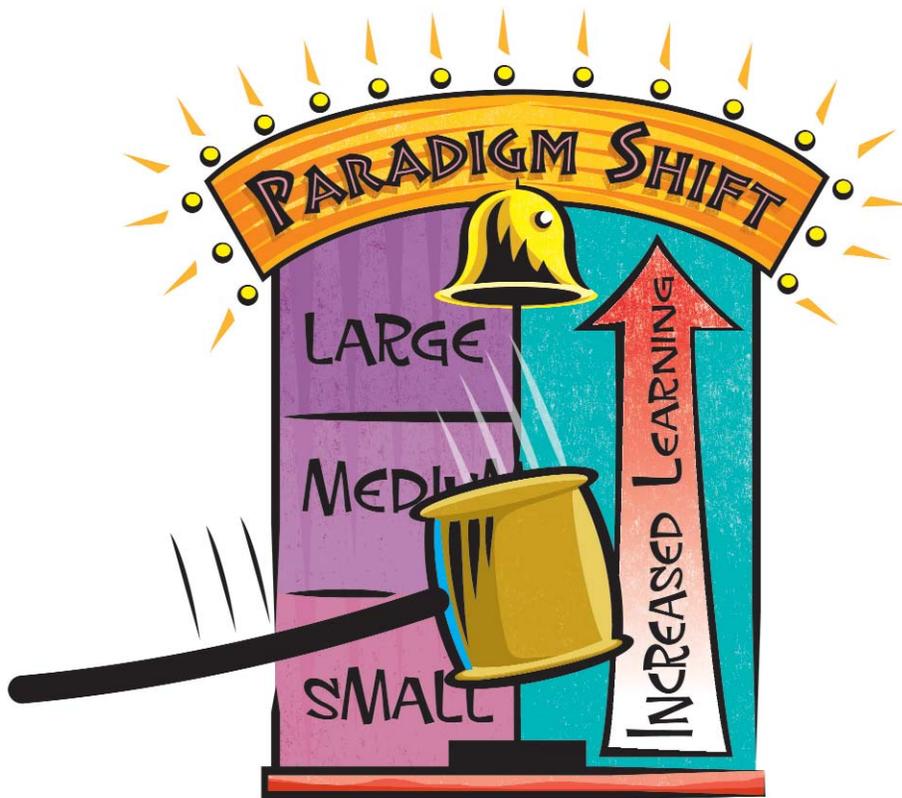


Paradigm Shift

How Higher Education is Improving Learning



There are increasing calls for change and improvement in the American educational system. The accountability movement, begun in an attempt to revitalize K-12 institutions, is now gaining momentum in postsecondary education. Governors, legislators, and coordinating or system boards are considering achievement on performance indicators as one factor in determining future campus allocations.

To be truly responsive to the calls for accountability, institutions may have to rethink the core mission of undergraduate education and reexamine their central values. Many critics think education will have to place learning at the center of all its actions, decisions, and allocations in order to be truly and meaningfully accountable.

In the last 10 years, much of the impetus for a discussion on learning came from an article that appeared in the November/December 1995 issue of *Change*: "From Teaching To Learning: A New Paradigm For Undergraduate Education." The authors, Robert Barr and John Tagg, tapped into a deeply ingrained sense that

something had to change. By applying to undergraduate education the theories of scientist Thomas Kuhn and futurist Joel Barker, they developed a simple and penetrating analysis of the current modus operandi in the classroom they called the Instruction Paradigm.

In this paradigm, the mission was to provide instruction to students, and the focus was on the teacher, who usually employed lecture as the primary method of delivering instruction. Learning was clearly the responsibility of the student, and its measurement was not a high priority. This centuries-old model of the scholar possessing knowledge and transferring it to eager students has changed little since before the invention of the printing press.

Other characteristics of the Instruction Paradigm were readily recognizable. Independent, discipline-centered departments were repositories of specialized and somewhat isolated knowledge. Significant resources and planning were committed to keeping teachers current in their disciplines through professional development programs. A subtle but perceptible caste system existed on many campuses in which the faculty were the “upper class” and other employees were identified as support staff.

Despite the significant body of literature on the value of collaborative or self-paced learning environments, the learning community movement, and assessment as a valuable pedagogical tool, there was little documentation of efforts to incorporate these approaches into the curriculum. There was agreement that students came to the campus with multiple learning styles and that critical thinking should be incorporated into every course, yet there was little concrete evidence that schools practiced what they preached.

