Cultivating Careers: Professional Development for Campus IT

Cynthia Golden, Editor
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At one time IT was the new frontier, and early IT leaders were considered pioneers exploring undiscovered territory. These technically capable, strong individuals brought about breakthroughs in computing few could have imagined during the emergence of IT. As a result, some of them found themselves in leadership positions, wondering exactly how it happened. After all, it was the excitement offered by the new frontier and the potential for making the next great discovery that attracted these inquisitive individuals. As you might imagine, many of them had little knowledge of or interest in management or organizational matters. A pioneer’s excitement is piqued by what lies beyond the horizon.

**Personal Reflection: Bruce**

*In the early 1980s, Bill Dickson, then MIT’s senior vice president, asked me to talk with him about computing. Some weeks and three conversations later, he asked me to lead MIT’s central computing activities: computing services, data center operations, administrative computing, and telephone services. At that time, MIT had no computer network. Its computing environment included some four or five mainframes providing batch and time-sharing services, less than a hundred minicomputers, and no personal computers.*

*After carefully reflecting on his offer and consulting with colleagues, I told Bill yes. I had previously held senior leadership responsibilities at MIT, and I knew IT reasonably well. That knowledge and skill set, I thought, would be enough. But I now know that when I took the position, I lacked a key set of skills that I will call “leadership competencies.”*
Being a competent leader requires that you have the skills and knowledge necessary to reach your personal and organizational goals. Assuming that this means primarily technological skills and knowledge, for years we have appointed some of our best technologists to technology leadership positions. But like me some two plus decades ago, most of these people have toolkits that are incomplete. Their tools focus too much on the content of the work—technology, which of course is essential—and far too little on what leaders really do and how they do it.

IT—the Innovative Frontier

The idea of computing engines dates back at least to Babbage’s mechanical difference engine in 1822. Almost a century and a quarter later, in 1946, the first electronic, general-purpose, programmable machine, the ENIAC, was built at the University of Pennsylvania’s Moore School of Electrical Engineering. In spite of IBM Chairman Thomas Watson’s memorable statement in 1943, “I think there’s a world market for maybe five computers,” from that date forward the march of computing technology advancements—hardware, system software, and applications—has been exciting and relentless:

- 1949—The first stored program computer was built.
- 1951—Magnetic core memory entered the picture.
- 1953—Transistors replaced vacuum tubes.
- 1957—FORTRAN was written.
- 1960—Time-sharing made computers more accessible.
- 1963—J. C. R. Licklider argued that computers need to speak to each other in a common language.¹
- 1969—ARPANET came into existence with four nodes.
- 1971—E-mail, which had been available on stand-alone, time-shared computers, became available between machines on the ARPANET.
- 1973—Ethernet invented, becoming the standard technology for local area networks.
- 1975—The Altair 8800 personal computer kit brought computers to consumers.
- 1981—IBM introduced personal computers.
- 1984—Apple created the Macintosh.
- 1991—Tim Berners-Lee released the first Web browser to the high-energy physics community at CERN.
2002—MIT debuted OpenCourseWare with the goal of making almost all of MIT’s subjects available on the Web, free of charge, to anyone, anywhere. This march of advancing technology and applications will continue, driven by human inquisitiveness and by Moore’s Law (along with its corollaries focusing on computer memory and network bandwidth). Within a decade we can expect to see computers that are some 100 times more performant and applications that are highly visual, interactive, and collaborative.

A careful look back at this march forward finds many instances where the goal was to achieve a specific technical objective. Leaders, who were experts on the technology and its underlying science and engineering, focused on discovery and development of new technology. They were giants in the new field, like Howard Aiken and Grace Hopper, who designed the MARK series of computers at Harvard in the 1940s; Presper Eckert and John Mauchly, who designed ENIAC at the University of Pennsylvania; Jay Forrester, who invented the magnetic core memory; Fernando Corbató, who was a pioneer in the development of time-sharing; and Jerry Saltzer, who was technical director of Project Athena, one of the first large client-server computing environments. In each of these instances, the true frontier was building the new technology. While these leaders always had a planned application in mind, to a large extent their philosophy was “If we build it, they will come” and “More technology will enable more good things.” To a large extent they were correct.

