

Online Learning and the Future of Residential Education



A summit hosted by
MIT and **Harvard University**
Cambridge, Massachusetts
March 3 and 4, 2013



Summary Report

DRAFT

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In March 2013, Harvard and MIT, with the support of the University of California Berkeley, hosted a summit on innovations in online learning and their implications for the future of residential education. The summit was a response to the urgent need to come together as a community and to discuss the unique challenges and opportunities that face residential campuses in light of the recent developments in online learning technologies.

The discussions that emerged from the summit are published in this summit report. This report includes summaries of keynote speeches delivered at the conference, as well as speaker profiles. Additional transcripts of keynote lectures and panel discussions, presentations, web and video resources, and articles by panel participants can be found on the Summit website at onlinelearningsummit.org. These resources generated from the summit are part of a larger effort by Harvard and MIT to advance practices and ideas that will improve the student learning experience on residential campuses for years to come.

With special thanks to:

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Introduction: Setting the Agenda

This summit on online learning and the future of residential education occurred at a time of urgency and opportunity. While distant learning and online learning technologies have existed for years, the proliferation of online learning models at the postsecondary level has occurred with unpredicted speed over the last eighteen months. The opening program of the summit offered the presidents of MIT and Harvard, as well as the Director of the National Economic Council Gene Sperling, the opportunity to provide framing remarks for the discussion. The “fireside chat” format, moderated by Tufts President Emeritus Larry Bacow, allowed for candid conversation among the speakers, and instigated many interesting conversations that continued through dinner afterwards.

Speakers

Lawrence S. Bacow (moderator) served as the twelfth President of Tufts University from September 2001 through July 2011. During his ten years as President, he advanced the university’s role as a leader in teaching, research, and public service. Within Tufts, he championed academic excellence and placed a premium on open communication and close engagement with students, faculty, staff, and alumni. Nationally, he became well known as an advocate of broader access to higher education and the importance of need-based financial aid.

Drew Faust is the president of Harvard University. As president of Harvard, Faust has expanded financial aid to improve access to Harvard College for students of all economic backgrounds and advocated for increased federal funding for scientific research. She has broadened the University's international reach, raised the profile of the arts on campus, embraced sustainability, launched edX, the online learning partnership with MIT, and promoted collaboration across academic disciplines and administrative units as she guided the University through a period of significant financial challenges.

Gene B. Sperling is Director of the National Economic Council and Assistant to the President for Economic Policy. Upon his appointment on January 7, 2011, Mr. Sperling became the first person to serve as NEC Director and principal economic policy advisor for two presidents: first under President Clinton from 1997 to 2001, and now under President Obama. In the Obama Administration, Sperling has played a key role representing the White House in budget negotiations with Congress as well as in designing several of the President’s economic initiatives including the American Jobs Act, the extension of Transition Adjustment Assistance, the universal dislocated workers program, and the small business tax credit.

L. Rafael Reif has served as the 17th President of the Massachusetts Institute of Technology (MIT) since July 2012. Before taking on the presidency, Dr. Reif served for seven years as MIT’s Provost. In this role, he helped create and implement the strategy that allowed MIT to weather the global financial crisis; drove the growth of MIT’s global strategy; promoted a major faculty-led effort to address challenges around race and diversity; fostered the emergence of the Kendall Square innovation cluster; helped launch

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the Institute for Medical Engineering and Science; and spearheaded the development of the Institute's latest experiments in online learning, MITx and edX.

Harvard President Drew Faust began by emphasizing that the summit offered participants a chance to not only react to how online learning is changing higher education, but to shape the changing landscape, as creatively and beneficially as possible. In a time of great upheaval and change, Faust also encouraged those in the audience to look back at higher education's most fundamental and enduring purposes, and consider how to preserve them, sustain them, and renew them. Faust noted that there is still much to be valued in coming together in person to bounce ideas off of one another face-to-face, in real time—what Bill Bowen has called “minds rubbing against minds”.

Director of the National Economic Council Gene Sperling reminded those in the audience that rather than focusing first on technology, participants' focus should be on the core challenges facing higher education – including ensuring affordability, improving completion rates, and improving access – and whether and how new technology can help address these challenges. Sperling also expressed support for “hybrid approaches,” methods that preserve a human element in instruction, which to Sperling seem considerably more promising than approaches that rely on computer instruction alone. This probably limits, but does not eliminate, the cost cutting potential of online education. Finally, Sperling concluded that the growth of online education will only increase the need to improve our measurement of quality and outcomes in higher education.

