

**REINVENTING  
HIGHER EDUCATION**

*The Promise of Innovation*

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*Editors*

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## Old School

### *Four-Hundred Years of Resistance to Change*

Jon Marcus

THAT NEW CAR SMELL. It's one of the first things you notice about Harrisburg University of Science and Technology—the smell of brand-new carpets in the halls and still-pristine furniture in the offices and classrooms overlooking Pennsylvania's capital city.

Harrisburg opened in 2005, the state's first new nonprofit university in a hundred years, operating from this single, sixteen-story, \$73 million state-of-the-art academic center. Its approach to higher education is as new as its building.

There are no sports teams. The food court of an adjacent downtown shopping center serves as the de facto student union. There's no gym, though a health club in the mall offers student discounts. There are no dormitories; if they want, students can rent rooms in an apartment building shared with the local community college. A neighborhood restaurant is jokingly referred to as the faculty dining room.

What's more important are the other things this university doesn't have. There's no tenure. Faculty sign twelve-month contracts. There are no departments. Everyone has expertise in more than one subject. In addition to

the full-time faculty; there are working professionals—called “corporate faculty”—drawn from the region’s high-tech sector, something the state (by helping underwrite this school, among other things) is hoping to bolster as a means of replacing central Pennsylvania’s vanished manufacturing industries.

Harrisburg University does allow at least one nod to tradition: it has an official seal. It’s a stylized delta, the Greek scientific symbol representing change. This is a university focused on one thing: educating students. It was designed from scratch in a collaboration among experienced educators, government, and businesspeople frustrated by the barriers that thwart reform in American higher education—barriers like tenure and departments.

“If anybody believes that the curriculum at a mature institution is built for the students, think again. It’s built for the faculty. The departmental structure, the college-within-the-university structure—these are silos within which people in traditional disciplines live,” says Mel Schiavelli, Harrisburg’s president and previously provost and interim president at the College of William & Mary and provost at the University of Delaware.<sup>1</sup> “I used to think you could knock those silos down,” Schiavelli said. “Well, believe me, that is the most difficult thing in a university to have happen, partly because of the reward system for faculty. You’re rewarded for contributions to your discipline, as opposed to contributions to your institution.”

At Harrisburg, the idea that students and not faculty should be at the center of everything is as immediately obvious as it seems self-evident—when the security guard in the lobby helps one undergraduate fix his tie for a job interview, for example, or when a member of the board of trustees greets another student by name. Or when students seek help after hours in chemistry or algebra from faculty who teach microbiology or immunology, without worrying about the boundaries that traditionally separate departments. Or without worrying that the faculty won’t be in their offices, because they almost always are, instead of working on research or publishing to bolster their campaigns for tenure.

Students learn such things as math and science not by copying long formulas off blackboards in large lecture halls, but by teaming up and apply-

ing these disciplines to problems that are socially current—studying the rates at which disease spreads, for instance, as a way of mastering statistics, or learning technical writing by designing a swine flu public-awareness campaign. They work at local companies with corporate faculty who are CEOs and managers in their chosen areas of study and who, unlike adjunct faculty at other universities, help design the curriculum to make it relevant to real-world career requirements. The average class size is twelve.

Professors can change the content of a course midsemester if it’s not working out or if they need to add fast-moving new advances—a process that, at other universities, can take years. Core requirements such as ethics and critical thinking, taught at other universities as separate courses, are incorporated into every class here. Technology is pervasive, and faculty use it to its full effect.

This largely new model for delivering higher education was possible because this university itself is brand new. No one should be surprised, Schiavelli says, that what he calls mature institutions are unwilling or unable to change in such ways. “Think about it: How many human institutions that existed before the Reformation still exist today?” he says. Schiavelli pauses. “There’s the Catholic Church—and how frequently do things change in the Catholic Church?—and the parliament of Iceland, maybe. And the rest of them are universities. When you start with a blank piece of paper, you don’t have that.”

## WHAT HISTORY CAN TEACH US

Every few years in America, someone comes up with a new and better way to deliver higher education. It’s not hard, given that the standard model is the one-way lecture, usually dispensed by a professor without pedagogical training or professional incentives to teach.

Recent examples of such new ideas include service learning, role playing, the case-study model, undergraduate research, small learning communities, capstone classes, writing in the disciplines, collaborative learning, and technology-based course transformation. Not all such approaches are

new. Some are very old. Some schools have introduced small-scale seminars based on the Oxbridge tutorial, for example, to honor programs and for teaching traditionally underrepresented and underprepared students. New approaches in teaching have also encompassed *where* education happens—abroad, in a laboratory, in a classroom equipped for team projects, in a workplace. Innovation includes curricular decisions, too—the contentious debate between electives versus core requirements, for instance, or how or whether students are encouraged to work with each other.

Whatever form it takes, the innovation that does happen in American higher education tends to follow a familiar pattern: initial enthusiasm, proselytizing, promising assessments, growth from a small handful of institutions to larger handfuls, and then a plateau into a comfortable niche. Enough professors, departments, and, in a few cases, whole institutions adopt the practices to build small followings of enthusiasts. But the great mass of teaching continues more or less as before.

Most of the ideas about undergraduate teaching that have fallen in and out of favor in the nearly four hundred years of higher education in America turn out to have had several important and extraordinarily consistent things in common: They were imposed from outside universities at historic moments in which there were spurts of dramatic and significant social shifts propelled, in turn, by such epochal events as wars. They were as much in the universities' interests as the students'. And they occurred when reformers, frustrated by the slow pace of change at existing universities, opened new ones.

History shows that it is possible to develop and adopt new teaching methods under such circumstances. But it also makes apparent that, without self-interest or external pressures, existing universities have—not just recently, but for centuries—unswervingly exercised a stubborn resistance to systemic change that can hold off the smallest of reforms for years, stretching into decades. Not even major social movements have always resulted in changes to undergraduate teaching. The flood of returning veterans that inundated universities after World War II, for example, triggered only tweaks to the way that the schools provided higher education. Classes

simply became much, much larger. The Soviet Union's successful launch of Sputnik on October 4, 1957, accelerated government involvement in subsidizing research and tuition, something many critics argue actually discouraged reform by ensuring a stable supply of revenue regardless of outcomes. After that, higher education settled in for several comfortable decades of general public and government financial support. Such interruptions as protest movements may have attracted a lot of attention, but they had little or no impact on classroom methodologies, other than allowing for more student freedom in choosing electives in the 1970s, before swinging back to the required core curriculum in the 1980s.

