

"campuswide discussion about this issue."

- College officials will engage House masters and resident deans to convene conversations on academic integrity—apparently after the Ad Board acts.

- Harris met with directors of undergraduate studies to promote clear language in each course syllabus and in course assignments regarding collaboration and other issues of academic integrity. University-wide responses remain unspecified at press time.

Faust, Smith, and Harris put these steps in context at the first FAS meeting of the year, on October 2. Faust outlined general principles of academic conduct, and urged caution in commenting while the Ad Board deliberates. Smith reviewed the board's pedagogical role, and outlined a broader

agenda for FAS to consider teaching practices and communications about expectations and academic values; he then turned the floor over to Harris, who is the point person on the whole cluster of issues, for a more detailed outline of research and potential FAS actions during the year. For a full report on their remarks, see <http://harvardmag.com/cheating-12>.

In his August letter to students, Harris said that, beyond familiarizing themselves with Harvard's pertinent rules (and the respective measures Smith has asked faculty members to take in clarifying their own course practices), "More is necessary.... We must all work together to build a community that fully embraces the ethos of integrity that is the foundation of all learning and discovery."

The Endowment Eases

Harvard's endowment was valued at \$30.7 billion last June 30, the end of fiscal year 2012—a decline of \$1.3 billion (4.1 percent) from the prior year. That result, released September 26 in Harvard Management Company's (HMC) annual report, reflects an investment return of -0.05 percent on endowment and related assets, following the robust return of 21.4 percent in fiscal 2011. The decline in the endowment's value reflects the investment return (essentially nil); *minus* distribution of endowment funds to support University operations and for other purposes (perhaps \$1.5 billion; the exact sum will be reported in late October); *plus* gifts received. Endowment distributions account for about one-third of Harvard's annual revenues.

Domestic equities yielded a return of 9.65 percent, but international stocks declined sharply, producing an overall return of -6.66 percent for public equities—about one-third of the invested assets. Private equities and absolute-return assets (principally hedge funds)—together, about 30 percent of assets—yielded slightly positive returns. Fixed-income holdings (about 10 percent of the total) yielded 7.95 percent. Real assets were mixed, with strong gains in real estate, positive returns in natural resources (timber- and farmland), and significant losses in the commodities portfolio.

Peer institutions' results demonstrated the important interplay of endowment investment returns, spending, and gifts from capital campaigns. At Yale, a 4.7 percent investment return for fiscal 2012 nearly offset distributions of about \$1 billion, so the endowment declined only marginally during the year, from \$19.4 billion to \$19.3 billion. Stanford's investments earned only 1 percent, but the endowment rose 3.2 percent in value, to \$17 billion, as a surge of campaign gifts apparently more than offset nearly \$900 million in spending.

HMC president and CEO Jane L. Mendillo cautioned that "at a time of unusual turbulence with significant macroeconomic issues facing regions around the world... future returns may be uncertain," but expressed confidence in a strategy of focusing on highly diversified investments and "long-term value creation."

For a detailed report on Harvard's endowment performance, see <http://harvardmag.com/endowment-12>.

Classroom in the Cloud

EVEN AS David J. Malan enjoyed the news that Computer Science 50, "Introduction to Computer Science," was the second-largest College course this fall, with 691 undergraduates, he was contemplating a "classroom" much vaster than Sanders Theatre. By mid September, well before the October 15 launch of CS50x, the all-online version (cs50.net/x), some 53,000 students had enrolled worldwide. The nonprofit Harvard-MIT learning venture edX, created last May (see "Harvard, Extended," July-August, page 46), has begun by offering seven free, open-access, noncredit "massive open online courses"—MOOCs as they are known—in its first fall.

It is not a traditional semester. Much as edX courses relocate the learning location to wherever student and computer may be, set class hours dissolve as well. Two advanced computer courses offered by Berkeley (a third edX partner, announced in late July) run from late September to late October and mid November, respectively. And those tens of thousands of students learning with senior lecturer on computer science Malan have until next April 15 to complete their work.

