Technology Everywhere

A Campus Agenda for Educating and Managing Workers in the Digital Age

EDUCAUSE Leadership Strategies No. 6

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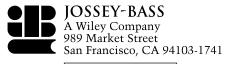Julia A. Rudy,
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The EDUCAUSE Leadership Strategies series addresses critical themes related to information technology that will shape higher education in the years to come. The series is intended to make a significant contribution to the knowledge academic leaders can draw upon to chart a course for their institutions into a technology-based future. Books in the series offer practical advice and guidelines to help campus leaders develop action plans to further that end. The series is developed by EDUCAUSE and published by Jossey-Bass. The sponsorship of PricewaterhouseCoopers LLP makes it possible for EDUCAUSE to distribute complimentary copies of books in the series to more than 1,800 EDUCAUSE member institutions, organizations, and corporations.

EDUCAUSE is a nonprofit association with offices in Boulder, Colorado, and Washington, D.C. The association's mission is to advance higher education by promoting the intelligent use of information technology. EDUCAUSE activities include an educational program of conferences, workshops, seminars, and institutes; a variety of print and on-line publications; strategic/policy initiatives such as the National Learning Infrastructure Initiative, the Net@EDU program, and the EDUCAUSE Center for Applied Research; and extensive Web-based information services.

EDUCAUSE

- provides professional development opportunities for those involved with planning for, managing, and using information technologies in colleges and universities
- seeks to influence policy by working with leaders in the education, corporate, and government sectors who have a stake in the transformation of higher education through information technologies
- enables the transfer of leading-edge approaches to information technology management and use that are developed and shared through EDUCAUSE policy and strategy initiatives
- provides a forum for dialogue between information resources professionals and campus leaders at all levels
- keeps members informed about information technology innovations, strategies, and practices that may affect their campuses, identifying and researching the most pressing issues

Current EDUCAUSE membership includes more than 1,800 campuses, organizations, and corporations. For up-to-date information about EDUCAUSE programs, initiatives, and services, visit the association's Web site at www.educause.edu, send e-mail to info@educause.edu, or call 303-449-4430.

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Preface

Recent literature is replete with articles and books that examine the transformational changes wrought by information technology (IT) in higher education. Previous books in the EDUCAUSE Leadership Strategies series have suggested strong campus agendas for advanced networking, e-business, knowledge management, learning marketspace partnerships, and technology-enhanced teaching and learning. In this sixth book, we turn our attention to workforce challenges in an age of ubiquitous technology.

In keeping with the goals of the series, this book offers practical advice and guidelines based on actual campus experience to help you develop a campus action plan in response to these workforce challenges. The authors we have brought together to this end explore roles for colleges and universities in the supply system for IT workers and IT-fluent workers; the need to structure campus human resource policies, practices, and roles to attract and retain the best of such workers; and the importance of developing campus IT leadership for the future.

Economic and Social Context

Before addressing these campus challenges, however, it is useful to consider several external economic and social factors that have implications for both campus administration and curriculum development.

The authors of the three chapters in Part One have engaged in significant national studies relevant to these factors; their work should go a long way toward informing and giving context to your campus planning and restructuring efforts.

IT Workforce Shortage

The second half of the last decade gave rise to a growing imbalance in the supply and demand for information technology professionals in the workforce, causing at a minimum a tight labor market for workers with certain sets of skills and in certain geographic areas by the year 2000. This was somewhat exacerbated by the high demand for information systems developers as small businesses, corporations, colleges and universities, and government agencies sought to implement or reengineer systems to survive the Y2K date rollover. With that pressure alleviated and the economic downturn and crash of many dot-com firms in 2001, more IT workers became available in the marketplace. However, an economic recovery will likely mean a resurgence of supply-and-demand challenges at some point in the future. Regardless of these fluctuations in the IT workforce overall, there is ongoing concern about underrepresentation of women and minority workers in the IT workforce.

