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# Learners 2.0?

## IT and 21st-Century Learners in Higher Education

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Are today's learners fundamentally different from those of earlier generations? Has information technology (IT) altered the learning environment so profoundly that higher education has new and different jobs to do? This research bulletin examines what the literature refers to as "new learners" or "critically engaged learners." It explores the responsibilities our institutions have to create opportunities for these learners to actively engage in creative discovery, problem definition, and appropriate use of information technologies. It is based on a literature review and accompanying conceptualizations that begin to answer the following questions about institutional development for a technologically sophisticated age: 1) What is the institutional context for "new learning," and what influences the new learning environment? 2) What do achievements in critical thinking, problem solving, communication, and other higher-level capabilities desired across areas of study look like in technology-enriched environments? 3) What teaching strategies might be employed to help students attain the identified goals? 4) What kinds of faculty development might be employed to develop teaching strategies aimed at facilitating achievements for faculty, staff, and students in higher-level capabilities in media-enriched contexts and in active learning?

According to Claudia Goldin,<sup>1</sup> the "new economy" at the beginning of the 20th century was driven by such phenomena as greater use of science by industry; the proliferation of academic disciplines; the diffusion of a series of critical inventions (including small electric motors, the internal combustion engine, the airplane, and chemical processes); the rise of big business; and the growth of retailing. Progress for industrial nations depended on educating more people at the secondary and postsecondary levels. The United States established an education system that produced educated citizens and workers, enabled geographic and economic mobility, resulted in more equality of economic outcomes, and may have increased technological change and productivity (although that is harder to prove, she wrote). It was largely a decentralized, forgiving education system that—in the context of the day—was highly successful. Today, however, more than one hundred years later, economic and social drivers are quite different, calling into question some of the assumptions that underlie institutions of higher education.

The "new economy" of the 21st century is driven in large measure by unprecedented advances in transportation and in computing, information, and communications technologies. To be competitive, industrialized and developing nations alike are driven by needs such as greater use of science and new technologies by average citizens; more creativity and more interdisciplinary work; greater understanding of highly complex, interacting systems; new and renewed efforts at building community and solving local challenges in the face of globalization and massification; and a substantial rethinking of retailing, services, and business in general as a result of changing tools, physical possibilities, and financial opportunities.

Much of the rhetoric about contemporary higher education suggests that colleges and universities need to embrace change in response to advances in knowledge, technology, transportation, and more—advances that have dramatically shifted the way one functions in the modern world. But what manner of change for learning itself do the

public narratives suggest? Commission reports, report cards, and public agenda profiles of requirements for higher education in many nations seem to be asking for substantial changes that will prepare learners to meet modern challenges. Many years ago, Chris Argyris and Donald Schön<sup>2</sup> described such transformational shifts as double-loop learning, the kind that ultimately brings about changes in an institution's structure and processes. Double-loop learning is quite different from its single-loop cousin, which often looks like piecemeal changes on the margins of institutional behavior—the isolated shifts in rules or regulations of an institution. Both single- and double-loop learning can be parts of a significant change process.

Despite the fact that the public rhetoric champions transformative change—the kind of organizational learning that signals a marked shift in the way colleges and universities behave—the reality is that most mature organizations and the individuals they employ resist change, and they especially resist the double-loop variety. One way to overcome such resistance is to lower learning anxiety through development programs designed to create new capabilities that people might find useful for personal, professional, or institutional reasons.

Transformational learning at an individual, organizational, or community level is difficult and rarely occurs—except by coercion—unless desired, or indeed invited, by the learner(s). Edgar Schein's research on transformational learning suggests that despite much press to the contrary, very few institutions are truly learning organizations. "Learning and the change that inevitably accompanies it is a complex process," he warns, "often more a source of frustration than achievement for groups and for individuals."<sup>3</sup> He says that radical relearning induces anxiety and guilt in most people. For individuals and for organizations, if relearning is desired, it is necessary to find ways to provide safe environments in which to experiment with change, ways in which people and the organizations they cherish do not risk embarrassment. Schein also says that it is important to distinguish between asking people to learn something that they see as practical—such as learning new computer skills—and asking them to learn something that is questionable to them or beyond their comprehension at a particular moment. If people accept the need to learn, such tactics as training, coaching, community support, communication strategies that provide feedback on progress, and incentive programs are necessary for the change process.

