FACULTY 2.0

By Joel L. Hartman, Charles Dziuban, and James Brophy-Ellison

Much has been written recently about the Net Generation—the generation (roughly twelve to twenty-five years old) that makes up the majority of students attending U.S. colleges and universities—but relatively little attention has been given to the college and university faculty who teach them. Faculty roles and the processes of teaching and learning are undergoing rapid change. Most faculty members did not seek careers in the academy because of a strong love of technology or a propensity for adapting to rapid change; yet they now find themselves facing not only the inexorable advance of technology into their personal and professional lives but also the presence in their classrooms of technology-savvy Net Generation students, leading them to feel a bit like the character Valentine Michael Smith in Robert Heinlein's 1961 novel *Stranger in a Strange Land*.

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The three traditional roles of college and university faculty are teaching, research, and service, with the relative emphasis on each varying by institutional type and mission. Each of these roles is undergoing substantial change, but teaching and research are being most significantly altered by technology. The growing impact of technology on research has been well documented in recent publications: the National Research Council's *Preparing for the Revolution: Information Technology and the Future of the Research University*; the National Science Foundation's *Cyberinfrastructure Vision for 21st Century Discovery*; and reports from the EDUCAUSE Center for Applied Research (ECAR), including *What Do Researchers Need? Higher Education IT from the Researcher's Perspective* and *IT and the Changing Face of Research in Higher Education*. These publications, and many others, chronicle the transformation that is under way in research tools and methods, in the composition of research teams, and even in the structure of academic disciplines. Nearly every discipline has been redefined to some extent by technology, and entirely new branches of traditional disciplines are emerging. A recent Google search for the word *computational* conjoined with the names of traditional fields of study revealed more than thirty newly defined fields, ranging from computational astrophysics to computational zoology. As the title of a *New York Times* column by George Johnson suggests, "All Science Is Computer Science."[1]

Although research and publication are undeniably important components of the professional lives of many faculty members—for some, they form *the* most important component—we are focusing here on the less-visible changes brought about by technology in the teaching and learning space and on how these changes are fundamentally reshaping the processes and tools associated with the institutional structures, extending to the roles and responsibilities of campus IT leaders and organizations. For the first time in their careers, faculty members are expected to teach in ways that differ from how they were taught when they were students. Diana G. Oblinger and Mark K. Maruyama have observed that historically, at a majority of institutions, lecturing has been equated with teaching: approximately 80 percent of instruction has been delivered in this mode. Yet even though lecture-based classroom teaching has long been held as the "gold standard" against which newer, technology-enhanced methods are often compared, A. H. Johnstone and W. Y. Su have noted how inefficient lecturing can be as a means of conveying information. The typical lecture contains approximately 5,000 words, of which a student may capture about 500—a mere 10 percent.[2]

TABLE 1. Differences between Teaching-Centered and Learning-Centered Approaches

TEACHING-CENTERED	LEARNING-CENTERED
Deliver instruction	Produce learning
Transfer of knowledge from teacher to student	Discovery and construction of knowledge
Active faculty	Active students
One teaching style	Multiple learning styles
Curriculum development	Learning technologies development
Quantity and quality of resources	Quantity and quality of outcomes
Quality of faculty	Quality of students
Time held constant; learning varies	Learning held constant; time varies
Learning is linear and cumulative	Learning is a nesting and interacting of frameworks
Promote recall	Promote understanding
Faculty are lecturers	Faculty are designers of learning environments
Learning is competitive and individualistic	Learning is cooperative and collaborative

Source: Robert B. Barr and John Tagg, "From Teaching to Learning: A New Paradigm for Undergraduate Education," *Change*, vol. 27, no. 6 (November/December 1995): 12–25.

Over the past two decades, broad and rapid advancements in new theories of learning, new student-centered pedagogies, and new online- and classroom-based interactive technologies have begun to enable the pedagogical changes called for by Oblinger and Maruyama. Donald P. Buckley referred to this shift as a transformation from a *teaching-centered* to a *learning-centered* paradigm,[3] as elaborated by Robert B. Barr and John Tagg (see Table 1).

In 1995 the Campus Computing Survey, an annual study of IT activities and priorities in higher education conducted by Kenneth C. Green, documented a major shift in the use of technology to support instruction. Before 1995, survey responses noted general growth in the availability and use of various instructional technologies on U.S. campuses. However, in 1995, Green reported that the survey data indicated that "the use of information technology in instruction" was "finally moving past the early adopters and breaking into the ranks of mainstream faculty" at all types of institutions.[4] Instructional integration of IT remained the number-one issue as reported by the Campus Computing Survey through 2003, after which network and data security bumped it to the number-two position.