MIT President Rafael Reif spoke about how the MIT campus is being turned into a laboratory to experiment with online learning in the classroom. Reif noted that with preliminary evidence showing that online tools can be more effective than traditional methods for instruction, there is great potential for online learning to make more room for the other aspects of education that human beings do best, such as undergraduate research opportunities, mentorship, teaching judgment and ethics, and homework. Reif reported that students and faculty are enthusiastic with the online on-campus experiments so far, and more classes are being added each semester.

Blended Models of Learning: Bringing Online to On-Campus

MIT President Rafael Reif began the day by welcoming everyone to the MIT Media Lab and thanking the participants for traveling from near and far to the summit. As a preview to the day's discussions, Reif laid out a series of thought-provoking questions about the future of residential higher education, including the potential impact of hybrid models on the traditional college experience. Reif asked the audience to consider what success will look like in a decade, and how we will measure it. Reif closed by positing that the opportunities presented by online education are limited only by participants' imagination.

The first session tackled some of the biggest questions about the current state of online learning and how it may impact the residential campus. Speakers, panelists, and participants were encouraged to consider an ambitious set of questions, including the following: What are some of the most innovative and compelling examples of online learning today – and on the near-term horizon? How does the rise of online learning affect the ways we evaluate student work in the context of individual courses? What is “quality” and how do we achieve it? How do faculty think about the opportunity offered by MOOCs? What special challenges and opportunities arise regarding online teaching, learning, and assessment in the humanities and arts, or in other disciplines? How do we create self-assessment tools that provide effective feedback to students, without dramatically altering how we teach? And finally, how are subsets of the higher education landscape impacted – e.g., state schools, community colleges, liberal arts, etc.?

Speakers & Panelists

William G. Bowen (keynote) is President Emeritus of The Andrew W. Mellon Foundation where he served as President from 1988 to 2006. He was the president of Princeton University from 1972 to 1988. Bowen has authored 19 books, including the Grawemeyer Award-winning *The Shape of the River: Long-Term Consequences of Considering Race in College and University Admissions* (co-authored with Derek Bok). In 1988, he left Princeton and joined The Andrew W. Mellon Foundation, where he created a research program to investigate doctoral education, collegiate admissions, independent research libraries, and charitable nonprofits in order to ensure that the Andrew W. Mellon Foundation's grants would be well-informed and more effective. Dr. Bowen is a founder and trustee of ITHAKA which is a non-profit academic services organization focused on “helping the academic community use digital technologies to preserve the scholarly record and to advance research and teaching in sustainable ways.”

Ian A. Waitz (moderator) is Dean of the School of Engineering, the Jerome C. Hunsaker Professor of Aeronautics and Astronautics, and a MacVicar Fellow at MIT. He served as Head of the Department of Aeronautics and Astronautics from 2008 until his appointment as Dean in 2011. He is also the Director of the Partnership for AiR Transportation Noise and Emissions Reduction (PARTNER), an FAA, NASA, DOD, EPA and Transport Canada-sponsored Center of Excellence with participants from a dozen universities and 50 industry and government organizations.

Eric Mazur is the Balkanski Professor of Physics and Applied Physics at Harvard University and Area Dean of Applied Physics. An internationally recognized scientist and researcher, he leads a vigorous research program in optical physics and supervises one of the largest research groups in the Physics Department at Harvard University.

John Mitchell is the Mary and Gordon Crary Family Professor in the School of Engineering and Vice Provost for Online Learning at Stanford University. Dr. Mitchell's research interests include computer access control, network protocols, privacy, software systems, and web security.

Eric Rabkin is Arthur F. Thurnau Professor, Professor of English Language and Literature, and Professor of Art and Design at the University of Michigan in Ann Arbor. As a teacher, Rabkin is especially known for his large, popular lecture courses on science fiction and fantasy, and for his many teaching innovations, including the development of the highly successful Practical English writing program for those who will use writing in their work lives, and for his work at all levels, including faculty training in research and communication applications of computer technologies.