Derek Bok<sup>4</sup> suggests that if improving education is an important goal requiring change, then faculty need to use the body of teaching, learning, and student-development research results at hand and build on this plethora of evidence about what works. The considerable literature on faculty development in higher education lists few research experiments on interventions that improve teaching, but it does contain a multitude of program evaluations, case studies, white papers, surveys, and descriptive analyses full of data relevant to this end.

Still, other factors complicate development activities aimed at helping faculty acquire or even renew capabilities that will allow them to design technology-assisted learning activities for students. First, the technologies are changing rapidly, approaches to instructional development are changing in tandem, and disciplinary and interdisciplinary

areas of study are evolving rapidly, too. Second, and as a result, there are no historic benchmarks against which to gauge success and no obvious, widely accepted standards to ensure excellence in technology-enriched teaching and learning. Third, and perhaps most important, change agents face the challenge of ensuring that they do no harm to student learning—or to their own, for that matter—while trying to implement truly innovative strategies in a quickly evolving, contemporary idiom.

The antidote, writes Bok, is grounded in more institutionally sponsored activities aimed at acquiring local knowledge that will give direction to curricular and pedagogical design and evaluation: “So long as this kind of work remains undone, colleges run the risk of continuing to rely on familiar methods of instruction and curricular policies that do far less than they should to develop the very cognitive abilities that faculties endorse so strongly as the principal aim of a college education.”<sup>5</sup>

## Highlights of New Learning Environments

In 1999, at the request of the National Science Foundation, the National Research Council (NRC) published results of a two-year study of IT literacy. The report, “Being Fluent with Information Technology,” acknowledged tendencies to focus on skills when approaching technology literacy and explained that literacy today requires a complement of knowledge and related abilities to be fluent in information technology (FIT). Moreover, according to the report, FITness is a long-term process of self-expression, reformulation, and synthesis of knowledge in three realms:

*Contemporary skills*, the ability to use today’s computer applications, enable people to apply information technology immediately...are an essential component of job readiness...[and] provide...practical experience on which to build new competence.

*Foundational concepts*, the principles and ideas of computers, networks, and information, underpin the technology...explain the how and why of information technology...give insight into its limitations and opportunities...[and] are the raw material for understanding new information technology as it evolves.

*Intellectual capabilities*, the ability to apply information technology in complex and sustained situations, encapsulate higher-level thinking in the context of information technology...empowers people to manipulate media to their advantage and to handle unintended and unexpected problems when they arise...[and] foster more abstract thinking about information and its manipulation.<sup>6</sup>

The report also explained that for institutions to embrace the new learning involved in acquiring such knowledge and skills, a rethinking of the curriculum is required in much the same way that institutional efforts to improve the writing abilities of undergraduates involve such rethinking. “The greatest successes in these...efforts have been achieved not through a mandated requirement that all students complete the same writing course, but rather through the integration of writing into the fabric of courses taken by disciplinary majors.”<sup>7</sup>

Some institutions are demonstrating successes in launching and sustaining two of the three knowledge- and skill-development areas that the NRC says are required for fluency with information technology in higher education: 1) *learning contemporary skills*, arguably, single-loop learning efforts; and 2) *advancing foundational concepts*, also mostly single-loop activities. The third knowledge and skill arena involves *acquiring, extending, or adapting intellectual capabilities*—problem-solving, critical thinking, communication, and more—in the context of IT-enabled environments. In practice, this third area of change remains elusive even to those with the best intentions of engaging in the double-loop learning required. Initiatives designed to closely associate appropriate technologies with content-specific information to achieve defined teaching and learning aims are still largely creative, experimental endeavors. It stands to reason that the activities involved in creating new technology-assisted teaching strategies are time-consuming and labor-intensive because of the personal and organizational rethinking involved in the effort.

## Re-Visioning for New Learning

To accommodate a new kind of learning, institutions must adjust how they approach some long-standing tenets of how higher education functions, as described in Table 1.