The diffusion of technology into the teaching and learning space is producing a number of subtle—and not-so-subtle—changes to which faculty members must adapt:

- Most faculty members are experts in their respective disciplines, and as teachers, they expect to be regarded as such. Confronting new and unfamiliar technologies can quickly turn them into novices, and with technically-savvy Net Generation students in their classes, they may find that their students know much more about specific technologies than they do,

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creating a balance-of-power shift in the faculty-student relationship. When Francis Bacon stated that "knowledge is power," he could not have imagined the role that technology would one day play in the dissemination and acquisition of knowledge. Today, students are increasingly prepared to abandon libraries and class attendance in favor of the Internet as the most expedient path to knowledge.

- Net Generation students use a range of technologies and information sources that are often unfamiliar to their teachers, who may be from older Gen-X, Boomer, or Mature generations. When faculty communicate through technology, they are likely to use e-mail. By contrast, their Net Generation students communicate with peers through instant messages (IMs), using e-mail for communicating with "old people" or institutions.[5]
- Although the quality of students' writing has long been a concern, faculty are recently reporting a sharp decline, which some attribute to the increasing popularity of IM and also cell phone text-messaging.
- Faculty members see their students as individual learners and regard students who complete assignments with others as cheaters. However, Net Generation students exhibit strong social behavior patterns and value social networking, working in groups, and experiential learning. Net Generation students' social groups extend beyond people they know directly and include others whom they encounter on social networking sites as friend-of-a-friend contacts. Students prefer and expect to work in groups.
- Course management systems, cell phones, iPods, and other popular technologies have been used by students to commit acts of intellectual dishonesty, requiring faculty members to be vigilant, to establish rules for when and how technology can be used in class, and to modify the ways they assess student learning. In regard to assessment, the Net Generation's ability to create information products affords new, more authentic and contextual means of assessing student learning.
- The increasingly vast array of online information, social networking Web sites, digital media, and other online resources has greatly increased opportunities for informal learning, leading to an environment in which learning opportunities outside the classroom may far exceed those within.
- Net Generation students grew up exposed to television and interactive media and are consequently more visually literate than previous generations. At the same time, these students are reading less than did previous generations. This shift from textual to visual literacy is leading some students to avoid reading, including assignments and lengthy questions on exams. Some faculty members are adjusting to the shift in students' literacy by using more visual and interactive media in their classes.
- The way that faculty members use their time is also shifting. Traditionally, faculty members would be in class, in their offices, in their labs or elsewhere doing research, or off campus and inaccessible. Students now expect their instructors to be accessible via e-mail at nearly any hour and to respond to e-mails within minutes. Many faculty members report that they are devoting more time to their work and that their work time is spread over a larger portion of the day because they can communicate with students via e-mail or through a course management system.
- Students assume that everything is online and that everything online is free. Many faculty members, however, consider their course materials and notes to be their intellectual property. Instructors are appalled, therefore, when they find that an enterprising student has posted lecture notes to a social networking site or, worse, to a Web site that is selling lecture notes and exam questions contributed by students.
- Faculty members think of technology as technology. Students think of technology as environment. Faculty use technology as tools for presenting content. Students use technology as tools for exploring, communicating, and socializing. When asked about their preferences for the use of technology in their classes, students consistently report that they desire "moderate" incorporation into the learning environment.[6] This is not because they dislike technology but, rather, because they see it as a tool for active learning instead of as a tool to facilitate the instructor's presentation of information. Marc Prensky refers to today's students as "digital natives" in recognition of the fact that they have never known a world in which computers, the Internet, the Web, and digital media did not exist. Older generations, including most faculty and administrators, are "digital immigrants" who have come to use technology later in their lives and whose "digital accents" are discernible to their students.
- A plethora of social networking and resource-sharing sites has appeared over the past few years, including Facebook, Myspace, Flickr, YouTube, LiveJournal, Twitter, and Second Life. Students have increasingly turned to these sites as the nexus of their social and even academic universe. Faculty members are beginning to follow, using these sites as a means of getting to know their students, as a rapid and reliable way to reach students, and as a method for sharing faculty-produced and student-produced content.
- Although faculty members are associated with departments, disciplines, and various campus organizations, in

their roles as teachers they generally act as individuals. The need to understand and apply technology brings about a greater dependency on a wide range of others, including help-desk staff, trainers, faculty developers, instructional designers, and even their students.