More than most of his peers, Malan is already skilled in extending his teaching virtually—with online lecture videos, sections, PDFs of handouts, discussion sets and quizzes, and a Google discussion group. Comp Sci 50 existed in an online version before edX, for whoever wished to follow along (see cs50.tv) and for far-flung Extension School audiences, so the transition to the edX platform did not require a wholly new approach to pedagogy. That

Harvard Management Company 2012 Investment Performance

Asset Class	HMC Return	Benchmark Return	Difference
Public equities	(6.66)%	(9.05)%	2.39%
Private equity	1.99	4.04	(2.05)
Absolute return*	0.81	(1.15)	1.96
Real assets**	3.23	1.55	1.68
Fixed income	7.95	7.85	0.10
Total endowment	(0.05)	(1.03)	0.98

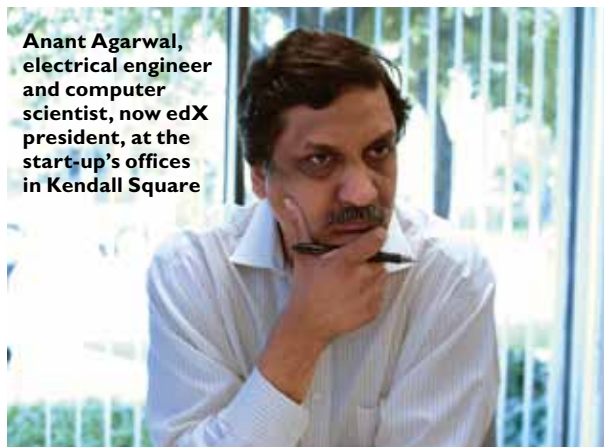
*Includes high-yield bonds

**Includes real estate, commodities, and natural resources

seems true for the other initial offerings, too—all are quantitative or scientific in nature, including the MIT circuitry course that served as the prototype last year.

But edX's aspirations span the breadth of learning, and it aims to take technologically distributed education well beyond where Malan and other computer-literate teachers have already arrived. Its offices, in fact, are not on MIT's campus (the president, Anant Agarwal, is professor of electrical engineering and computer science there), but in a Kendall Square office building, surrounded by technology enterprises and budding new ventures. Although a nonprofit, edX is much more start-up than academic department or faculty meeting. From its inception, the staff had grown to about 35 by mid September—"zero to 60 in six months," Agarwal said—including an engineering team for the technological platform; a content team to edit course videos (with content-expert fellows to assist faculty members); a chief scientist; a director of university partnerships (more are in the offing, he suggested); and with recruiting under way for marketing and communications personnel. Computers are set up at simple tables and chairs in open spaces that can be rapidly reconfigured, khakis and open shirts are in fashion, and a rainbow of Post-its counts down days-to-live for each course.

All this reflects fundamental differences between online and classroom education. The three-dozen edX staff, and participating faculty members, could potentially reach hundreds of thousands of students this fall. Course delivery is relatively cheap (*The New York Times* reported that edX uses Amazon's cloud computing services to deliver content to enrollees), and marketing to students is essentially free, via social media.



Anant Agarwal, electrical engineer and computer scientist, now edX president, at the start-up's offices in Kendall Square

COURTESY OF EDX



David J. Malan in Sanders Theatre, teaching the wildly popular Computer Science 50

Having taught the prototype MITx course, Agarwal has already learned that online teaching is "quite a bit different" from the classroom and adapting a course "is a lot of work." He outlined dividing lectures into "sequences" of five- to 10-minute videos, interleaved with exercises so students can demonstrate their understanding. (In a talk preceding the installation of MIT's new president on September 21, Agarwal spoke about "gamifying learning" by providing instant feedback and offering "karma points" for helping others in the course.) Tutorials become sidebar videos by teaching fellows. His course had a "virtual lab," with students manipulating electrical components on an online "bench" and testing the result with virtual tools. Computer-generated homework was machine-graded. ("Essays and free-form answers are not a solved problem" yet, he said—posing challenges for humanities courses, and prompting searches for peer-grading and other solutions.)

Students resonated to "tablet handwriting" in the videos, Agarwal said—a more personal feel than viewing typeset text. For CS50x, Malan has prepared tutorials (a teaching fellow talking about binary numbers, for instance) in which the instructor writes on a tablet; the strokes, captured wirelessly, appear

as scrolling script directly in front of the viewer. Agarwal also found that deadlines "mattered a lot": like their peers in classrooms, students did assignments just before they were due. Discussions and peer interactions "scaled nicely" online; as students asked questions and others weighed in, they could electronically "upvote" problems to be addressed. (The extent to which students helped each other learn was "absolutely astounding," he said.) In the evolving edX platform, such tools now can be deployed beside each unit of the curriculum and can link to an overall course discussion forum; Malan is using this technology in CS50x, and, in a similar way, matching College students with Comp Sci 50 teaching fellows who can help them with specific queries.