**Table 1. New Competencies for New Learning**

From (Current Prevalent Outlook)	To (New Learning Vision)
Re-visioning movements are institution-focused, on <i>inputs</i> , changing courses, curricula, programs.	Re-visioning movements are student-focused, on what students need to know and be able to do; competencies and <i>outcomes</i> are central.
Coverage of domain knowledge and skills is via individualistic, passive, and teacher-centered modes of instruction.	Increasing emphasis is on hands-on, minds-on methods, <sup>8</sup> authentic learning, <sup>9</sup> and high-concept/high-touch capabilities. <sup>10</sup>
Students are approached and viewed as being absolute knowers.	Students are approached and viewed as being independent and contextual knowers. <sup>11</sup>
Students are encouraged to develop problem-solving capabilities.	Students are encouraged to develop problem-solving <i>and</i> problem-posing capabilities. <sup>12</sup>
Teaching of skills occurs that does not lead to flexible skills or their application.	Teaching of portable skills occurs. <sup>13</sup>
Skills and competencies are highly compartmentalized.	Information literacy, technology fluency, and domain knowledge are blended.
Students treated as passive receivers of information and unengaged learners.	Students treated as big-picture thinkers and critically engaged doers.

## Technology-Enhanced Learning Environments

Following are some principles for technology-enhanced learning environments:

**Start with pedagogy, not technology.** Creating a new learning climate demands that chief academic administrators collaborate with chief information technology administrators to develop incentives and rewards for faculty who reexamine current teaching practices, for staff who support innovative teaching practices, and for students who engage in new learning activities. For faculty, changing pedagogy is not necessarily

accomplished by simply introducing new technologies. Change starts with an examination of pedagogy and domain content if new learning is the aim. Only then can useful technologies and teaching strategies be matched to best achieve desired learning outcomes. Across all ranks and disciplines, faculty should participate in the necessary shift toward active engagement of contemporary learners.

Research reveals that traditional “stand and deliver” lectures are the least likely formats to generate the specific intellectual skill sets that undergraduate students must develop. Recent developments in pedagogy<sup>14</sup> suggest that learner-centered environments that employ problem-based learning to teach domain knowledge engage students more effectively and help them develop lifelong learning skills and a mastery of the material beyond exam dates. While several technologies can further interactive student engagement in learning, faculty must begin by examining their pedagogical objectives before introducing new elements to the learning equation. Introducing technology without this preliminary work often alienates faculty, disappoints students, and fails to produce significant change. Institutions must engage faculty by *first* asking them to analyze the learning goals in their courses and curricula and then involving them in choosing appropriate technology tools to accomplish the desired learning outcomes.

**Recognize key challenges.** As faculty shift from lecture-driven to more interactive teaching formats (whether in small or large classes), they need to bring students into the process. Yet most undergraduates arrive from public secondary education in which “teaching to the test” and memorization are dominant modes of instruction. Well-developed intellectual curiosity and intellectual self-motivation are rare. It falls to faculty to help students learn how to be independent learners and contextual knowers.<sup>15</sup>

In order to prepare students for professional practice in a complex, global economy, students need to know how to learn, a task that used to be accomplished in secondary education.<sup>16</sup> Faculty are often frustrated with students’ apparent confusion about how to use, rather than simply memorize, the material faculty aim to teach. By talking to students directly about problem-solving and problem-posing skills, we can involve them in a larger conversation about lifelong learning, intellectual maturity, and their own learning process.

**New learning is student-centered and technology-enriched.** Faculty should be encouraged to examine their assumptions about contemporary students. For instance, students from the Web 2.0 generation have extensive experience with technology. Faculty should see these preexisting skills as an asset by allowing students to be the “experts” in discovering ways to use technology. Faculty can learn from student expertise, while students gain extensive disciplinary knowledge from faculty. Faculty do not need to be as technologically savvy as their students. In line with the precepts of learner-centered pedagogy, faculty should be encouraged to recognize, respect, and leverage student knowledge and skills in the realm of technology.

For example, faculty must find ways that student technology skills can synergistically interact with disciplinary domain knowledge, such as by asking students to demonstrate mastery of skills and concepts via student-produced homepages, electronic portfolios, tutorial videos or video blogs, and/or podcasts. Faculty will need to provide crucial

supporting roles by helping students critically evaluate their effective and appropriate use of technologies—an important step in becoming FIT. This will include mentoring students on the delivery of and engagement with course content. Faculty can also help overcome existing digital divides by making sure all students have access to appropriate technologies and related resources so they can expand their technology skill sets, including via peer-to-peer interactions. The development and infrastructure components described in the following sections can play crucial supporting roles for this vision of technology-enhanced learning.