Fast forward to today and look into the future. While many computer scientists and information technologists today are working in their laboratories to push the frontier forward with new IT, new IT systems, and new IT applications, the context has changed. Technology is no longer new and at the periphery of people’s lives—including university faculty, staff, and students—but is ubiquitous or very nearly so. The university’s central IT mission has shifted from primarily the creation and early use of new technology to its effective and efficient use by everyone. This requires a shift in leadership focus, from creating the technology to making existing and new technology work for clients. Key strengths that were valued in the past are not sufficient for today’s IT leaders (see Table 1).

**Different Times, Expanded Skill Sets**

Similarly, innovation is shifting to the configuration of open, community source, and commercial systems for campus use and to improving support services for a sophisticated client community with expectations driven by experiences with the best commercial software and online options. The territory once occupied by
pioneers and early adopters has attracted many new users who want the technology to facilitate their work. These clients want to do whatever computing they choose, wherever and whenever they choose. Meeting the requirements of the many means providing more stable, seamless, and integrated systems. Providing the various constituents from the faculty to the students and the administrators with this computing experience requires leaders with broader toolkits than those possessed by the early pioneers.

Today, university IT leaders face an increasingly complex environment. Technically, they receive requests for new systems and demands for interoperability, security, and authentication and authorization across trust hierarchies. Nontechnically, they must respond to new and conflicting demands from multiple constituencies and increasing expectations from clients, along with the need to continuously improve operating processes in order to increase client satisfaction, to include decentralized IT groups in the planning process, and to address a multitude of priorities. This complexity calls for leadership that is not only technologically astute but also skilled in competencies more important now than when IT was the new frontier.

**IT Leadership and the Required Competencies**

At the apex of a leader’s responsibility is the strategic challenge involved in determining the right things for the IT group to take on to provide needed services to the university. This is hardly a simple task in complex environments with multiple demands and conflicting interests. Today, senior leaders also know that deciding

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**Table 1. Shifting Leadership**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical leader</td>
<td>Capable leader/manager</td>
</tr>
<tr>
<td>Subject matter expert</td>
<td>Technically astute and able to facilitate common solutions</td>
</tr>
<tr>
<td>Respected resource with the answer</td>
<td>One voice among many</td>
</tr>
<tr>
<td>Specialist</td>
<td>Generalist working across organizational units and the university</td>
</tr>
<tr>
<td>Technology centric</td>
<td>Strategic thinking from a university view</td>
</tr>
<tr>
<td>Narrow expertise</td>
<td>Continuous learner</td>
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on the right things to do means setting the ethical standards for the organization as well as the strategic direction.

Once a leadership team decides (in collaboration with others) on the right things to do, the team needs to assess whether the needed talent occupies the roles necessary to accomplish the desired tasks. Significant shifts in strategies or priorities require an analysis of the resources needed to accomplish the desired goals. In the end, most leaders will be judged on their ability to deliver results. After some period of time, senior leaders at the university want to see the progress outlined in the plan. Today’s executive IT leaders need to

- decide on the right things for the IT group to pursue,
- put in place or develop the talent needed to achieve the desired direction, and
- deliver the results.

This description of a leader’s actions doesn’t necessarily reveal the leadership behaviors that allow some people to execute well while others have great difficulty. During the spring and summer of 2004, we conducted an informal survey of CIOs at a group of leading higher education institutions in order to build a list of those competencies needed to fulfill the leadership and management roles particular to university-based IT environments in the coming years. Through these conversations we identified 10 competencies that IT leaders need:

- **Strategic thinking from a systems perspective.** The leader contributes to the organization’s development of a vision and priorities, anticipates the future, and builds scenarios based on explicit assumptions.

- **Shared leadership.** The leader builds working relationships with co-workers and external parties, negotiates and handles problems without alienating people, obtains cooperation through influence, and delegates both responsibility and authority appropriately.