Philipp Schmidt is Co-founder and Executive Director of P2PU. The Peer 2 Peer University is a grassroots open education project that organizes learning outside of institutional walls and gives learners recognition for their achievements. P2PU creates a model for lifelong learning alongside traditional formal higher education.

Susan Singer is the Division Director for the Division of Undergraduate Education in the Directorate for Education and Human Resources at the National Science Foundation. She was formerly the Laurence McKinley Gould Professor in the Biology and Cognitive Science Departments at Carleton College.

William G. Bowen provided the opening keynote for the session. Bowen's address largely drew on the Tanner Lectures that he gave at Stanford University in October 2012, and he began by noting that this is an uncertain, shifting and evolving frontier. Bowen called for both more and better studies that take care to control for ubiquitous selection effects, decrying the fact that there is a profound lack of good data and real evidence about both learning outcomes and costs. Moreover, Bowen believes that data on student learning outcomes are a public good, and should be shared widely to improve learning for all students. Bowen also noted that online learning will have real implications for college costs and savings, although he cautioned that what those implications are has yet to be determined. Before they can be understood, MOOCs have to become self-sustaining; many of their financial models are still being worked out. Bowen claimed that there is real potential for online learning to reduce inefficiencies in teaching, scheduling, and lost transfer credits, and also encouraged participants to think carefully about whether different pedagogies are appropriate in different fields of knowledge, and speculated whether a "portfolio" model of curricular development may be more useful in the future. Bowen concluded by further cautioning audience members that the intelligent adoption of online pedagogies is going to require new thinking about decision-making in academia, and particularly the role of faculty going forward.

The panel quickly took up the themes that Bowen had highlighted in his keynote. Stanford Professor John Mitchell wondered how professors can assert academic leadership in this new era, while Harvard Professor Eric Mazur cautioned, “We need to make sure that we don’t simply use online education as a new avenue for doing things the old way — putting ‘old wine into new bottles.’” Mazur also emphasized the importance of assessment, which drives students’ study habits and must be aligned with educational goals to ensure real progress in improving education.

*“I continue to be struck—
and appalled—by the
lack of good data,
evidence if you will, about
both learning outcomes
and costs.”*

– William G. Bowen

Co-founder and Executive Director of P2PU Phillip Schmidt speculated about the role of serendipity in postsecondary learning, positing that the physical spaces provided by campuses play a role in learning that cannot be replicated in the online experience. He asked audience members to consider whether the college experience should be similar to a “very efficient travel agent,” providing a ticket from destination A to destination B and helping students get to where they’d like to go, or more like an open-ended around-the-world ticket, allowing students to stop and explore interests at their leisure.

Mazur entertained and educated the audience by showing data demonstrating that students’ brains are least active during lectures and sleep. He noted that, “Considering education is a two-step process — transfer of information, followed by assimilation of that information — my hope is that online education can facilitate the first step, so we can use class time for pedagogically more meaningful activities.”

National Science Foundation Division Director Susan Singer reminded audience members that a great deal is known already about effective instructional practices and how undergraduates learn from the research on learning, including discipline-based education research. Singer emphasized that it is imperative to unite the revolutions in learning science and online learning, and noted that applying what is known from the learning sciences to online learning will improve learning

*“Because of the
magnifying effect that we
get by having large
numbers of participants,
online education can
serve as a bellwether for
on-campus education” –
Eric Rabkin*

in both blended and MOOC learning environments. Singer also emphasized the opportunities that MOOCs provide in the arena of advancing research on learning, especially if meaningful learning analytics are developed to mine the vast data generated and findings used to iteratively improve online and bricks and mortar classroom learning.

University of Michigan Professor Eric Rabkin spoke about how the best on-campus uses of online technologies depend on the subject, level, goals, and so on. Rabkin cautioned that MOOCs are bellwethers for on-campus education, citing the example of how even though distant participation by thousands presents problems of plagiarism, when solved, those large-scale solutions can provide guidance for large on-campus lecture courses. Rabkin also encouraged

participants to exploit the new technologies provided by MOOCs for new opportunities to improve learning in both realms, such as using students in an on-campus seminar on peer-editing as online tutors for distant high school speakers of non-standard English.