## What It Means to Higher Education

**Changing faculty practices.** The literature provides six broad areas of faculty development best practices to guide institutional efforts: managing institutional issues, incorporating adult learning principles, offering incentives, providing workshops, integrating peers, and providing ongoing support.<sup>17</sup> These practices have proven effective in developing the contemporary skills and foundational concepts in faculty who aim to be FIT, and innovative faculty development directions and practices are necessary to help faculty attain the intellectual capabilities required in the new learning environment.

Wlodkowski's Framework for Culturally Responsive Teaching workshop model is especially valuable in that it offers a synthesis of best workshop practices that aim to increase motivation, participation, and the transfer of learning. It employs active learning strategies, such as problem-based learning, peer modeling, and role-playing, which enhance and deepen learning. These learner-centered practices in faculty development workshops also mirror the desired pedagogy for new learning environments. The role of the faculty developer in such learning environments is that of facilitator; at the same time, the Concerns-Based Adoption Model provides valuable, pragmatic monitoring and intervention strategies that developers can employ to guide new learning processes.<sup>18</sup>

**Immersive development.** Immersive development opportunities for faculty that create learning partnerships between faculty and students are another powerful way to foster healthy functioning in new learning environments. Immersive development may also increase intellectual capabilities for FITness and may be utilized as faculty development strategies that complement the best practices and Wlodkowski model. Immersive development might take the form of a single course buy-out, in which a faculty member resides as a part-time fellow within a university's new media center, digital commons, faculty development center, or similar unit. Student fellows would ideally be offered an equivalent opportunity within the same unit and receive independent study or internship credit or a stipend. While faculty might be selected based on award-winning teaching experience, specific teaching goals, research interests, or targeted institutional faculty development goals, students might be selected based on particular technological expertise, career goals or experience, or personal interests.

**Enabling infrastructure: Joining people, processes, and tools.** Virtually all FIT scenarios require an envelope of ubiquitous networks and services in support of students, faculty, and staff. Incoming 21st-century students and faculty will no doubt

assume the availability of a high level of connectivity throughout the physical campus, coupled with appropriate connection to the Internet and, perhaps, to specialized research-oriented networks. Assuring faculty and students an adequate share of an institution's network access will likely continue to require effective network prioritization policies to ensure that mission-critical activities (such as interactive video learning activities or intensive real-time visualization of remote data) can be accomplished consistently and efficiently.

Traditional centrally provided infrastructure services that support individual productivity and FITness include course management systems, file repositories (both personal and institutional), web hosting facilities, automatic file backup, digital imaging, and data visualization. Yet the physical operating environments used by faculty and students, such as offices, classrooms, labs, libraries, new media centers, various living spaces, and informal study and gathering spaces, also offer opportunities for intentionally providing unique and adaptable infrastructure—for example, collaborative display technology that can facilitate group work, often within problem-based learning contexts. Network-delivered, collaborative services provide a unique virtual operating environment for groups to meet, share information, create content, and generally overcome time and space constraints. As users become increasingly FIT and grow more discriminating, infrastructure once considered adequate may seem unnecessarily constrained, inflexible, and unresponsive. When users can easily configure infrastructure services to meet unique needs, whether related to a discipline, research group agenda, or changing project conditions, their levels of satisfaction and use are more likely to rise.

## Key Questions to Ask

- How do we help faculty from diverse disciplines make the transition to problem-based learning and other approaches to pedagogy appropriate to a new learning paradigm?
- How might existing faculty development resources be leveraged or reallocated to support changes in faculty conceptions of teaching?
- Which faculty opinion leaders are already practicing learner-centered, technology-enriched pedagogy? How might they be incorporated into targeted faculty development activities?
- What changes would our institution's existing infrastructure need to support significantly increased use of technology in teaching and learning?
- How could our current newsletters and communication channels be modified or extended to broadly and better share the results of faculty moving to technology-enriched pedagogy and learner-centered teaching?
- What assessment resources does our institution have to assist in understanding the effects of moving to a learner-centered, technology-enabled pedagogy?

- How do we incorporate students in faculty and institutional development activities as active participants and not just as objects of teaching or apprentices of experts?

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