- **Communication and persuasion.** The leader distills ideas into focused messages that inspire support or action from others and effectively communicates through presentations, recommendations, or writing. The leader uses appropriate interpersonal styles to guide and persuade individuals and groups.

- **Change management.** The leader acts as a catalyst for the needed changes, develops plans, and follows through on change initiatives.

- **Decision making.** The leader gathers and uses data and analysis to make decisions, including evaluating the long-term consequences, and makes decisions judged to be right for the university.
Financial and business acumen. The leader possesses financial savvy and demonstrates the ability to lead cost-efficient initiatives without sacrificing quality. He or she successfully leads projects and programs that produce favorable results (business and financial outcomes) and demonstrates understanding of the changing financial constructs supporting IT.

Working across the organization, developing strategic partnerships. The leader develops networks and alliances, collaborates across boundaries, and finds common ground with a wide range of stakeholders. He or she can maneuver through political situations effectively to get things done.

Managing complex projects. The leader maps and manages complex initiatives, continually adjusts plans and strategies based on new information, and identifies and coordinates appropriate resources to support objectives.

Building agreement. The leader recognizes different points of view, brings them out into the open, and builds on areas of agreement, exercising influence in ways that enhance the support needed to advance initiatives and building consensus when appropriate.

Self-knowledge. The leader knows his or her own personal strengths, weaknesses, opportunities, and limits; seeks feedback; and gains insight from mistakes.

The context and the competencies have changed for leaders taking on responsibility for guiding IT organizations during these increasingly complex times in higher education. These competencies are relevant for more than just IT leaders in executive roles—leadership is needed at many levels within IT. Developing these competencies more broadly will allow many members of the IT community to participate in everyday leadership.

Leadership Roles

IT leaders play various roles inside their organization, inside their university, and in the community at large. These roles could be described as follows:

- **Strategist**—builds agreement on the right things, providing a shared strategic direction that, for example, outlines the responsibilities of the central IT organization and how these responsibilities can complement the work of decentralized IT organizations.

- **Developer**—designs and delivers increased capabilities (capacity and services), potentially via multiple channels.

- **Catalyst**—explores common solutions in order to leverage the knowledge and experience available; makes use of partnerships and consortia.
Advocate—formulates policy, potentially articulating the position of higher education on broader public policy issues.

Innovator—initiates collaborative endeavors, entering into selective partnerships to create what is needed for the future.

Ringmaster—orchestrates a set of coordinated activities, initiating projects, proposing changes where needed, and empowering people to step up and take on the responsibility to bring initiatives to fruition.

What does this mean for IT leaders? Much like the field itself, where often it seems like a sea change is under way, those willing to provide leadership to IT organizations will find themselves in a sea of change. The context, the competencies, the constituencies, the challenges, and the need for more client-centric and collaborative approaches create a confluence that shifts the very landscape for IT leaders.

The pioneers made tremendous contributions to advancing IT, and untold innovations are yet to come. Still, the landscape has changed, and there is a graying of long-term IT leaders in higher education. This makes it incumbent on those of us turning over the reins to support the development of competencies needed by those stepping up to lead mature, complex organizations. One of the most important jobs any leader has is to develop the next generation of leaders.

There are many ways to enhance leadership development within IT organizations:

Make sure the hiring requirements reflect the need for technical competency and the broader skill sets related to leadership so that those entering employment opportunities in higher education arrive with the necessary prerequisites. It may also be useful to create a developmental ladder for new hires so that they can see the skill sets they are expected to develop.

Provide the experiences and exposure that enable people to expand their horizons and capabilities. In a recent set of informal interviews we conducted, when asked what helped them learn about leadership, participants repeatedly mentioned on-the-job opportunities. Individuals found stretch assignments to be one of the most important contributors to their growth. In addition, they mentioned how attending meetings at a higher level or being put on a cross-functional team hastened their development. Creating opportunities for individuals to work within other divisions in IT can expand their knowledge and break down organizational barriers.
Take a more deliberative approach to fostering distributive leadership in IT. Leadership need not be restricted to a few senior directors or the CIO. It will help to cultivate leadership competencies at multiple levels in IT. There are hundreds of interactions between IT staff and clients throughout the university. If the knowledge workers in IT can become more strategic, communicate better with clients, help build agreements with clients, and become catalysts for needed changes, then the executives’ job will be to foster these constructive behaviors.