In this respect, universities "move with the predictability of a metro-nome," says Arthur Levine, president of the Woodrow Wilson National Fellowship Foundation and former president of Teachers College at Columbia University. "General education oscillates between moving toward free electives and moving toward required programs, just as the country also oscillates."<sup>2</sup>

Spiraling increases in costs, complaints from employers about work preparedness, the improvement of higher education in countries that are economic rivals, the challenge from the for-profit sector, and the general decline in economic competitiveness began to come together as early as the 1970s in a sort of slower moving, more spread-out, amalgamated crisis. Compounded by the acute financial pressures of the 1990s and 2000s, these problems are so dissolute that no single reform movement has risen to meet them, only a patchwork of proposals, many of which have not on their own picked up the momentum they need to overcome institutional interests invested in the status quo.

Why is it important for innovators to understand this history? Because it shows that change *can* happen in higher education, *when* it can happen, and how hard it can be.

When President George W. Bush's Secretary of Education Margaret Spellings convened a commission in 2005 to propose reforms, she discovered "just how adept organized higher education had become at 'opa-dopa'—the art of stalling, dodging, and misdirecting until your opponent

is too exhausted to be an effective threat," says Robert Zemsky, founding director of the University of Pennsylvania's Institute for Research on Higher Education, who was a member of the commission.<sup>3</sup>

"For nearly a century now, there has been no successful systemwide effort to change the environment in which undergraduate students learn," Zemsky writes in his book *Making Reform Work: The Case for Transforming American Higher Education*. "Nor have all that many institutions taken up the challenge of how faculty teach and hence how their students learn."<sup>4</sup> He writes: "Individual institutions can and do change, and very occasionally they transform themselves. But their successes tend to pale with time as the inertia in the system draws almost all institutions back to a mean that brooks only minor changes."<sup>5</sup> Instead, over the years, frustrated reformers have found it easier to give up and build new universities—for example, the University of Virginia, Rensselaer Polytechnic Institute, Johns Hopkins University, the aforementioned Harrisburg—than it is to transform old ones. And that isn't easy at all, which says a lot about how hard it is to change the way American universities deliver higher education.

### The Deep Roots of American Higher Education

Most universities in America don't have the advantage of having just been built from scratch. They stand on foundations that do, in fact, predate the Reformation and even the Catholic Church and the tenth-century Icelandic parliament, if you consider the classical Greek and Latin with which most began and long persisted, and the enduring influences on them of the Renaissance and British universities founded in the twelfth and thirteenth centuries. Their resistance to change dates almost from their start.

Like their British forebears, colleges in pre-Revolutionary colonial America taught a simple curriculum of classical languages and literary or nonexperimental science, largely involving memorization and using the same tutorial system that had been in place since the twelfth and thirteenth centuries at Oxford and Cambridge. It would remain the norm at most for more than a century and, at the oldest, for nearly two. Only one of the

early colleges was concerned with professional instruction—something that would take more than a hundred years for the rest to grudgingly embrace—and none with research or for that matter any particular form of active inquiry.<sup>6</sup> All operated under an administrative hierarchy similar to Cambridge's and Oxford's, though an American adaptation was to call the head of school the president.<sup>7</sup>

It was not surprising that, when the governors of the Massachusetts Bay Colony decided in 1636 to "advance Learning and perpetuate it to Posterity" by establishing America's first college, they adopted the curriculum of Emmanuel College, Cambridge.<sup>8</sup> After all, thirty-five of the one hundred-thirty university-educated Puritan men in New England by that time had attended Emmanuel, a Puritan stronghold.<sup>9</sup> Of the first nine graduates of Harvard, four became ministers. They got busy, spreading their approach to higher education like a virus or, more precisely, a gospel. Of the ten ministers who founded Yale, nine were Harvard grads. Six graduates of Harvard and three of Yale were among the twelve ministers who were charter trustees of the College of New Jersey, later renamed Princeton University.<sup>10</sup> Columbia University, originally called King's College, then adopted the curriculum of Princeton, which had, in turn, been modeled on those of Harvard and Yale.<sup>11</sup> Though not identical, most of these first colleges were, as a result, quite similar, and their graduates would largely determine the direction of other, newer schools for another hundred years. To this day, most American universities in their various classifications seem to prefer being more alike than different.

The single pre-Revolutionary college in the South and the second to be founded in America, the College of William & Mary, was as much inspired by the Renaissance as by the Reformation, including among its goals the idea of broadly educating southern gentlemen in the classics and the sciences.<sup>12</sup> But it was also there and later in the other colonies that the influence of higher education institutions in another, hardly likely place began to take root: Scotland.

The first head of William & Mary, James Blair, was a product of the University of Edinburgh, while the first head of what became the University of

Pennsylvania, William Smith, had studied at the University of Aberdeen. They imported to American higher education the rudimentary Scottish system of dividing colleges into schools—at William & Mary, a school of Greek and Latin, a school of philosophy and mathematics, and a school of divinity and “Oriental tongues”; at the University of Pennsylvania (originally called the Publick Academy of Philadelphia), a school of Latin and Greek and a school of natural philosophy and science.<sup>13</sup> These earliest departments divided the academy by discipline.

Some of the most radical early education methods were imprinted on the University of Pennsylvania; many were decidedly domestic in origin and driven by its most enthusiastic advocate, Benjamin Franklin. The famously pragmatic Franklin, who had not himself gone to college, successfully pushed the novel idea of teaching practical skills above and beyond the usual theology and classical languages, beginning what would be a more than century-long (if not longer) dispute about the very purpose of higher education.<sup>14</sup> In 1765, Penn added a medical school, effectively becoming the nation’s first real university by combining undergraduate and graduate education. It was the first to call its teachers *faculty*, a term that Harvard wouldn’t use until 1825, and established another fateful precedent by giving them extraordinary powers over policy. The faculty would meet twice monthly with the provost and vice provost, the founding statutes decreed, to have “an immediate and general regard to the Manners and Education of all the Youth belonging to this College.”<sup>15</sup> For all of the progressivism of the University of Pennsylvania, the authority it vested in the faculty would have significant repercussions for academic change, mainly by working against it as countless reforms disappeared into the seemingly bottomless process of faculty governance.

After the Revolution, America turned to France for all things fashionable, including the occasional new trend in higher education. For one thing, American colleges started teaching French, their first modern language, after France became an ally. Thomas Jefferson, U.S. minister to Paris, returned with other new ideas for higher education in America, foremost among them, that it be independent of organized religion. But Jefferson was among

the earliest reformers to come up hard against the stubborn resistance of American colleges. Though governor of Virginia and chairman of the board of visitors of the College of William & Mary, his alma mater, he appealed in vain for changes in the traditional curriculum to add the same practical arts that Franklin pushed in Philadelphia—namely, agriculture, science, and modern languages. Finally, Jefferson gave up trying to reform existing colleges and famously began his own. “There are letters in the archives from him [Jefferson] to the masters begging them to change the curriculum to recognize the needs of the colonial society,” says Schiavelli. “He tried for forty-five years and failed. So he went off and founded the University of Virginia on those principles.”<sup>16</sup>

Jefferson’s university finally opened in 1825, with its famous “academic village” shared by faculty, students, and classrooms. The most important part of the design is often overlooked: Where in other universities there would be a chapel, Jefferson put the library. Chapel attendance was not required.