In Chapter One, William Aspray and Peter Freeman review research conducted by the Computing Research Association on the supply of IT workers in the United States as well as a similar National Research Council study. Included in their review are definitions of an IT worker, evaluation of the supply system, discussion of shortages and market tightness, exploration of political issues, and assessment of why women and minority workers are underrepresented in the IT workforce.

Changing IT Skills and Careers

With rapid technological change now in a steady-state, the skills of IT professionals are in a continual state of flux. Fundamental changes are occurring in the information technology profession

itself; new kinds of IT workers are needed as we move more deeply into the information age. This increased need for higher-level and distinctive technical skills suggests articulation and application of IT skill standards, development of new job descriptions and career clusters, and provision of just-in-time retraining as these new skills and careers emerge on the technology landscape.

In Chapter Two, Neil Evans, director of the National Workforce Center for Emerging Technologies (NWCET), examines the changing nature of skill sets and careers in the IT workforce and why there is a need for definitions and standards for IT skills. He also suggests future trends in IT skill standards and jobs in light of e-business and e-commerce; IT specialization; nontraditional IT degree paths and certifications; and IT outsourcing, contracting, and consulting.

It's Not Just About IT Workers

Information technology is revolutionizing the workplace. The nature of work is changing as new processes and styles are enabled; jobs of new sorts are created; and new kinds of employees, for whom Peter Drucker (1959) coined the term "knowledge workers," are needed. Drucker (1994) also predicted that by the end of the twentieth century, knowledge workers would make up a third or more of the U.S. workforce and new jobs would offer much greater opportunities. More recently, Thomas Davenport (1997) predicted that the "information" in information technology will take on increasing importance, creating the need for skills related to functions such as information pruning, adding context to information, enhancing the style of information, and choosing the right medium for information. And John Seely Brown believes that information navigation will be the "new form of literacy, if not the main form of literacy, for the twenty-first century" (Brown, 1999, p. 9).

These new workers require advanced education, not just technical certification or training. Their jobs, often described as "IT-enabled," require information literacy and fluency with IT. According to a report published by the National Research Council (NRC), such

fluency "entails a process of lifelong learning in which individuals continually apply what they know to adapt to change and acquire more knowledge to be more effective at applying information technology to their work and personal lives" (1999, p. 2).

In Chapter Three, Herbert Lin summarizes the key findings of the NRC report, answering such questions as What is the changing nature of work in the digital age? What should everyone know about information technology to be more effective in their personal lives and in the workforce? What does IT fluency mean? He discusses the role of the college or university in promoting IT fluency and which approaches work best.

Campus Challenges: An Agenda for Change

Given this economic and social context, what are some of the resulting challenges for higher education, and how might they be met? Each chapter in Part Two of this book offers advice and recommendations from a campus perspective, in several cases based on the authors' own campus experiences. Together, these chapters represent a potential overall agenda for meeting campus workforce-related challenges in the twenty-first century.

Transforming Human Resource Management

As is the case in government and industry, human resources—people—and the intellectual capital they represent are a critical resource in higher education. Attracting and retaining these resources is coming to be recognized as fundamental to institutional success, suggesting the need to redesign the human resource (HR) infrastructure to support the mission of the institution (New Business Architecture Planning Group, 2001). There is growing recognition of the more valuable role that HR can play in knowledge- and technology-intensive environments in the corporate world (Ulrich, 1998; Roberts-Witt, 2001) as well as in higher education (Connolly, 1999).

In Chapter Four, Lauren Turner and Susan Perry urge a changing role for campus human resource organizations, emphasizing the importance of a strong partnership between HR and IT leaders and of HR playing an integral role in supporting the institutional IT agenda. They suggest a number of specific strategies that can be employed, among them being a proactive part of process and organizational change; promoting flexibility in classification, compensation, and reward systems; managing information about the IT skills and competencies of campus employees to facilitate their deployment as needed on project teams; and establishing effective training approaches and development programs. Their Mount Holyoke College case study illustrates a number of the general principles they advocate.