Introducing the Learning Paradigm

Barr and Tagg argued that the very mission, vision, culture, and structure of a college must undergo a paradigm shift from the **Instruction Paradigm** to the **Learning Paradigm**, from being an institution that provided instruction to students to an institution that produced learning in students. Once that shift is made, everything has the potential for change.

In the new scheme, faculty become the designers of powerful learning environments, and every college employee, not just faculty, has a role to play and a contribution to make in maintaining a learner-centered environment. Curriculum design is based on an analysis of what a student needs to know to function in a complex world rather than on what the teacher knows how to teach. Colleges are encouraged to reconfigure the ways in which they interact with

students. The name of the game is learning, not instruction.

In the view of Barr and Tagg, colleges and faculty were prisoners of a system, structure, and history not of their creation, one that prevented meaningful collaboration among campus stakeholders. Archaic and discriminatory grading practices continue, in some cases predefining how letter grades will be distributed in a class without concern for the prior preparation, abilities, or academic potential that an individual student possesses. Given the nature of colleges and universities—their history and traditions, their commitment to shared governance and consensus building, and a substantial institutional culture that seems to resist change—the impediments to an organizational shift suggested by the Learning Paradigm are formidable.

Since the arrival of the article by Barr and Tagg, there has been a measurable movement to embrace learning as the focus of undergraduate education. As the concept spread rapidly throughout education, a new emphasis on learning began to appear. Every new book, conference program, and web site echoed the concept: learning college, learning communities, learning organizations, learning outcomes, brain-compatible learning, surface learning versus deep learning, and teachers as learning facilitators.

Other Voices for Change

Movements such as Management by Objective, Total Quality Management, behavioral objectives, learning outcomes, and the student development movement of the 1970s all have chipped away at the traditional education system with moderate success. The literature on institutional change began to gather momentum in the early 1990s, as more critics weighed in on what was wrong with undergraduate education. The Wingspread Group on Higher Education (1993) offered a concise statement on the implications of change in academia and the impact of that change:

Putting learning at the heart of the academic enterprise will mean overhauling the conceptual, procedural, curricular, and other architecture of postsecondary education on most campuses.

Hastening the potential for that overhaul was the emergence of information technology as an essential dimension of institutional infrastructure and the impact of the Internet on instruction. If today's student has a choice of accessing information and learning electronically anywhere and at any time by means of the World Wide Web or televised courses, and the provider of this educational experience can be the local community college or a university

thousands of miles away, what competitive advantages do local colleges have when they require students to battle freeways and confront crammed parking lots in order to sit in crowded, uncomfortable lecture halls to acquire the same knowledge? The student no longer has to go to a “place” to learn; learning now comes to the student.

Challenge to the Classroom

For many faculty, the classroom is a familiar and comforting environment. However, as William Plater observed, even though the metaphor of the classroom is a powerful one, this “most basic and fundamental unit of academic life—the sanctity of the classroom and the authority of the teacher in it—is about to be turned inside out.”

In Plater’s view, readily available access to information means that the traditional classroom might lose its place of primacy as the central location where knowledge is acquired. This, in turn, may force educators to rethink the teacher-student relationship.

Faculty, in addition to their subject expertise, need to be trained in identifying learning styles, developing modular curriculum, and mastering instructional technology and methodology in order to become effective assessors of a student’s abilities and potential, as well as designers of learning environments and systems. In turn, colleges and universities need to revisit how they design, update, renovate, and equip current classrooms to make the most of teacher-student interaction.

Barriers to Learning

Terry O’Banion, another contributor to the literature of change, echoed and expanded upon the Wingspread Group’s view of the primacy of learning. In O’Banion’s perspective, educational institutions face four limitations. First, they are bureaucracy-bound with restrictions embedded in education codes, procedures manuals, state master plans, legislatively driven budgets, and organizational cultures that tend to perpetuate business as usual.