There were other precedent-setting innovations. The university, at its inception, was divided into seven colleges, one each for ancient languages, modern languages, mathematics, natural philosophy, moral philosophy, chemistry, and medicine. The next year, an eighth college—law—was added.<sup>17</sup> Each conferred its own degrees, and while students were required to become a part of one college, they could take courses in another. It was the birth of the particularly contentious idea of the elective: letting students pick the lectures they attended. This model also finally met Jefferson’s ideal that “all the useful sciences should be taught in their highest degree.”<sup>18</sup>

If Jefferson believed that other schools would follow suit, he never lived to see it. Another twenty years passed, and the Industrial Revolution was under way, before Harvard or Yale started any sort of school for science. Harvard didn’t drop mandatory chapel attendance until nearly the end of the nineteenth century. As for electives, Harvard added a total of one: a course in modern language that could be substituted for some of the requirements in Greek. That happened only at the urging of faculty who had attended German universities, where they became adherents of the

idea of *Lernfreiheit*, the freedom to study anything they wanted—and a raucous student demonstration in support—in 1825. Most of those faculty and students, too, would be dead by the time Harvard acquiesced to make any electives available in the rest of the curriculum, which took another forty-seven years.<sup>19</sup>

### Classical Versus Practical Knowledge

Notwithstanding *Lernfreiheit* and Jefferson, and in spite of the relentless flood of new knowledge, classical studies, taught in the original ancient languages, continued to dominate American higher education as the nineteenth century began. Universities were downright obstinate about it. For example, though Harvard was pressed to build an observatory for a program in astronomy as early as 1815—by, among others, John Quincy Adams—the university took twenty-four years to do it, and then only when a Boston clockmaker agreed to donate the equipment and work as “astronomical observer to the university” for free.<sup>20</sup>

In his broadly influential “Report on a Course of Liberal Education,” Yale President Jeremiah Day explicitly railed against the introduction of experimental sciences and modern languages. A classical curriculum, he wrote, taught mental discipline: “Those branches of study should be prescribed, and those modes of instruction adopted, which are best calculated to teach the art of fixing the attention, directing the train of thought, analyzing a subject proposed for investigation; following, with accurate discrimination, the course of argument; balancing nicely the evidence presented to the judgment; awakening, elevating and controlling the imagination; arranging with skill the treasures which memory gathers; rousing and guiding the powers of genius.”<sup>21</sup>

New universities were sprouting up all over the new nation at the time, and most subscribed to Day’s philosophy, no matter how disconnected it seemed from everyday realities. “You had colleges in Tennessee adopting the Yale approach, teaching the classics in the original Greek and Latin,” Levine says. “It was in pretty much every college during that period.”<sup>22</sup>

Most of the many private colleges that started cropping up had religious affiliations and were driven by the Second Great Awakening of Christian evangelism. Where there were nine colleges before the Revolutionary War, another 182 were successfully founded between that war and the Civil War.<sup>23</sup> The widespread religious revival advocated reforms to prisons and the treatment of the mentally ill and led to the abolition movement, but where higher education was concerned, it embraced the status quo as Day promoted it, incorporating the Judeo-Christian tradition and the classics.<sup>24</sup> There things largely stood.

There were a few exceptions to Day’s ideas. The wealthiest man in America and a convicted forger who taught themselves botany and geology in prison—Stephen van Rensselaer III and Amos Eaton, respectively—weren’t particularly concerned about the opinions of the academic elite. They had met when Eaton delivered a series of lectures on the eminently practical topic of how the geology of New York State would affect the construction of the Erie Canal. In 1824, they opened the Rensselaer School, later renamed Rensselaer Polytechnic Academy, “for the purpose of instructing persons, who may choose to apply themselves in the application of science to the common purposes of life.”<sup>25</sup>

Van Rensselaer and Eaton’s new school was the first to apply field work to the study of botany and geology, and the first to use the laboratory method in a regular course in science, in this case, chemistry. It tapped into a rising swell of pent-up interest in higher education as a means to practical pursuits and attracted a flood of students, including many who had already graduated from Harvard, Yale, and Princeton.<sup>26</sup> But once again, those schools themselves did not respond to the demand for change.

Meanwhile, on what was then the frontier, the new midwestern states created universal education, different from the European model under which postsecondary study in the East had been largely reserved for the upper classes. Indiana, for example, in its 1816 constitution, promised education “ascending in regular gradations from township schools to a State University, wherein tuition shall be gratis and equally open to all.”<sup>27</sup> So did Michigan, Wisconsin, and Ohio. These public frontier universities, not

the elite privates, would finally lead the movement toward the simultaneous instruction of basic and practical knowledge—practical knowledge, of course, being far more in demand on the frontier than Greek and Latin.

But that would take another fifty years, despite frustration that was building along with the demand that colleges teach the useful arts of agriculture, on which American society was then still based, and of industry, toward which it was inexorably heading. The center of this groundswell continued to be the Midwest, where another botanist, John Baldwin Turner, led the fight for such industrial education against the staunch opposition of traditional colleges and advocates of their sectarian approach. In 1853, someone speculated to be a critic burned down his farm. But he gradually won support, including from Congressman Justin Smith Morrill of Vermont, who introduced a groundbreaking bill providing grants of land to each state proportionate to the number of its representatives in Congress—a formula that would benefit more densely populated eastern states like Morrill's—on which new public universities would be built.

President Abraham Lincoln signed the Morrill Act into law as the Civil War raged, on July 2, 1862.<sup>28</sup> It was to prove the single most dramatic turning point in the history of American higher education, and, like many other such milestones, it was imposed from without. One hundred and thirteen years after Benjamin Franklin had pushed for combining practical training with the traditional curriculum, the Morrill Act finally established new American universities, “without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”<sup>29</sup>

Sluggishly, existing colleges responded by beginning to add modern languages, the natural and social sciences, and professional studies including navigation and surveying, though the classical curriculum persisted.<sup>30</sup> Some were pushing to accelerate the pace of change, but not quickly enough for others.