- Technology has the potential to affect the three "Rs": reward, recognition, and risk. Faculty who devote large amounts of time to learning about and applying technology in their courses may not be rewarded or recognized for that work and, worse, may find that the additional time spent with technology takes time away from their research and publication activities, which might place them at risk regarding tenure or promotion.

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Teaching Excellence

Emerging technologies are modifying the relationships between instructors and students, making the determination of quality teaching in higher education more complex and difficult. Henry Jenkins calls this process *convergence*, in which faculty deal with course content across multiple media platforms, producing compound learning environments—some of which are created and mediated by students.[7] In a sense, the professoriate is becoming unbundled just as music selection has become an à la carte activity rather than a centralized service; no longer are instructors the sole source of information. More than ever, students are consumers as they learn collaterally across dispersed content emanating from games and media that force complex decision-making and with technologies that permit them to rewind and replay.[8] This environment moves higher education away from a transmission-of-information model and toward a culture in which teaching excellence becomes a multifaceted construct.

The popularity of RateMyProfessors.com demonstrates that students' assessment of instruction is moving from the historically staid rating system, in which respondents rarely experience any results from their responses on the teaching and learning process, to a social networking phenomenon, in which evaluation happens within a worldwide community. Given the current interest in how Net Generation learning styles differ from those of earlier generations, we might ask: What components underpin students' perception of excellent teaching by faculty in this emerging environment of enhanced instructional technology?

At the University of Central Florida (UCF), an unanticipated side effect of teaching in a technology-enhanced environment arose from faculty members' concerns that their evaluations by students would suffer simply because the assessment-of-instruction instrument, which was originally developed to assess face-to-face classroom instruction, was inconsistent with various technology-mediated class-delivery modalities now in common use. To address these concerns, UCF undertook a series of data-mining studies encompassing more than 700,000 end-of-term instruction ratings by students, leading to the discovery of a set of decision rules for the conditions under which students assign an overall rating of "excellent" to a course and its instructor.[9] These studies produced a primary decision rule that leads to a high probability that an instructor will receive an overall rating of "excellent": if students rate an instructor as "superior" on the two (out of sixteen) items that assess his or her ability to facilitate learning and to communicate ideas and information, then the chances are very good (.92) that he or she will be given an overall "excellent" rating. This rule holds true for face-to-face, blended, fully online, or any other course-delivery modality and is not affected by college affiliation or course level. Other course elements—such as good organization, clear expectations, effective use of time, authentic assessment techniques, and a demonstrated interest in students' learning—have some influence, but facilitation and communication become the dominant influences on students' ratings.

The Net Generation values recognition, respect, responsiveness, and reward from their instructors, whether they are in an online or face-to-face course. When students experience those elements, they see excellence. A content review of the narratives in RateMyProfessors.com reveals a consistently large number of comments that reflect those dimensions and instructors' ability to engage their students. In that respect, the Net Generation is no different from Baby Boomers or Generation X. What is unique is the high level of expectations that Net Generation students hold for professors to establish interactive learning environments and to have a working familiarity with the growing number of Web-based instructional resources. Teaching excellence is becoming what Susan L. Star has termed a *boundary object*—a concept that is shared by many and used to bring multiple constituencies together but that is understood differently by each constituency.[10] Consider, for example, how CIOs, other campus administrators, tenure-track faculty, instructors, students, and parents of students might describe the prototype "excellent" instructor. There would be commonality, but there would be great divergence as well.

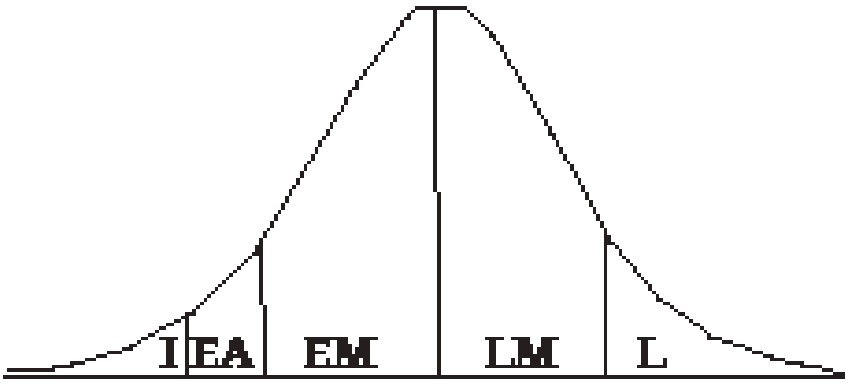
Jenkins claims that new media will not replace old media; instead, old and new media will interact and converge.[11] A good example of that phenomenon may be seen in the increasing attention being given to blended learning, in which the prior modality (face-to-face) is converging with the new modality (online). Jenkins argues that entrenched institutions will develop new models for teaching