These online developments, Agarwal said, all support a learning experience with the "same as on-campus" rigor. In fact, of the 155,000 students enrolled in the first iteration of his circuits course online, less than 5 percent completed all the work. Many lacked the necessary background.

edX aims to maintain that level of rigor. It is rolling out courses relatively deliberately; the for-profit Coursera, in contrast, has repeatedly announced new partnerships, now with 33 institutions, and has posted some 200 courses. Stanford, a Coursera participant, is also deploying two other online platforms, a multipath approach overseen by a new vice-provostial office for online learning.

Agarwal said edX's focus is on "high-

quality learning” on two levels: “dramatically increasing access to learning to students worldwide, while reinventing campus learning” simultaneously—a blended model for improvements in virtual *and* real classes. The Harvard personnel overseeing that hybrid mission as edX

board members are a mix of scholars and administrators: deans Michael D. Smith (Faculty of Arts and Sciences) and Kathleen McCartney (Graduate School of Education), provost Alan Garber, and executive vice president Katie Lapp.

As Malan put it, Harvardx courses

will “debut when ready”; there is no rush to “port existing courses on to the Web,” a different goal from improving teaching and learning across the board. Cross-fertilization is already evident in the two versions of Malan’s introductory course. CS50x, he said, will “enable as many people as possible online to feel a part of this shared experience”—it even encourages virtual students to meet to share their programming projects, much as Comp Sci 50 students do in the popular programming-and-pizza “hackathon” events and term-end fair on campus. Yet significant differences will remain. Online students’ programs can be machine-evaluated for correctness (whether their code is “buggy”) and style (what Malan called “aesthetics”), but not subjectively for their design (a qualitative evaluation requiring human judgment). And staffing is at a different level entirely: the campus teaching cohort for Comp Sci 50 this semester numbers 108, including teaching fellows and course assistants—larger, Malan noted, than many *class* enrollments. The real and virtual courses, he said, will be “similar but not identical experiences.”

As for Agarwal, his new post was sufficiently “exciting” to lure him away from running MIT’s largest laboratory. He has been involved in five previous start-ups, but edX, he said, is “the first one that can really change the world.”

A Victory—and a Campaign

DEAN MICHAEL D. SMITH’S annual report for fiscal year 2012—previewed with Faculty of Arts and Sciences (FAS) colleagues at their October 2 meeting and published two days later—declares victory and outlines a future campaign.

The retrospective victory note concerns the faculty’s finances: after projecting large deficits in the wake of the 2008 financial crisis and sharp decline in the value of the endowment, FAS, as planned, achieved a balanced budget in its “unrestricted Core operations”: the faculty, the Graduate School of Arts and Sciences (GSAS), and the College. But *unplanned* activities—prominently, launching edX (see page 44) and beginning construction for the House

Revitalizing Tozzer

The Tozzer Library building on Divinity Avenue adjacent to the Peabody Museum will undergo a major reconstruction during the next year and a half as part of a \$20-million Faculty of Arts and Sciences project to consolidate the anthropology department. Most social anthropologists are now housed at the far end of the street in William James Hall (the towering home of the psychology and sociology departments as well). The renovation will unite the archaeologists in the Peabody with the anthropologists, who will relocate to an enlarged and revitalized Tozzer in the spring of 2014. The idea, championed by both former dean of the social sciences Stephen Kosslyn and current dean Peter Marsden, is to strengthen the sub-disciplines within the department by bringing them together.

In accord with larger discussions about the changing role of academic libraries, the project reconceives the library as a series of collaborative spaces, rather than primarily as book storage. In preparation, 155,000 books were moved from Tozzer, one of the world’s largest anthropology research libraries. Some 28,000 volumes were relocated to the first floor of Wil-

liam James Hall, which will be Tozzer’s temporary home during the construction, expected to begin with site preparation in December and January. Most of the remaining books were moved to the Harvard Depository, where they are readily accessible for recall through the online HOLLIS catalog. Once the new library space is complete, about 54,000 volumes will be held on two floors. Librarians anticipate that having the anthropology faculty housed on the three floors above will revitalize the library.

FAS project manager John Hollister says the existing building will be stripped back to its structural steel and rebuilt to a LEED gold standard, with sustainable heating and cooling systems; 10,000 square feet will be added to the existing 24,800. (The building was originally designed to accommodate an additional story.) The design by Kennedy and Violich Architects includes a façade of brick and copper designed to echo the neighboring Peabody Museum; adds an entrance onto the rear courtyard; and incorporates an atrium that extends to the fourth story, with shared pedagogical and social gathering space on the second floor.



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