### The Movement Away from Classical Education

By the mid-nineteenth century, the most powerful conceivable force finally began working to transform conventional American higher education institutions: their own self-interest. As the Industrial Revolution picked up steam, students were increasingly reluctant to attend schools they thought could teach them nothing useful. Between 1850 and 1870, the proportion of the population that enrolled in college actually declined.<sup>31</sup> Angry alumni demanded change. The stalemate between classical and professional education began to break when Harvard and Yale both finally established scientific schools, though in each case, these were operated separately from the rest of the colleges.

Reform proceeded, if only in spits and starts. Henry Philip Tappan, president of the University of Michigan, followed the design of German universities in trying to integrate research with teaching. Francis Wayland, president of Brown University, added graduate study and emphasized such practical disciplines as modern languages and engineering in a system that gave students freedom to elect their own curriculum. Tappan was fired and Wayland quit, in both cases because of opposition and financial problems.

Not always smoothly, more educational reformers gradually began to rise to positions of influence at established universities and colleges. They included Charles W. Eliot, the youngest man to ascend to the presidency of Harvard; James B. Angell, who succeeded Tappan as the president of Michigan; Andrew Dickson White, who would become cofounder of Cornell; and White's Yale classmate, Daniel Coit Gilman, the second president of the new University of California. Each of these men had personal reasons to support new ways of doing business. Eliot had left Harvard at a low point in the college's history, when disparaging alumni were demanding change. One, the historian Henry Adams, summed up this criticism. “For generation after generation, Adamses and Brookses and Boylstons and Gorhams had gone to Harvard College, and although none of them, as far as is known, had ever done any good there, or thought himself the better



for it, custom, social ties, convenience, and, above all, economy, kept each generation in the track," Adams wrote. In fact, he said, Harvard "taught little, and that little, ill."<sup>32</sup>

When he was denied a coveted professorship in chemistry at Harvard, Eliot took a position across the Charles River in Boston as a professor of analytical chemistry at the newly founded Massachusetts Institute of Technology (MIT), which would later move to Cambridge. Like Tappan's Michigan, MIT emulated German research universities, whose faculty had for more than half a century divided their time between research and teaching in seminars and laboratories, beginning in 1809 at the Friedrich Wilhelm University in Berlin, which conducted research in every field of instruction and broadly used the lecture, the elective, and the semester calendar.<sup>33</sup> Eliot had also witnessed this model up close on a two-year tour of Europe. Yet even he at first wasn't sold on the value of research. "I can't see that that will serve any useful purpose here," Eliot told a member of the Harvard faculty.<sup>34</sup>

White and Gilman also had traveled through Europe together, where White studied at the Friedrich Wilhelm University. After the Civil War, Gilman returned to Yale to serve as librarian and teach in the scientific school, but he left in a huff after being passed over for the presidency in spite of support from younger members of the faculty. He took the job of president of the new University of California. There, too, Gilman ran into problems, feuding with legislators who wanted the university to be primarily a school of agriculture, and his tenure in California was brief.

Angell chaired Brown University's department of modern languages under Wayland—who had, after all, elevated the status of his field—but left, as Wayland did, and went to Michigan when those reforms at Brown were unceremoniously reversed in the face of financial shortfalls and opposition from conservative faculty and members of the university corporation.

Confident of their cause and pressed by alumni angry that they hadn't learned much of value and prospective students who were convinced they wouldn't, these men advocated, to varying degrees, what became known as the "new education," which included undergraduate- and graduate-level

research and teaching and immersion in technology and science. Eliot wrote:

When institutions of learning cut themselves off from the sympathy and support of large numbers of men whose lives are intellectual, by refusing to recognize as liberal arts and disciplinary studies languages, literatures, and sciences which seem to these men as important as any which the institutions cultivate, they inflict a gratuitous injury both on themselves and on the country.

Their refusal to listen to parents and teachers who ask that the avenues of approach to them may be increased in number, the new roads rising to the same grade or level as the old, would be an indication that a gulf already yawned between them and large bodies of men who by force of character, intelligence, and practical training are very influential in the modern world.<sup>35</sup>

When Harvard restructured its board of overseers by allowing alumni to elect members, who had previously been appointed by the Massachusetts governor and legislature, Eliot's activist reputation finally worked in his favor. The reform-minded alumni made him president—at thirty-five, the youngest ever. He finally added more electives, so that, by the end of his presidency (which was also the longest in the school's history), there was only one *required* course: English composition, though knowledge of a foreign language also was compulsory.<sup>36</sup> He expanded graduate and professional schools, along with scientific and technological research, and moved teaching from lectures and memorization to seminars in which the students were expected to participate.

Change still came slowly. It took Eliot four decades to accomplish what he did at Harvard, with fierce opposition within and outside the university. James McCosh, the president of Princeton, which struck by the traditional curriculum, wailed:

Tell it not in Berlin and Oxford that the once most illustrious university in America no longer requires its graduates to know the most perfect language, the grandest literature, the most elevated thinking of all antiquity. Tell it not

in Paris, tell it not in Cambridge in England, tell it not in Dublin, that Cambridge in America does not make mathematics obligatory to its students. Let not Edinburgh and Scotland and the Puritans in England know that a student may pass through the one Puritan college in America without having taken a single class of philosophy or a lesson in religion.<sup>37</sup>

While the going was slow on his own campus, Eliot was able to hasten innovation in another tried and true way. When entrepreneur and philanthropist Johns Hopkins bequeathed the then-staggering sum of \$3.5 million to found a new university, Eliot, Angell, and White urged the trustees to hire Gilman as its president. Reforming higher education was after all easier on a blank piece of paper. Finally, Johns Hopkins University, started from scratch in 1876, could fully import the German university model, with research and teaching and undergraduate and graduate education in seminars and lectures to become America's first modern research university.

Eliot largely cemented his reforms at Harvard in 1890, when he made the faculty of arts and sciences responsible for undergraduate, nonprofessional education as opposed to the professional schools, in a system that was soon generally termed the comprehensive university.<sup>38</sup> Other colleges warily followed. At American colleges in 1890, 80 percent of the curriculum was required and 20 percent elective, on average. Ten years later, that ratio had nearly been reversed in more than a third of all schools.<sup>39</sup> Meanwhile, Clark University, the University of Chicago, Stanford University, and others followed Johns Hopkins in incorporating research into the curriculum. "There are institutions that are incredibly innovative," says Levine. "Gradually you see things beginning to move. We've gone from the classical college to the university to the megaversity."<sup>40</sup>

There, again, things largely stood. They still do.