from grassroots communities, thereby reinventing themselves from media convergence and collective intelligence. As a caveat, we add that determining teaching excellence involves far more than students' ratings of instructors and that there are many who question the validity of that process. However, it seems clear that student communities play an important role in framing instructional models.

Faculty Development

The above changes do not affect all faculty members equally. First, not all faculty members are equally engaged in teaching; second, those who are deeply engaged may differ in their willingness to explore or adopt technology in their teaching. Everett M. Rogers studied the diffusion of innovation throughout organizations. Rogers's "diffusion of innovations" model, depicted in Figure 1, suggests that members of an organization (e.g., college or university faculty) are not homogeneous but rather can be classified as sub-populations based on the order in which they are likely to become engaged with an innovation. Rogers labels these sub-populations as innovators (I), early adopters (EA), early majority (EM), late majority (LM), and laggards (L). Innovators are the few pioneers who are first to experiment with a new concept and put it to use. Often having advanced technical skills, innovators bring attention to the innovation within the organization, where it is subsequently observed and then attempted by the early adopters. Early adopters are the first to begin moving the innovation into the mainstream, and the greater the visibility and credibility of this group, the more likely the innovation is to be adopted by the early and late majorities. The final category, laggards, is named in recognition of its members' relative unwillingness to give up their traditional beliefs and practices.

FIGURE 1. "Diffusion of Innovations" Model



Source: Everett M. Rogers, *Diffusion of Innovations*, 4th ed. (New York: Free Press, 1995), p. 262.

If we apply Rogers's model to faculty members' adoption of technology in teaching, several points become apparent. First, the motivations, incentives, and support required for each population of adopters are different. At each stage, the adopters become more pragmatic, less likely to adopt an innovation for its own sake, and more entrenched in traditional beliefs and practices. It will therefore take higher levels of energy and resources to support an innovation such as technology-facilitated teaching and learning as it moves through an institution. Second, after an innovation passes from the early adopters to the early and late majorities, the size of the population that must be supported increases dramatically. Third, the later stages of diffusion will involve large populations at various levels of adoption, bringing the new challenge of supporting multiple populations with differing needs and attitudes.

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Tony Bates explains how to apply Rogers's model to the design of effective faculty-development programs.[12] He cautions that although providing direct support to individual early adopters—what Bates calls the "Lone Ranger" faculty-development model—may seem attractive to IT organizations, the resulting initiatives often do not scale because they are heavily dependent on one or only a few individuals. Bates cautions that faculty enthusiasm and self-reliance may not be sufficient to ensure the diffusion of these efforts institution-wide. Bates's second faculty-development model is the "boutique approach." Boutique solutions provide one-on-one support to faculty members as they come forward and request assistance. This model is satisfying to both faculty and professional staff—until the number of faculty members requiring support begins to increase. Although boutique projects may themselves be scalable, the support structure is not, eventually leading to the "support crisis" present on many campuses. In Bates's third model—the systemic approach—campus support resources, including instructional designers, programmers, and digital media specialists, are brought together under a common strategy, scaffolded by scalable systems and by processes for dealing with rapidly increasing support needs. Return on investment is improved by designing systems that scale for enterprise-wide delivery as opposed to developing what Chris Dede calls "islands of innovation."[13]

Because teaching with technology

is in a constant state of beta or, as Janos Setenyi says, a state of "uncertain mediation,"[14] faculty development needs to be organic and continuous. Resources that have potential for improving teaching appear on a daily basis, but integrating those teaching assets into an instructional plan and then implementing them is an arduous task. Real-time professional development puts increasing pressure on faculty-development centers to be much less place-centric. The centers may evolve into clearinghouses where faculty members can share with each other on a peer-to-peer basis, possibly involving students in the development process. The obvious enabling constructs for such an arrangement will be information technology and instructional technology: the "two ITs." If Thomas L. Friedman is correct in ascertaining that the world economy is gravitating from countries and multinational corporations to individuals in the world marketplace,[15] then the same must be true for higher education. Certainly knowledge disperses itself in a much more horizontal structure than ever before. Just as academic libraries are moving away from being the atomistic centers of their colleges or universities, faculty members need to become the critical component in a broader network of peer-to-peer professional development. This represents a fundamental cultural shift.