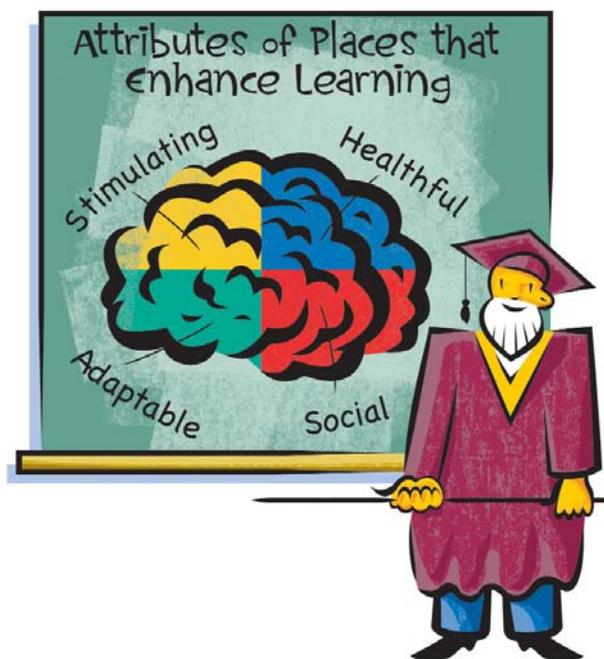
Second, faculty are role-bound, working in isolation in their own classrooms, portrayed as the “expert” filling up the empty vessel of the student by using the lecture as the primary delivery mechanism.

Third, colleges and universities are time-bound. College offerings are atomistic and mpartmentalized. In this metaphor, the atom is the 50-minute lecture period and the molecule is the three-credit course offered in a 15-week semester or a 10-week quarter. In this environment, time is constant while learning

varies from class to class.

Lastly, institutions are place-bound. The very concepts of the campus, the classroom, the library, the laboratory are all “places you go to learn.” The historic one-room schoolhouse has left an imprint on current educational facilities. Many standard classrooms lack flexibility and are not the most conducive locations for meaningful learning to occur. Too often the layout, furnishings, and design of a classroom are the result of budgetary necessity failing to provide the flexibility, comfort, and atmosphere that can contribute to an enhanced learning environment.

While all four limitations put potential restrictions on the ability to design a learner-centered environment, it is in the area of place that colleges and universities have the most opportunity to make a difference.



A Place for Learning

Among critics, there is a growing sense that “formal education” (listening, taking notes, reading, taking exams) is not effective, and the locus of traditional education, the classroom, is perhaps one of the causes for this deficiency. This is perhaps a corollary of Barr and Tagg’s Learning Paradigm—that a room designed to house the transfer of information from teacher to student is not conducive to deep learning and retention.

Rather, it is informal education (collaboration, peer interaction, mentoring, reflection, coaching) that can provide a basis for academic success.

As Tagg observed in a subsequent book, colleges provide instruction in classes. When this

methodology doesn't work, the remedy is to offer more courses. When students fail to learn, it is regrettable but the system doesn't change. In the Learning Paradigm, the approach is to diagnose the reasons for the failure to learn and create an environment that addresses the problem. Learning is continually assessed and the environment is regularly modified to produce more learning. Implicit in this analysis is an emphasis on the environment, the physical space, as a contributor to enhanced learning.

New Students, Old System

Today's students are changing far more rapidly than the colleges and universities that recruit them. They have a preferred mode of activity and interaction that is not in sync with an educational system that is showing its age. "Net Gen" students, as author and consultant Marc Prensky calls them, are not interested in large lecture halls, preferring informal, small-group discussion, often through text messaging or e-mail, as a means of gaining understanding of curriculum content. They want a learning space in which they can get to know one another, engage in dialogue, work independently or in groups on projects, get or provide feedback, and, in general, they seek a collaborative environment that fosters understanding and learning.

Colleges that create new classroom buildings are hoping for a long life for those facilities, and their hopes usually will be realized. However, while a building will last 50 or more years, its mechanical and electrical functions will need replacement long before the building's useful life is over. Cabling and IT hardware has a shorter shelf life, and software will become obsolete even sooner. Furniture, décor, variable lighting, and flexibility are often afterthoughts in the design process. What should be addressed in the planning process are questions on the pedagogical approach to be taken in a given space, layout, functionality, flexibility, access to technology, and the human needs of the room: lighting, temperature, acoustics, adaptability, comfort.

The highly regarded book *Student Success in College: Creating Conditions That Matter* offers insight into strategies that promote student success. Based on the Documenting Effective Educational Practice (DEEP) project at Indiana University, the book investigated common features of 20 institutions and their cultures. Among the institutions' shared values were a "living" mission, strong focus on student learning, and shared responsibility for educational quality and student success. Joining these essential indicators of success was "environments adapted for educational enrichment."