### Settling In

It took American universities 250 years to make the seemingly small hop from a classroom methodology based on recitation to one incorporat-

ing research, with lectures, seminars, and laboratory classes on a semester system. While the twentieth century would see a significant expansion of American higher education—and some universities did not even entirely welcome that—the research university, modeled largely on the 1809 German system with a calendar of summers off that originated in an agricultural economy, remained the most common method of delivery.

Some of the reforms in America at the end of the nineteenth century began to be reversed. After Eliot finally stepped down in 1919, Harvard's faculty restored requirements including that all students choose a major in a single discipline and take two or three classes outside it; by then, 55 percent were graduating having elected nothing but introductory courses.<sup>41</sup>

Decrying the "disunity, discord, and disorder" into which he argued higher education had descended, University of Chicago President Robert Maynard Hutchins launched a *revival* of the classical tradition there in 1930.<sup>42</sup> The Chicago Plan was built around the Great Books, taught in a series of cross-disciplinary lectures and small-group discussions that "purported to include all subject matter indispensable to every educated person."<sup>43</sup> There were no course credits, but there were examinations that a student had to pass before advancing to the upper divisions of the university. Hutchins also did away with football, fraternities, and other extracurricular activities he judged to be distractions. In their effort to be everything to everyone, said Hutchins, universities had become "service stations."<sup>44</sup>

*Time* magazine put Hutchins on its cover and said his plan would transform education.<sup>45</sup> A handful of other schools tried it. But enrollment at Chicago declined, and as soon as Hutchins left in 1951, the university dropped most of his ideas and even restored fraternities and football. The controversy he stirred up eventually fueled a backlash against American universities' stubborn and consistent focus on western civilization-based instruction.

Just after World War I, Nobel Peace Prize laureates Columbia University President Nicholas Murray Butler and former Secretary of State Ellhu Root proposed the most widely adopted and enduring of the few twentieth-century innovations in higher education—study abroad. Their intention

was idealistic—to encourage greater international understanding—yet their vision also was a completely fresh pedagogical model that immersed American students in modern languages and foreign cultures in the ultimate extension of Eaton's geological field studies.<sup>46</sup>

Those students' "ability to speak and understand a foreign language is likely to improve, especially if their stay abroad lasts for a semester or more and they live with a foreign family or are otherwise forced to use the native language frequently," former Harvard President Derek Bok writes admiringly in *Our Underachieving Colleges: A Candid Look at How Much Students Learn and Why They Should be Learning More*. "In all probability, a stay of substantial length in active contact with foreign nationals will also yield many of the fruits of a well-taught course on another culture."<sup>47</sup>

Many universities were skeptical of study abroad until the government eased visa rules and steamship lines introduced cheap student third-class passage. "If study abroad had been more expensive, it wouldn't have spread," Levine says.<sup>48</sup> In fact, universities discovered they could charge their students full tuition while paying just a fraction of that amount to foreign host institutions. Faculty who at first feared that the more students went abroad, the fewer would remain to take their courses, climbed aboard when they discovered they could travel, too. It was another reform that succeeded because of self-interest.

Again, external intervention next rocked American higher education: the Servicemen's Readjustment Act of 1944, more commonly known as the G.I. Bill. Like study abroad, the measure wasn't immediately concerned with education. It was meant to avoid a postwar recession caused by too many returning soldiers entering the job market and a repetition of the Bonus March on Washington that disaffected World War I veterans had staged in 1932. But it had an extraordinary impact on American universities, filling them with 2.2 million former servicemen, many of whom brought a seriousness of purpose to which preceding generations of students paled in comparison.<sup>49</sup> The ex-GIs were often lower- and middle-class students who would now expect their own children to follow them to college.

As more government money started streaming into higher education, more government scrutiny followed. Presidential and foundation commissions began considering how universities did their job—and could do it better. They would quickly find, like so many before and after them, that it was easy to propose pedagogical reforms, but nearly impossible to get them implemented.

The first commission, appointed by President Harry Truman, was chaired by Vannevar Bush, a former MIT vice president and dean of engineering who, during the war, had been director of the Office of Scientific Research and Development. Its report, *Science: The Endless Frontier*, proposed a massive federal investment in basic scientific research at universities, because they offered "an atmosphere which is relatively free from the adverse pressure of convention, prejudice, or commercial necessity."<sup>50</sup> Among other things, this led to the chartering of the National Science Foundation (NSF) and gave university science departments a new and important boost in influence.

Truman also convened a Commission on Higher Education for American Democracy, whose findings would expose a deep division between prestigious private universities and colleges and the fast-growing publics. Chaired by American Council on Education President George Zook, an activist reformer, it was implicitly critical of traditional higher education, calling for dramatically expanding access to college for students who might not have previously considered it, and for providing them with educations "that will prepare them more effectively than in the past for responsible roles in modern society."<sup>51</sup> That included global, rather than just western, cultural study and more practical education.

Zook's commission complained that universities spent too much time on "verbal skills and intellectual interests" at the cost of "many other aptitudes, such as social sensitivity and versatility, artistic ability, motor skills and dexterity, and mechanical aptitude and ingenuity."<sup>52</sup> Dominated by the presidents of public universities that emphasized professional education, plus a few experimental colleges, the commission wanted to expand the

nation's higher education capacity to double the number of 18- to 21-year-olds enrolled, from the 16 percent then in line for bachelor's degrees to 32 percent by 1960.<sup>53</sup>

The other universities shot back in what became the most public airing of higher education's dirty laundry since Princeton's McCosh admonished Harvard's Eliot. Heads of the leading private universities got themselves appointed to a rival Commission on Financing Higher Education, sponsored by the Rockefeller Foundation and the Association of American Universities and chaired by Paul Buck, dean of arts and sciences at Harvard. Its report blamed any barriers to access not on the universities, but on students' motivation, secondary schooling, and family finances—a contention American universities still make—and argued against admitting many more. No more than 25 percent of the population would benefit from a college education, this elite commission insisted.<sup>54</sup> The Rockefeller report “affirmed the characteristics of higher education that the Zook commission attacked: its relative exclusivity, its emphasis on the development of individuals, and its focus on specialized knowledge,” one historian observes. It “resisted the notion that major change was needed.”<sup>55</sup>

Both sides, of course, were motivated by expediency. The Zook commission recommended that federal financial aid go only to public institutions, which would have benefited many of its own members and was “bound to frighten the establishment figures in the Rockefeller group, since it would shift the balance of academic power against” them.<sup>56</sup> Whichever side was right, the conversation moved away from what was best for students and become about what was best for universities, another historical hallmark of debate about reform.