Steve Ehrmann, in the blog *TLT-SWG*, suggests another model for faculty development: "Academic programs could do much better (in all senses of 'better') if they helped their faculty become the best at a) finding and adapting best practices from peers [at other institutions] who teach similar courses, and b) sharing their own best practices with the world."[16] If this were to come to pass, the implications for IT units of colleges and universities would be profound, as they would be also for academic reward structures for teaching excellence and faculty development.

In addition, students have a perspective that influences faculty development. Brenna Veale, a student from the University of South Carolina, responded to a presentation by Chuck Dziuban: "As you said, someone of the mature generation might sit down and read the manual for a new cell phone. My generation will learn by interaction with the phone itself or through a social network, not by passively isolating oneself and following the narrative of the manual. My main question, then, is this: is the current way of measuring critical thinking outdated?"[17]

A Moving Target

Everything has changed, is changing, and will continue to change: students, faculty, research, the processes of teaching and learning, and of course, technologies. The implications of research 2.0, teaching and learning 2.0, and faculty 2.0 for campus IT leaders and organizations are both broad and deep. Only within the past few years has central support for research, instructional technology, faculty development, and instructional infrastructure begun to appear as an element of the CIO's portfolio. The 2007 EDUCAUSE Current Issues Survey gives a sense of how this

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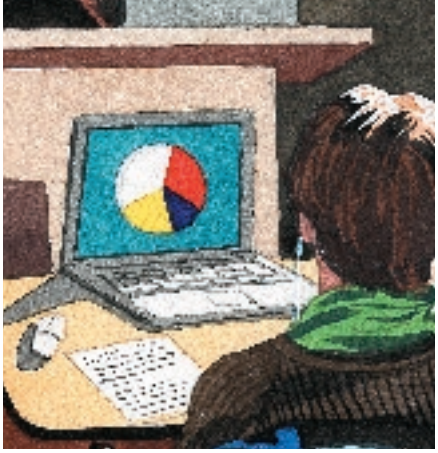
change is occurring across the spectrum of institutional types and sizes.[18] In terms of how IT leaders are spending their time, CIOs at large or doctoral-research institutions report that research support is among their top-ten IT-related issues, whereas CIOs at small-to-medium institutions and those at master's, baccalaureate, and associate's institutions do not. Conversely, CIOs at master's, baccalaureate, and associate's institutions and those at small-to-medium institutions are more likely to report that faculty development and support, course management systems, and electronic classrooms are among their top-ten IT-related issues. The survey clearly shows, however, that the infrastructure to support technology-enhanced instruction—course management systems, electronic classrooms, and e-learning—has become an area where institutions of all types and sizes are spending significant human and financial resources.

The above changes will challenge IT leaders in many ways. They must become familiar with new technologies (those that are supported by the institution as well as many that are not), understand and serve new populations of faculty at varying levels of sophistication, find the fiscal and human resources to support and sustain these new initiatives, and adapt their organizations to serve new missions. This will require modifying existing organizational structures (e.g., adding instructional designers and digital media producers) or forming new campus partnerships with instructional technology organizations in order to create a much broader network for supporting teaching and learning.

As faculty members confront the expanding impact that technology is having on their scholarship, research, teaching, and students—what Peter Vaill calls "Permanent White Water"—IT organizations must assess what role they will play in shaping, implementing, and supporting the assimilation of IT into the teaching and learning process. Should the goal be to persuade and assist faculty members to adopt technology, or should it be to enable systemic transformation? When technology is "bolted on" to an existing process, the usual result is a modest improvement in the process and also higher costs.[19] To obtain both greater improvement and reduced costs, higher education institutions must redesign the

process so as to take maximum advantage of the enabling capabilities of technologies. Such initiatives, as Bates suggests, will ultimately produce the greatest benefit for the largest number of faculty in a manner that aligns with institutional goals, is sustainable, and will lead to transformation at course, program, and institutional levels.



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