Recruiting, Retaining, and Retraining IT Workers

Information technology is no longer just an add-on feature for most colleges and universities; its implementation and application are increasingly mission-critical and strategic. Having the right infrastructure is crucial to attracting and retaining students, moving forward with distributed learning programs, and being able to compete with the for-profit sector in the education space. To fulfill these technology-related strategies—as well as to support the growing number of students, staff, and faculty who now depend on technology in their daily work—a higher education institution must be able to attract and retain a sufficient number of highly skilled IT professionals (Skinner and Cartwright, 1998).

In the early 1990s, college and university IT leaders began to note growing challenges in the human resource area. Among these were the need for more adequate personnel development plans and stronger career paths, the need to address IT staffing from an institutional perspective with institutional goals in mind, and the need to revisit organizational structures and processes (CAUSE Current Issues Committee, 1994). By 1999, a tight labor market for IT workers was causing an IT staffing crisis for many colleges and universities, which were

hard pressed to recruit and retain IT professionals when competing with industry, where salaries and benefits were generally more lucrative (Gandel, 2000). EDUCAUSE, a nonprofit association for information technology in higher education, created a working group, in cooperation with the National Association of College and University Business Officers and the College and University Professional Association for Human Resources, to explore solutions to the crisis. The group's on-line discussions were summarized in an executive briefing, which is available on-line at www.educause.edu/pub/eb/eb1.html. EDUCAUSE also developed a Web page to identify and link to resources relevant to the intersection of HR and IT in higher education (see www.educause.edu/issues/hrit.html).

In Chapter Five, Allison Dolan offers a recipe for success in recruiting, retaining, and reskilling information technology workers that begins with establishing a strong partnership between campus IT and HR organizations. The highly practical advice in this chapter is relevant regardless of the state of the labor market for IT workers; following Dolan's guidelines can help your campus compete for and keep the best, brightest, and most skilled IT professionals, as well as develop creative retraining programs to keep them up to date in their skills.

Educating IT-Fluent and Information-Literate Workers

As proposed in the context discussion earlier in this preface, college graduates need to be fluent with IT so that they can use and apply it appropriately in their work in the information society. In an interview with the *Chronicle of Higher Education*, Rita Colwell related the National Science Foundation's concern about "having students who really are capable, not just computer-literate, but highly versatile." The NSF, she said, is "looking for ways to update curricula, to enrich courses with technology" (Carnevale, 2001, p. A50).

The pressing need to produce IT-fluent graduates (especially liberal arts majors) for today's workforce demands that colleges and universities consider significant curriculum change. What are the

challenges and key issues that arise in developing curriculum to ensure IT-fluent and information-literate graduates? What are the partnerships on campus that are necessary for such programs to be successful? In Chapter Six, Anne Scrivener Agee and John Zenelis draw on their experience with George Mason University's award-winning Technology Across the Curriculum Program to share the ten factors they have found to be crucial elements in implementing a successful program. Critical among these are institutionwide engagement and buy-in and collaboration among many campus stakeholders, especially the library and IT units.

Partnering to Close the Gap

One primary characteristic of the IT industry is rapid change; workers with up-to-date ("hot") and highly specialized technology skills are critical to the product development cycles of many corporations. Such workers are not necessarily—perhaps even not likely to be—the product of a traditional, four-year undergraduate education. Some corporations (Cisco and Microsoft are good examples) have developed certification programs to ensure rapid training of specifically skilled IT workers.

An emerging trend, however, could be a new paradigm for the future: the partnering of colleges and universities with corporations to offer hybrid programs combining traditional education with more skills-related training on a faster track. A September 5, 2001, *Edupage* abstract reported that a U.S. Department of Education study predicts colleges and universities will continue to develop such hybrid certification programs through private industry alliances as a way of generating revenue and meeting changing corporate and student needs. Although it is not the business of higher education to "churn out graduates with hot skills," a recent *CIO Magazine* article concluded that colleges and universities can collaborate with corporations to produce the kind of IT worker they are looking for (Compton, 2001).