Still, the debate marked important changes, all of them structural, and none pedagogical, despite the gap it exposed that still remained between adherents of traditional and practical educations. The first was the involvement of the federal government in considering higher education policy. Truman's pioneering commissions would be followed by many more, notwithstanding universities' ropa-dopa evasion of their eventual recommendations; now that they were awash in federal money, universities would

have to tolerate the meddling of federal policy makers. Access to higher education did, in fact, expand. And the government began to provide financial aid at the federal level for students of given income levels at all universities and colleges, guaranteeing them a steady supply of customers and money, something critics say, even further diminishes their incentive to reform.

More money poured into the universities after another external crisis: the launch of Sputnik. “Much remains to be done to bring American education to levels consistent with the needs of our society,” President Dwight D. Eisenhower said ominously at the signing ceremony of the National Defense Education Act in 1958.<sup>57</sup> The most significant effect of this on classroom learning was to expand foreign language instruction and accelerate the combination of research with teaching, something the universities did not resist, given the huge windfall they reaped in government research grants. More graduate fellowships were also funded, fueling graduate research and study.

Most of the Sputnik-era reforms in educational methodology, however, came at the primary and secondary levels. Still, combined with ever-growing enrollment, the national response to Sputnik had a broader impact on how universities delivered higher education. More faculty and more facilities meant schools could expand their course offerings and give students greater choices of majors and electives. While innovations also made their way into the classroom here and there, few of them stuck. “Ever since the demise of the classical curriculum,” writes Bok, “faculties have clung to several different visions of education with no one model proving itself superior in a clearly demonstrable way.”<sup>58</sup>

There were a few attempts. As universities grew bigger and opportunities more numerous, they made attempts to offer smaller classes, which assessments show improve success. Large universities launched honors programs, undergraduate internships, freshman seminars, and group tutorials. An “experimental college” movement dated back as far as 1927 when a Scotsman named Alexander Melkelyohn established a two-year school at the University of Wisconsin. Students and faculty lived and governed together in what

Meiklejohn, who had served as a dean at Brown and president of Amherst, called "an adventure in education." The school rejected both recitation and research. "Liberal education is not training in technical skill; nor is it instruction in knowledge," Meiklejohn wrote in a book about the project. Instead, he wrote, "The positive term which this book uses in the attempt to fix the aim of education is 'intelligence.'"<sup>59</sup>

Older forms of higher education, Meiklejohn wrote, "have lost, if not their vigor, at least their fitness for the new conditions in which men and their institutions have become so suddenly and rapidly involved . . . Never before in the history of the world was higher education so eagerly desired, so widely offered and taken, so lavishly endowed. And yet—or rather we should say, 'And hence'—it is at present largely futile, frustrated, dissatisfied."<sup>60</sup>

The principal and perfectly reasonable functional lesson of Meiklejohn's experiment was that educational planning and teaching should be entrusted not to large faculties, but to small groups of instructors working in close collaboration to coordinate their teaching. "It must be possible, it must be arranged, that all the members of the teaching force shall have genuine and intimate intellectual acquaintance with one another," he wrote.<sup>61</sup> The school also conducted classes one on one and gave students extraordinary freedom; some lived in trains like hobos for a while to see what it was like in a kind of early independent-study project. But the timing again was poor. Judged too radical, Meiklejohn's school lost public support and shut down in 1932.

In the 1960s, in the face of earth-shaking external factors including the civil rights and antiwar movements, the experimental college movement revived at Tufts University, the University of California at Davis, the University of Washington, Oberlin College, and other campuses. These programs confronted large social questions, of which there was no shortage at the time. Most did not give grades. They were part of a student-driven movement toward relevance in the classroom—something to connect the campus to the world—just as students in the nineteenth century had pressed for practical instruction. If there was a pattern to American higher

education, that was it. It would come up again at the beginning of the twenty-first century and lead to new universities like Harrisburg.

### Current Innovations

Some reforms have stuck—again, because of outside forces or self-interest, or in the form of altogether new universities built from scratch—and schools that practice them prove the remarkable consistency of the mainstream by remaining even a little bit outside of it. At Tufts, where the so-called Ex College (Experimental College) began in 1966 and continues today, students are voting members of the governing board, evaluate course proposals, and teach courses they design themselves. Classes are small and center around discussion, case studies, role playing, and simulations in such topics as adolescent fiction, the Vietnam War in film, legal and social aspects of domestic violence, and the politics of conservatism. By serving as a test ground for new courses, experimental colleges like Tufts's led to the addition of women's, African American, and peace-and-justice studies to the formal university curriculum.<sup>62</sup>

Another, newer innovation has been the extended freshman orientation, which helps acclimate arriving students to the university environment in small, seminar-style classes that afford them personal attention, and with tutoring and other support services that teach them study and research skills, at a time when they are otherwise thrown into huge, impersonal introductory lecture courses. Self-interest is the motivating factor here, too. Pressed by families and lawmakers to improve retention rates, universities have made this reform not only out of altruism, but because it costs less to keep a student than to have to go out and recruit another one. About 60 percent of American universities now offer some sort of extended orientation and support, showing the close connection between the spread of innovation and its impact on the bottom line.

Some colleges have taken the idea of smaller classes to its extreme—in the process returning to the earliest American models of higher education—by advocating variations of the Oxbridge tutorial system. Sewanee: The

University of the South in Sewanee, Tennessee, for instance, has created in itself not only an academic copy of Oxford, but a physical vestige of it. Ethereal spires rise from the dense woods of the Cumberland Plateau. The gothic-style buildings are arranged in quadrangles. The chapel includes a replica of Magdalen College's Great Tower. Faculty wear academic gowns. Even the governing structure is similar to Oxford's. The chancellor plays a symbolic function, while the vice chancellor is the institution's functional head. Sewanee emphasizes British literature and history, and sends more Rhodes Scholars to the real Oxford, per capita, than almost any other American liberal arts university.

"If you have a choice of being given a humanistic education or one that is based on a factory model, the humanistic education is very attractive," says John Mark Reynolds, director of the Torrey Honors Institute at Biola University in southern California, which also has a tutorial system.<sup>63</sup> Employers like the results, too, says Michael McLean, president of Thomas Aquinas College in California. "One of the virtues of this pedagogy is that students are practicing on a daily basis the arts of analysis, inquiry, careful reading, listening to one another, and engaging one another in serious conversations about serious issues," McLean says, sounding much like Jeremiah Day and Robert Maynard Hutchins.<sup>64</sup>

St. John's College in Annapolis and Santa Fe also uses a variation on the Oxbridge tutorial and is one of a few institutions to continue Hutchins's Great Books curriculum. Tutors work with students in small groups and one on one. Even the booths in the St. John's campus snack bar are equipped with chalk and blackboards for this purpose.