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Online Learning: Today and Tomorrow

In the second panel of the day, the keynote, moderator, and panelists discussed the challenges and opportunities online technologies may have on teaching, learning, and assessment. The wide-ranging discussion touched on the applications of technology in diverse academic fields, from science and technology to arts and the humanities; how to integrate new technologies on and off campus; the importance of assessing student learning and outcomes in the online environment; and various perspectives on the use of technologies in different academic settings.

Speakers & Panelists

Anant Agarwal is the President of edX, a worldwide, online learning initiative of MIT and Harvard University, and a professor in MIT's Electrical Engineering and Computer Science department. He has also served as the Director of the Computer Science and Artificial Intelligence Laboratory (CSAIL).

Bror Saxberg is responsible for the research and development of innovative learning strategies, technologies and products across Kaplan's full range of educational service offerings. He also oversees future developments and adoptions of innovative learning technologies and maintains consistent academic standards for Kaplan's products and courses.

Daphne Koller is a Professor in the Department of Computer Science at Stanford University and a MacArthur Fellowship recipient. She is also one of the founders of Coursera, an online education platform. Her general research area is artificial intelligence and its applications in the biomedical sciences.

Jonathan Zittrain (moderator) is Professor of Law at Harvard Law School and the Harvard Kennedy School of Government, Professor of Computer Science at the Harvard School of Engineering and Applied Sciences, and co-founder of the Berkman Center for Internet & Society. His research interests include battles for control of digital property and content, cryptography, electronic privacy, the roles of intermediaries within Internet architecture, human computing, and the useful and unobtrusive deployment of technology in education.

Sal Khan (keynote) is an educator, entrepreneur, and former hedge fund analyst. He is the founder of the Khan Academy, a free online education platform and nonprofit organization. From a small office in his home, Khan has produced over 3,500 video lessons teaching a wide spectrum of academic subjects, mainly focusing on mathematics and the sciences.

Steve Hodownes is Southern New Hampshire University's senior vice president of marketing and student recruiting, and the former president of Embanet.

“...Technology can drive amazing efficiencies, affordability, reliability, customization, but it'll drive that for bad solutions as well as good solutions. So part of the trick is, how do we find the learning problems and the good solutions, and then use technology to make them affordable and available and reliable and data rich?”

– Bror Saxberg

The format of this session differed from the others, as Sal Khan joined via Skype, and offered his comments throughout the session. An educational innovator, Khan believes that online learning will allow professors and teachers to leverage the physical space better. When rote learning can be replaced by online technologies like those provided by Khan Academy, the classroom can be used for more high level discussion. Khan stipulated that lectures and videos are the least important part in the learning process; interactivity provided by questions, assessments, and diagnostics hold the most power in the online technologies. Specifically, Khan considers nailing the diagnostics for core topics a key priority. Finally, he noted that higher education should seek to decouple credentialing from learning.

Coursera co-founder Daphne Koller discussed some of the complexities involved with making online learning technologies sustainable, with strategies such as providing a signature track with identity

verification, institutional content licenses, and employer referral services. Koller also discussed the ways in which Coursera shares data on student learning outcomes with its institutional partners, but cautioned that student privacy measures may limit sharing data with greater audiences.

EdX president Anant Agarwal also spoke about data sharing, stating that edX has broad and liberal data sharing capabilities, but he noted the same legal limitations as Koller. Agarwal encouraged audience members to move questions of cost to questions of efficiency, as efficiency includes quality, and is thus a better variable to consider. Agarwal spoke about the impact that working with MOOCs has had on his own perception of pedagogy and adaptive learning, and specifically about how much students value immediate feedback in the learning process.

Hailing from Southern New Hampshire University, Steve Hodownes brought the unique perspective of working with both a large online population as well as a smaller number of on-campus students. Hodownes noted that while much attention is justifiably focused on the critical role innovative technologies can have on the future of online learning, there is a large, underserved population of degree-seeking adults who can effectively be served and supported today through the delivery of affordable, regionally accredited, online degree programs. Hodownes also noted that while adaptive learning platforms offer great promise in the student learning process, one cannot underestimate the human aspect and vital roles the

“What I think is most exciting about this whole movement, if you can call it that, is even the people who are not directly involved in producing a MOOC, it forces them to re-think about what they should be doing.”