Each institution in the project has a unique campus setting, both natural and/or constructed. Each college understands the value of "place," a realization that its unique geography, layout, and architecture could be made an active part of the learning equation. Each was quick to alter the physical environment in order to enhance a potential learning situation. For example, Evergreen State College used its Puget Sound location and surrounding wooded preserves to study plants, ecosystems, and marine life. Ursinus College redesigned facilities to put "interaction areas" near faculty offices, enhancing and strengthening collaboration between teacher and student. George Mason University situated its Johnson Center at the heart of the campus, with its library, food court, movie theater, retail outlets, student support offices, and small-group study spaces attracting students literally around the clock.

Many DEEP institutions had strong ties with the community, extending learning opportunities into surrounding municipalities, increasing the number of "virtual labs" while providing service learning opportunities with real-life people and organizations. Testimony documented that signage, landscaping, architecture, and the physical environment influenced students' feelings of engagement, self-worth, and belonging, leading to increased retention.

George Kuh, principal author of *Student Success in College*, is also the Director of the National Survey of Student Engagement (NSSE), an annual assessment of information supplied by colleges and universities on student participation in programs. Since the inception of the survey, more than 844,000 students at 972 four-year colleges and universities across the country have reported their college activities and experiences to the NSSE, making the program a leading authority on the improvement of undergraduate education, enhancing student success, and promoting collegiate quality. Among its most recent findings: The single best predictor of student satisfaction with college is the degree to which students perceive the college environment to be supportive of their academic and social needs.

Another recent study of the impact of facilities on recruitment and retention of students gave some clues about the growing emphasis on the quality of learning environments. The research, published by APPA (Association of Higher Education Facilities Officers), went beyond the considerable research done on factors that impact a student's decision to attend or not choose a particular college or university.

The research, conducted among APPA member institutions, included a total of 16,153 students responding from 46 institutions across the U.S. and

Canada. Understandably, the top five characteristics cited by students focused on academics, indicating that the students wanted a quality educational experience. Two-thirds of the respondents indicated that the “Overall Quality of the Campus Facilities” was “Essential” or “Very Important” to their decision. Half of the respondents indicated that the “Attractiveness of the Campus” scored in those upper-end categories as well.



Reexamining the Built Environment

What are colleges and universities doing — through commitment to innovative campus construction or renovation? Here are some examples.

Estrella Mountain, one of the ten colleges that comprise the Maricopa Community College District in Arizona, recently had the opportunity to renovate two liberal arts classrooms. Prior to the project, school officials had developed three principles for designing learning spaces: leverage of physical space, engaging stakeholders, and a concept they called “radical flexibility”—the desire to make faculty and students unencumbered by either the space in which they interacted or the technology used in the learning process.

As part of this project, classrooms were transformed into “learning studios,” featuring ergonomic furniture, wireless technology, mobile teaching stations, wall writing areas, and informal learning spaces within the formal instructional setting. Based on positive feedback from users of these two spaces, the college recently opened Ocotillo Hall with 22 learning studios based on the feedback from the original prototypes.

The movement toward studios and away from traditional classrooms is seen in other institutions as well. Due to its variable geometry, flexible seating arrangements, and use of enhanced technology, the studio concept allows for a variety of pedagogical options. With all furnishings moveable, classes can spontaneously reconfigure the spaces to match the day’s subject matter and presentational or interactive style. A room with no front engenders creative reconfiguration. Contemplation, engagement, collaboration, and reflection are all possible and encouraged. The resultant learning is dynamic rather than static.

The studio concept has also been successfully expanded into the residential-life experience. The University of Dayton has developed twenty-first-century residential facilities that mix living and learning to expand student engagement. The first phase of ArtStreet, completed in the fall of 2005, includes six two-story townhouses and five loft apartments sitting above performance spaces, artist studios, group discussion spaces, a multimedia room, exhibit spaces, the campus radio station, and a recording studio, all anchored by a café that serves as a gathering place for the “neighborhood.”

ArtStreet is just one component of the university’s ambitious Learning Village concept, in which collaboration, connectivity, and community are the hallmarks of an all-encompassing commitment to place learning at the forefront of every endeavor. Housing 400 first- and second-year students, Marianist Hall is another unique facility where learning studios, faculty and campus ministry offices, a two-story bookstore, post office, credit union, food emporium, and 60-seat chapel are all integrated under one roof.