"The heart of the idea is that if you follow a student's passion and work with them very closely to find a fruitful way of combining their interests, you will create someone who is intellectually independent and will go off and solve the problems of the world," says Jerrilyn D. Dodds, dean of Sarah Lawrence College, which also offers only small seminar-style classes, student-faculty tutorials, and what it calls an "open curriculum" that frees students to design their own courses of study. "But if you create structures for education that are too guided, that are too deterministic—in order to

become a lawyer, you will take this sequence of courses, and that does not include the arts—you will create people who think in proscribed ways and will not be ready with creative solutions when unexpected things happen."<sup>65</sup> Sarah Lawrence students don't have to declare a major or fulfill specific course requirements, though they do have to take courses in at least three of the four academic disciplines offered. The system has produced alumni the likes of Rahm Emanuel, Vera Wang, J. J. Abrams, and Alice Walker.

"The basic principle of the open curriculum is that faculty teach the courses that they want to teach, they teach in very small seminars to students, and the students are energized by the passion of the faculty," says Dodds. Before she came to Sarah Lawrence, Dodds was senior faculty adviser to the provost of the City College of New York for undergraduate education and spearheaded a freshman seminar program there modeled on the one at Sarah Lawrence. She quickly learned why, despite its evident effectiveness, the one-on-one and small-class-size style of education has remained confined to just a few isolated campuses: "It's expensive as hell."<sup>66</sup>

#### Barriers to Innovation

Cost, of course, is one significant and escalating reason that reform occurs slowly at American universities. ("Oh, have you noticed that?" quips Dodds.<sup>67</sup>) But there are many, many others, built into their structures in the last four hundred years, that favor intransigence—even stagnation—over innovation.

A key problem is the form of governance that the University of Pennsylvania pioneered, giving substantial authority to faculty, who worry about perceived threats—as anyone in their case would—to themselves or to their disciplines. "Humans are notoriously bad about change, especially when pay and reward systems all favor the status quo," says Eric Darr, who taught at UCLA and now is provost at Harrisburg University.<sup>68</sup>

As a result, writes Christopher J. Lucas, professor of higher education and policy studies at the University of Arkansas, "Much of the history of college curricula in America over the past century and a half revolves around



the struggle to legitimate new fields of scholarly inquiry and academic instruction, a struggle marked by broad opposition to the incorporation of new professional specialties at the expense of older ones, and by a recurrent desire to preserve certain subjects or content bodies as timeless and immutable.<sup>69</sup> Lucas tracks the process by which innovation often dies with a precision that evokes Elisabeth Kibbler-Ross: "Collegiate courses of instruction have always exhibited a certain inertia, evolving at first through a process of accommodation at the periphery and only later the core, and then almost always only as a result of strong pressure imposed from without."<sup>70</sup>

Departments also often stand in the way of teaching students whose interests cross disciplinary lines, the much ballyhooed interdisciplinary trend notwithstanding. That's why Harrisburg has done away with them. "The notion of not having departments may sound like a small thing," Darr says, "but it's actually a big deal in terms of getting different people with different talents to pull together for a common goal."<sup>71</sup>

Nor, in the complex and stressful progression to doctoral degrees and tenure, are scholars necessarily taught how to teach. Some universities now address this by offering support. The Eberly Center for Teaching Excellence at Carnegie Mellon University, for instance, distills research on how students learn and serves it up to faculty, along with advice about incorporating new technology and methods.

Accrediting boards and state departments of education can stifle innovation too, says Darr. They pronounce which standards must be met and proscribe such things as the permissible ratio of full-time to part-time faculty—a problem to a university like Harrisburg, which has full-time professionals from the fields students study serve as "corporate faculty." It gets around this by using a complicated formula that calculates the percentage of time students learn from part-time versus full-time faculty.

But there are deeper issues that prevent reform, says Arthur Levine, author of, among many other books on this topic, *Why Innovation Fails*. Universities, he says, have two missions: conservation and the advancement of knowledge. "And they have focused more on preservation than on advancement,"<sup>72</sup> just as the university representatives to the Rockefeller commis-

sion blamed motivation, family income, and poor secondary schooling for limiting student aspirations—not themselves—higher education still deflects responsibility and disapproval. It is "Teflon coated" and "remarkably immune to criticism," write Richard Hersh and John Morrow in *Declining Degrees: Higher Education at Risk*. Even now, they write, universities and colleges prefer to think that when students don't learn, "it is because high schools have not prepared them properly."<sup>73</sup>

In a time of limited resources, as Dodds notes, universities also often say that they cannot afford reform. But some changes have been proven to reduce costs while improving outcomes. The University System of Maryland, for instance, ran a pilot program to revamp introductory lecture courses, which serve disproportionate numbers of undergraduates. The twenty-five largest courses at American universities, on average, enroll 35 percent of the students, but 40 percent of students at teaching universities and 15 percent at research universities fail them and have to take them again. The Maryland program, in collaboration with the National Center for Academic Transformation, reduced the failure rates in one redesigned, particularly tough, introductory math course from 67 percent to 50 percent and in another from 40 percent to nearly 30 percent, while cutting costs as much as 71 percent per student. It converted the course from exclusively lecture formats to a mix of lectures, online study aids and tests, team projects, and small classes led by undergraduate mentors.

Technology is part of the reform equation, but for all its promise, universities have largely used it only as a new way of delivering the same information in the same context, Zemsky says. "For the most part, faculty who made e-learning a part of their teaching did so by having the electronics simplify tasks, not by fundamentally changing how they taught the subject," he writes. "Lecture notes were readily translated into PowerPoint presentations. Course management tools like Blackboard and WebCT were used to distribute course materials, grades, and assignments, but the course materials, for the most part, were simply scanned bulk packs, and the assignments neither looked nor felt different."<sup>74</sup> Instead, writes Zemsky, most faculty today "teach largely as they were taught: that is, they stand in

the front of a classroom providing lectures intended to supply the basic knowledge students need.”<sup>75</sup>

### CREATING AN INNOVATIVE UNIVERSITY—FROM SCRATCH

When central Pennsylvania business leaders first raised the idea that the region should have its own four-year university, Harrisburg was the largest state capital without one, only 23 percent of residents had bachelor’s degrees, and the few high-tech industries that were finally beginning to replace the vanished manufacturing sector couldn’t find qualified employees. They asked the presidents of the fourteen existing public universities in Pennsylvania what they thought of the idea of opening an urban campus to specialize in science, technology, engineering, and math with an innovative new curriculum. The presidents were unanimous: fourteen to none, against.