– Sal Khan

instructor and advisor play through interpersonal connection in helping students build the confidence and skills required to become successful. While innovative online learning models have successfully removed barriers and increased access to education for millions, Hodownes cautioned that it is more important than ever to focus not just on access, but on outcomes, and reminded everyone that the success of an institution should be measured by the success of its students.

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Adapting to a Changing Landscape: Addressing Institutional Barriers to Innovation

In the third session of the day, panelists discussed how institutions and their leaders can best enable technological innovation to further their academic and research missions. Topics of discussion included balancing faculty workloads with incentives; managing the accreditation of programs, credentialing of students, and potential awarding of full degrees for online learning; developing financially sustainable models for online learning enterprises and understanding their possible impact on current revenue sources; fostering meaningful collaborations with other higher education institutions, foundations, and companies; and exploring the promise technologies might have for lowering educational and research costs and enabling global engagement.

Anthony Masi was appointed to the position of provost of McGill University in December 2005. Prior to his appointment, he served as Interim Provost and as Deputy Provost and Chief Information Officer since 2003 and previously as Vice-Principal (Information Systems and Technology) from 2001 to 2003. Professor Masi is a member of the National Statistics Council, an advisory board to Canada's Chief Statistician.

Clay Christensen (keynote) is the Kim B. Clark Professor of Business Administration at the Harvard Business School, where he teaches one of the most popular elective classes for second year students, Building and Sustaining a Successful Enterprise. He is regarded as one of the world's top experts on innovation and growth and his ideas have been widely used in industries and organizations throughout the world.

George Breslauer currently serves as Executive Vice Chancellor and Provost of the University of California Berkeley. His interest areas include Soviet and Post-Soviet/Russian politics and foreign relations. He teaches courses on Soviet and Post-Soviet politics and foreign policy and in April, 1997, he was a recipient of the Distinguished Teaching Award from the Division of Social Sciences.

Kent Fuchs was appointed Cornell's provost effective January 1, 2009. He served as Cornell's Joseph Silbert Dean of Engineering from 2002-2008. He was formerly the head of the School of Electrical and Computer Engineering and the Michael J. and Katherine R. Birck Distinguished Professor at Purdue University, 1996-2002. His research interests focus on computer engineering, particularly, dependable computing and failure diagnosis.

Mark Kamlet was appointed to the position of provost at Carnegie Mellon University in 2000. Since then, Kamlet has worked with the deans and department heads to strengthen the university's academic programs, retain and recruit world-class faculty, enhance its many research programs, centers and institutes, and create new academic and research initiatives leveraging the university's talent and expertise.

Martha Minow (moderator), the Dean and Jeremiah Smith, Jr. Professor of Law, has taught at Harvard Law School since 1981, where her courses have included civil

procedure, constitutional law, family law, international criminal justice, jurisprudence, law and education, nonprofit organizations, and the public law workshop. An expert in human rights and advocacy for members of racial and religious minorities and for women, children, and persons with disabilities, she also writes and teaches about privatization, military justice, and ethnic and religious conflict.

This session began with a presentation on disruptive innovation by Harvard Business School Professor Clay Christensen. Christensen demonstrated that higher education has traditionally been immune from disruptions, as new models largely emulated traditional models. Christensen stated that while education is a process business, student-centric software will be a facilitated network business. He also presented his model of disruption, where a new product is launched in a space with no competitors and where nothing like it exists, then moves into a hybrid model with an older version, until eventually the original model gives way. He posited that major changes are on the way for many colleges and universities, with the hybrid phase already beginning with the advent of the MOOCs on

“And so what was impossible in the past—disruption of higher ed—actually is quite plausible. And in fact, it is under way at a scary pace.”

– Clay Christensen

many campuses.

McGill Provost Anthony Masi expanded on the keynote by addressing some of the changes that many colleges and universities will likely have to make to adapt to online learning, including providing professors with the time and tools necessary to adapt their teaching approach to new and emerging information technology platforms. Masi also noted that there are considerable upfront costs that institutions will have to undertake to develop the appropriate competencies, and that these will compete with other priorities. He warned that unless universities adapt quickly, they run the risk of being overwhelmed by the technologies and new entrants into a space they previously occupied all alone. Masi also addressed how the assessment of academic duties (teaching, research, service) will have to be modified to accommodate the required innovations in pedagogical framework.