IT organizations need to create career ladders that provide technical leaders an alternative pathway to exercising influence. A core competency in any IT organization will continue to be technical proficiency, and some technologists may not have an interest in or aptitude for the broader leadership skills outlined here.

Be more explicit about helping IT managers develop their leadership capabilities. Investing in the development of staff will provide your organization with a favorable return. Finding a formula for integrating development into the way people learn while they work will help them to continue to grow and evolve in a field that demands people keep up or be left behind. Stretch assignments, mentoring, action learning, and other approaches are simply a means to this end.

**Conclusion**

The context for IT has changed during the past few decades. The stakes are higher now that IT has come of age. There are still new frontiers to explore, but IT has become a mainstream service. Innovation needs to be done in protected arenas to shield people from the disruptions that marked the IT landscape in the early days. University leaders expect IT to deliver the seamless services required by those who find this technology integral to their work. IT must compete with other university organizations and priorities for the funding that once was handed to the pioneers who made bold predictions about this promising field.

IT leaders must evolve as the higher education IT environment continues to change. The next generation will need to develop new competencies and adapt as the landscape shifts. As pioneers settled into any new frontier, it became essential to bring order to chaos, to create organization and authority. Those joining the pioneers wanted to feel secure, to be assured of reliable services before they would embrace these new territories. The clients IT serves want
much the same, and that requires leaders capable of delivering technology and much more. Being a continuous learner may well be the best way to prepare for the uncertain future ahead.

**Personal Reflection: Bruce**

*Over my many years in IT, I came to believe it was important for me as a leader to reflect on three aspects of my leadership: be, do, learn.*

**Be**—To be an effective leader you must have character. Followers want leaders who have character. Who are you? What are your values? People want leaders who are credible.

**Do**—I have come to believe the leader’s work most often focuses on two fundamental sets of tasks: coping with organizational complexity, and coping with change. Both involve deciding what needs to be done, developing the capacity to get it done, and ensuring that it is done. The leader must be deeply involved at all levels in the doing that will achieve the vision, whether by providing resources, removing obstacles, monitoring results, or doing whatever is required.

**Learn**—To lead effectively, you must face each day as an active learner. Max De Pree wrote, “The rate of change requires that each of us become a frantic learner. Leaders respond to change by learning something new.”

These three touchstones have served me well. I hope you adopt touchstones that can provide you solid footing in a constantly changing IT world.

**Endnotes**

1. A number of Licklider’s writings as well as writings about him point to his making a case for standards among computers. For more on his work, see [http://www.ibiblio.org/pioneers/licklider.html](http://www.ibiblio.org/pioneers/licklider.html).

2. Empirical observation attributed to Gordon E. Moore, cofounder of Intel, that the complexity of an integrated circuit will double every 18 months. With an increase in complexity, size and cost for a given functionality decrease. See [http://en.wikipedia.org/wiki/Moores_law](http://en.wikipedia.org/wiki/Moores_law).
3. These observations are supported by earlier work done at the Center for Creative Leadership and published by Morgan W. McCall, Ann M. Morrison, and Michael M. Lombardo in The Lessons of Experience: How Successful Executives Develop on the Job (Lanham, Md.: Lexington Books, 1988).


About the Authors

James D. Bruce is a professor emeritus of electrical engineering and vice president emeritus for information systems at the Massachusetts Institute of Technology in Cambridge. He was responsible for MIT’s central information technology environment from 1983 to 2003. Bruce received bachelor’s degrees in electrical engineering and in mathematics from the Lamar State College of Technology in Beaumont, Texas, and his master’s and doctorate from the Massachusetts Institute of Technology.

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