But the business group persisted, egged on by an entrepreneurial mayor and a vision born of the frustration with conventional universities they shared with Thomas Jefferson and Stephen van Rensselaer. “From the beginning we decided we didn’t want this to be a traditional institution, because we in business who had been involved with other higher-education institutions felt that everything took too long,” says David Schankweiler, publisher of a chain of local business journals, who chaired the effort. Still, the group invited existing universities to sit on the committee to develop the new school. “What a huge mistake that was,” Schankweiler says. “I spent a lot of my time just handling their complaints, and it seemed like every corner we turned, they felt we were stepping on somebody’s toes.”<sup>76</sup>

The well-connected and determined group of backers got the state to give them \$59 million in start-up capital for their university, and there was another \$1.8 million from the federal government and \$1.3 million from private and corporate donors. Just four years from the time it was publicly announced, Harrisburg University enrolled its first students—less time than some existing universities take to develop a new course.

Technology is woven into the curriculum at Harrisburg. The roomy classrooms (not having altogether abandoned the pedantic language of the acad-

emy, Harrisburg calls them “learning environments”) connect to gleaming labs and conference rooms for team projects, and have iPad-sized remote controls from which instructors can project the lessons on computer screens and highlight them the way football commentators diagram plays on TV. Two cameras record each lecture and bank them for students to watch again if they need to. The average class size is twelve. The library (called the “learning commons”) has only thirty-three hundred physical books, but thirty thousand e-books and journal databases. Everyone in it is typing on a laptop.

Harrisburg’s fourteen charter faculty have no tenure, and many left tenured or tenure-track positions at other universities, including Fordham University, the University of Pennsylvania, Carnegie Mellon, and the University of Wisconsin. “My friends at William & Mary told me I was nuts not to offer tenure to our faculty,” says Schiavelli. “No one would come here. It was unilateral disarmament.” Schankweiler says, “When we advertised for our first faculty position we held our breath and wondered if anyone would come.”<sup>77</sup> There were 150 applicants.

Microbiologist and immunologist Rene Massengale left Baylor University to come to work at Harrisburg because, she says, “it utilizes the talents of various faculty and focuses on interdisciplinary work. That is not typically what universities with tenure-track faculty do.” In conventional universities, Massengale says, “one of the things I ran up against a lot was there was this idea that focusing on students wasn’t necessarily tenure worthy, as opposed to getting published in the right journals.”<sup>78</sup> On the whiteboard in her office are the formulas she’s used to tutor students in everything from chemistry to algebra, evidence of the hugely different nature of a university that doesn’t have departments. Massengale wrote a proposal four years ago at Baylor to create a degree in environmental health. It will take another three years to get up and running there, she says. At Harrisburg, says Christina Dryden, another member of the faculty, “We’re still small enough and nimble enough to say, ‘Well, that didn’t work.’ And instead of going to the curriculum committee and waiting two years, we can just change it.”<sup>79</sup>

Harrisburg invited corporations to the table, “not to ask them what they thought and then have the full-time faculty go off and do what they



wanted anyway, but to give them a vote on what the curriculum should be," Schiavelli says.<sup>80</sup> These corporations, after all, would be where students would eventually take their knowledge. Harrisburg offers a foundation in general education courses such as critical thinking and problem solving, effective communication, understanding global and societal issues, and quantitative reasoning, then undergraduate majors in biotechnology and bioscience, computer and information systems, geography and geospatial imaging, and integrative science.

Each major includes internships and classes with adjunct or "corporate" faculty. Each course incorporates such things as ethics and teamwork and collaboration. "If you think of it in the traditional way, you go out and take an ethics course," Darr says. "Or you do it our way, which is that you have some component of ethical thinking in all of your learning objectives."<sup>81</sup> These learning objectives are listed on the syllabus of every course. Most courses' topics are planned by connecting them to real-world social problems, providing the relevance American students have so long demanded. "I like to think of what we're doing," Schiavelli says, "as the new liberal arts."<sup>82</sup>

Now Harrisburg just has to bring this model to the rest of higher education.

### *Incubating Innovation*

There are no technicians in white lab coats making notes on clipboards or students hooked up to monitors with wires at the National Center for Science and Civic Engagement. In fact, so far, its future home is just a huge unfinished room on the still-empty fourteenth floor of Harrisburg University. The center is an incubator for further reform, funded in part with a \$2 million grant from NSF, which has been set up to help Harrisburg and other universities update undergraduate education, especially in the sciences, technology, engineering, and math, using an approach called SENCER (Science Education for New Civic Engagements and Responsibilities).

The idea is to make all-important science, technology, engineering, and math education in this century socially relevant in the same way that stu-

dents in the last two centuries demanded other fields be relevant. It connects course content to civic questions about such things as public health, sustainability, and social justice—learning complex biochemistry and physiology, for example, by tracking asthma rates among minorities. And NSF assessments show that this approach improves science literacy, especially for women, nonmajors, and low-performing students.

"Too often science is taught as if it weren't about anything but itself," says Wm. David Burns, the executive director. "It's abstract, dry, and tough. This gives students a reason to study. You want a certain kind of nimbleness on the part of the instructor."<sup>83</sup> Most university instructors, he says, "have also got lots of obligations to not be nimble. They've got disciplinary obligations or the hegemony of a textbook. Generally speaking what we've tried to do is liberate the professionalism of the professoriate. And you have to start with an interest in the student." Burns stops for a moment and considers how something so seemingly obvious needs to be restored to universities. "It's painful, isn't it? It's awful. This is what's been lost." Burns has spent as much time figuring out ways of motivating faculty as he has designing a curriculum that works for students, he says.<sup>84</sup>

The faculty involved with SENCER—there have been three hundred so far, from seventy-five institutions, attending summer institutes, exchanging ideas, being mentored, and getting e-mail updates—"are all these St. John the Baptist types who thought they were out in the wilderness alone." Innovation happens, Burns says, when "you begin to create opportunities for people like this to associate with one another." Burns also writes letters to presidents praising faculty who are involved. "We take a lot of pains to make things have C.V. value," he says. He sees this as

using a barrier to change as a means of encouraging it. It works against people when they want to change a department. It's a form of criticism. We try to at least make this not a risk for a person.

There seems to be something of Eros in all this. There is something about working on things that are real and relevant and meaningful, and that get good responses from students who were otherwise pretty indifferent, that

seems to reconnect people to what motivated them to be interested in doing what they do in the first place. And the driving or sustaining force seems thus a bit more intrinsic or personal.

To call it love seems precious, but that's what it looks like to me . . . No doubt, however, there are other factors: the chance to be part of a community, to receive some recognition and support for innovation, to borrow some legitimacy from the NSF—all of these things no doubt play a part. But I think the fundamental thing is some kind of reconnection with desire—a reconnection that is welcome given the lusterless conditions of the modern professoriate.<sup>85</sup>