University of California Provost George Breslauer pointed out that in discussions about the impact of the revolution in online education on residential campuses, it is important to bear in mind that discussants may have in mind differing priorities: for example, revenue-generation; enhancement of the quality of pedagogy; increased throughput for matriculated students; and/or social justice, whether to further the education (and prospective matriculation) of community college students or to “educate the world.”

“I think that one of the things that MOOCs will do is to force everyone on our campuses to think more carefully about what they're doing, if we're serious about MOOCs having an impact on the residential experience itself through the research that we conduct on the pedagogy and the way the technologies are used.”

– Mark Kamlet

Each of these would entail different uses for, or types of, online technologies. Breslauer believes that doing these in an ambitious way will require large up-front investments in infrastructure, training, and, importantly, communications strategies vis-à-vis students, parents, alumni, politicians, the broader public, etc. A disruptive technology will be controversial and requires a sophisticated communications strategy. He noted that the challenge is large also because universities change slowly, technology changes rapidly, and politics intrude episodically. Finally he urged the academy to embrace this revolution, and organize to incorporate its most useful features while setting realistic goals and managing the expectations of multiple audiences.

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Concluding Remarks

To wrap-up the day's events, Tom Friedman, Alan Garber, and Chris Kaiser came together on stage to present closing remarks and final thoughts.

Alan Garber became Provost of Harvard University in September 2011. He is also the Mallinckrodt Professor of Health Care Policy at Harvard Medical School, a Professor of Economics in the Faculty of Arts and Sciences, and a Professor of Public Policy in the Harvard Kennedy School of Government.

Chris Kaiser has served MIT as Provost since July 2, 2012. Professor Kaiser was the head of the Department of Biology from 2004 until 2012. Departmental initiatives that came to fruition during this period include the formation of an undergraduate degree program in computer science and molecular biology, the launch of the B³ postbaccalaureate program to create new opportunities for entry into research careers, and the reformation of the BioMicro Center as an Institute-wide core facility for next-generation DNA sequencing.

Tom Friedman is an American journalist, columnist and author. He writes a twice-weekly column for *The New York Times*. He has written extensively on foreign affairs including global trade, the Middle East, globalization, and environmental issues and has won the Pulitzer Prize three times.

Journalist Tom Friedman reflected on what he had heard throughout the day about higher education by connecting it to what he called “a great inflection” caused by the merger of globalization and the IT revolution that had occurred simultaneously with the great recession. Harvard Provost Alan Garber reminded the audience that several panelists spoke about the abundance of literature on what works in education, and yet many commented that all too often this literature is ignored. Also according to Garber, the completion rate for MOOCs and other online courses and the ability to master the material is going to be much greater when that learning is tied to some kind of residential or interpersonal experience, which again presents new opportunities for on-campus education. MIT Provost Chris Kaiser concluded the summit by considering the possibilities for future gatherings and thanking everyone for participating in this inaugural event.

Summit Feedback

In order to evaluate the success of the event, a post-summit survey was sent to all attendees. Questions focused on the relative strengths and weaknesses of the summit, key takeaways for campus representatives, and ideas for future events. Thirty-four responses were received. While many noted that the session lengths could have been shorter, and the diversity of institutions increased, the vast majority of feedback was overwhelmingly positive. All participants agreed that the group should be convened again, building off of the positive connections and energy generated from this one, and many noted that they were returning to their campuses energized and ready to engage their peers and colleagues in similar discussions. Sample quotes follow.

“The whole experience was helpful and positive. The highlight for me was to witness the number of senior academic leaders from leading universities in the U.S. and around the world who clearly are engaged in online learning and changing the academy for the better. This gives me confidence that the potential for truly transformational change.”

“Having such a large group of university leadership address some of the more pressing concerns facing higher education was quite helpful. Clay Christensen's talk was both sobering and important.”

“This is a very exciting field, but we are just beginning to understand its implications (whether we are in spring training or the 2nd inning). There are multiple complexities involved; it seems clear that for the first time, large-scale online learning has "taken off," compared with past efforts, but the consequences for higher ed, especially for residential undergraduate education, remain murky.”

“The ideas and contacts will help inform our institutional strategy.”

“An incredibly exciting, thoughtful, challenging event, perfectly executed.”