The Ryan C. Harris Learning Teaching Center continues the theme of collaboration and connection. One feature of the Center is “The Studio,” an experimental classroom and laboratory for inquiry-based teaching and a place where faculty can try new pedagogies and share their experiences with other faculty in a collaborative and supportive setting. The aim is to stimulate a community of practice among participating faculty around teaching and student learning and to produce useful outcomes for students and learning for faculty. With mobile furniture and white boards on ceiling tracks, the room can be quickly configured to small-group discussion, then back to full-class presentation. Wireless technology enhances the connectivity of all participants.

Increasing Learning per Square Foot

The intelligent use of technology has opened new doors to innovative facilities use at other institutions. MIT's TEAL classroom (Technology-Enabled Active Learning) is a case in point. The TEAL format, piloted in 2001 in an introductory physics class in electromagnetism, combines lecture, recitation, and hands-on laboratory experiments into one classroom experience. To successfully accomplish this, the classroom had to be rethought. Through imaginative positioning of tables, projection screens, white boards, laptops, an instructor's station, and discussion areas, active-engagements methods such as desktop experiments and collaborative exercises are incorporated into the traditional college course.

In a similar vein, The SCALE-UP project at North Carolina State University (NCSU) goes after a different target—large-enrollment classes. SCALE-UP stands for Student-Centered Activities for Large Enrollment Undergraduate Programs and seeks to deliver a learning environment that is highly collaborative, hands-on, computer intensive, and interactive. Rather than being seated in a large lecture auditorium, students face each other across small tables. Instead of standing behind a lectern, the teacher roams the room, answering questions, monitoring progress, occasionally giving a mini-lecture among, instead of in front of, the class. Students share laptops, complete impromptu assignments, and collaborate on projects. The setting is described on the project web site as “very much like a banquet hall, with lively interactions nearly all the time.”

To document the advantage of designing a collaborative learning environment, NCSU has conducted evaluations of learning attainment in parallel classes, one in the SCALE-UP model, and the other in a more traditional pedagogy. A wide array of quantitative and qualitative methods, including classroom observers taking field notes as well as video recorders capturing classroom interactions, were employed to evaluate the educational impact of the SCALE-UP pedagogy.

Data were compiled from over 16,000 NCSU students over a five-year span from 1997 to 2002. Failure rate ratios were calculated by dividing the percentage failing traditional courses by the percentage failing in SCALE-UP. Overall, students were nearly three times as likely to fail in a traditionally taught section as in an equivalent SCALE-UP section of the course.

Using SAT scores as a way of identifying students at risk of failure in traditional physics, researchers found

there was no difference in passing rates for those students with Math SAT scores above 500. But of those students whose Math SAT was less than 500, 83 percent of the SCALE-UP students passed Engineering Statics compared to only 69 percent in traditional sections. The SCALE-UP web site summarizes their findings as follows: Ability to solve problems is improved, conceptual understanding is increased, attitudes are improved, and failure rates are drastically reduced, especially for women and minorities.

In addition to efforts by single institutions, there are some promising collaborative ventures among higher education partners. NITLE, a partnership of the National Institute for Technology and Liberal Education and three other consortia, is one example. With almost 100 participating colleges, many of them with prestigious reputations, the organization fosters experimentation with emerging technologies and how they can produce an enriched learning experience.

Projects include 3D visualization, podcasting, wiki open editing, and wireless computing, all breaking down the traditional lecture hall format and encouraging students to explore and experiment with PDAs, pocket PCs, and cell phones. As a result of this mobile technology, students are beginning to alter their study and social habits, which in turn causes their colleges to rethink the physical environment they must provide and the technology to support it.

Space—The Final Frontier

With this growing movement to revitalize the learning environment, colleges and universities are revisiting the comfortable paradigms of the conventional classroom. New design and renovation strategies are emphasizing easily reconfigured, multiple-use spaces to permit small-group discussion, collaborative learning exercises, and maximum individualized interactions with faculty who have appropriate presentational technology to enhance their efforts.

In recent years, technology has significantly affected our world, and its presence is strongly felt in education. While virtual learning has an increasing role to play in the future, there is no reason to eliminate the place-bound campuses and locations in which institutions have invested. But the likelihood of massive new capital construction funding is small. Instead institutions must find ways to respond to critics by demonstrating that deep and meaningful learning takes place in their facilities. More institutions must move from the comfort of the

Instruction Paradigm to the challenge of the Learning Paradigm, daring to transform twentieth century classrooms into twenty-first-century learning environments.

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For information on the TEAL classroom, visit <http://icampus.mit.edu/>

Photos of SCALE-UP installations are available at <http://www.ncsu.edu/PER/SCALEUP/Classrooms.html>