in *Customer Intimacy* (New York: Knowledge Exchange, 1996) and second by focusing on gaining market share by getting and holding customers in *The New Market Leaders* (New York: Simon and Schuster, 2001).
2. Ibid. (1995), Chapter 4, "The Discipline of Operational Excellence," pp. 47–63; Chapter 6, "The Discipline of Product Leaders," pp. 85–100; and Chapter 8, "The Discipline of Customer Intimacy," pp. 123–142.
3. See D. Leonard, *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation* (Cambridge, Mass.: Harvard Business School Press, 1995), for a thorough discussion of core competence within the firm. While Treacy and Wiersema contrasted the core competence model with their own value discipline model, I prefer to think that core competence as described by Leonard and others is the distilled and accumulated expertise applied by a firm within a chosen value discipline, such as product leadership. The Gartner Group research reports have also touched on the relationship between value discipline and core competence: <http://www.gartner.com/5_about/press_releases/2002_08/pr20020805a.jsp> (accessed December 13, 2005).
4. Of course, the underlying question, "How does a university, college, or other academic institution choose a particular value discipline?" remains unanswered in this article. This is worthy of serious consideration by senior educational decision makers, particularly as the market for education becomes both more global and more regionally competitive.
5. Treacy and Wiersema, 1995, op. cit., pp. 49–63.
6. For a description of the processes and systems Indiana University implemented within what I would call the operational excellence rubric, see the following ECAR research bulletins (available by subscription): G. C. Elmore, J. R. Holloway, and S. B. Workman, "Customer-Centered IT Support: Foundations, Principles, and Systems" (Boulder, Colo.: EDUCAUSE Center for Applied Research, Research Bulletin, Issue 23, 2004), <http://www.educause.edu/LibraryDetailPage/666?ID=ERB0423>; and G. C. Elmore, J. R. Holloway, and S. B. Workman, 2005. "An Architecture for Evolving IT Customer Service" (Boulder, Colo.: EDUCAUSE Center for Applied Research, Research Bulletin, Issue 14, 2005), <http://www.educause.edu/LibraryDetailPage/666?ID=ERB0514>.
7. Treacy and Wiersema, 1993, op. cit., p. 87.
8. Treacy and Wiersema, 1995, op. cit., pp. 121–142.
9. See, for instance, A. Agee, A. Genovese, and K. H. Gillette, "Culture Change: What IT Takes to Create a Quality Customer Service Environment," a presentation at the EDUCAUSE Annual Conference, 2004, <http://www.educause.edu/LibraryDetailPage/666?ID=EDU0462>; M. Cain, "The Freedom of 'Yes'—A Personal View of Service," *EDUCAUSE Review*, November 2002, pp. 7–10, <http://www.educause.edu/ir/library/pdf/EQM0230.pdf>; and R. Grant, "Improving Service Quality with Benchmarks," *EDUCAUSE Review*, November/December 2001, pp. 12–13, <http://www.educause.edu/ir/library/pdf/ERM0168.pdf>.
10. P. A. McClure, J. W. Smith, and T. D. Sitko, "The Crisis in Information Technology Support: Has Our Current Model Reached Its Limit?" EDUCAUSE/CAUSE Professional Paper No. 16, 1997, <http://www.educause.edu/LibraryDetailPage/666?ID=PUB3016>.
11. Treacy and Wiersema, 1995, op. cit., pp. 87–100.
12. At this writing, grid computing and the middleware technologies to support grid computing serve as a good example of product leadership within higher education IT. For a description of these technologies, see P. Plaszczak and R. Wellner, Jr., *Grid Computing* (Amsterdam: Elsevier/Morgan Kaufmann, 2006). Also see M. P. Cummings and J. C. Huskamp, "Grid Computing," *EDUCAUSE Review*, November/December 2005, pp. 116–117, <http://www.educause.edu/ir/library/pdf/ERM05612.pdf>, for a description of the caveats and pitfalls involved in implementing technology associated with product leadership. Another example of product leadership, which is perhaps less cutting edge at this point, would be utility or commodity computing, in which off-the-shelf systems are combined in high-performance clusters. See, for instance, T. L. Sterling et al., *How to Build a Beowulf* (Cambridge: MIT Press, 1999).
13. For a description of the Microsoft method for posing complex puzzles and problems as the basis of job interviews, see W. Poundstone, *How Would You Move Mount Fuji?: Microsoft's Cult of the Puzzle—How the World's Smartest Companies Select the Most Creative Thinkers* (New York: Time Warner/Little Brown, 2003).
14. I think these sorts of games and standardized puzzles are better than having applicants talk about their skills as long as managers understand that the usual caveats about standardized testing apply to these settings as well. For example, these tests tend to measure a limited number of intelligence-related skills; they come with heavy cultural baggage, as does test-taking generally; and they have difficulty in measuring creative or unusual solutions.
15. It is common to hear that a particular individual "just didn't work out" in a specific organizational setting. Managers and those responsible for personnel decisions organization-wide are often at a loss to understand and respond appropriately. It is interesting to speculate, for example, the extent to which individuals might be trained within one value discipline and forced to work within a different value discipline. I believe organizations that require the discipline of customer intimacy are uniquely challenging for personnel in IT departments, since both the technology and the reward structure for these managers generally emphasizes the alternative value disciplines of operational excellence and product leadership.
16. For instance, see J. P. Frazee, "The SDSU Rubric for Rating Commercial Portal Vendors," March 2001, <http://www.bris.ac.uk/ISC/portal/sdsu-portal-rubric.pdf> (accessed December 13, 2005), for a thorough review of these technical specifications.
17. There are a number of learning style taxonomies. The following site includes a useful annotated bibliography in this area, as well as references to its application in graduate education and the integration of learning style theories into broader personality metrics: <http://www.ncsu.edu/felder-public/Learning_Styles.html> (accessed December 13, 2005).

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