MIT Open Learning

MIT Open Learning reports to Professor Sanjay Sarma, the vice president for open learning. Its mission is to transform teaching and learning at MIT and around the globe through the innovative use of digital technologies. To accomplish this, MIT Open Learning brings together the Institute's principal educational technology resources to focus on the following strategic priorities:

- **Residential education**: collaborate with faculty to instigate, explore, test, and institutionalize pedagogical models that enhance MIT's unique brand of education through digital and open learning technologies and practices
- **Open education**: build out the MITx on edX portfolio with exemplary courses and modules for a worldwide audience, including new paths to an MIT degree such as the MicroMasters credential, and publish new and updated MIT course materials and other teaching/learning resources through MIT OpenCourseWare (OCW), enabling global access to MIT course materials
- **Workplace learning**: support and enhance MIT's capacity to serve businesses, executives, and professionals in lifelong learning
- **Strategic education initiatives**: design and implement educational experiments and programs driven by MIT's strategic priorities
- **Digital learning research**: foster and enable digital learning research across MIT and support application of MIT's research ideas in educational institutions worldwide
- **Support the Institute-wide Task Force on the Future of MIT Education**: collaborate across MIT to implement recommendations of the task force that pertain to digital learning
- **Infrastructure and support**: provide infrastructure, tools, and related services that support digital teaching and learning at MIT
- **Resources and stewardship**: attract and steward enthusiastic fiscal and organizational support for MIT Open Learning initiatives and services from colleagues and funding sources at MIT and beyond

This report includes the unit-level reports of the groups that make up MIT Open Learning. Constituent units covered are as follows:

- Residential Education
- MITx on edX
- OpenCourseWare
- Bootcamps
- MIT xPRO (formerly Digital Learning Solutions)
- Strategic Education Initiatives

- Teaching Systems Lab
- MIT Integrated Learning Initiative
- MIT Video Productions
- Engineering and Technical Operations
- Resource Development
- Business Operations

Highlights of the Year

Strategic Projects and Programs

- *Piloted full-credit online residential course*: MIT Open Learning partnered with the Department of Electrical Engineering and Computer Science to pilot a digital offering of 6.001 Circuits and Electronics for a small cohort of students. Preliminary assessments suggest that students in the digital version earned comparable grades on the final exam while reporting less stress and increased flexibility.
- *Awarded MITx Prize for Teaching and Learning in MOOCs*: The MITx Faculty Advisory Committee selected three winners of the first MITx Prize for Teaching and Learning in MOOCs. Deepto Chakabarty, Peter Dourmashkin, Saif Rayyan, and Michelle Tomasik won for 8.01x Mechanics Series and their innovative use of lightboard technologies and new problem types. David Jerison, Gigliola Staffiliani, Jennifer French, and Karene Chu won for 18.01 Calculus Series, which introduced a new sketch input tool and live-action videos. Esther Duflo and Sara Ellison won for 14.310x Data Analysis for Social Scientists and their balance of rigor and accessibility.
- *Completed first MicroMasters cohort*: The first MicroMasters program in Supply Chain Management was announced in October 2015 and officially launched in February 2016. MicroMasters is a new credential consisting of a set of graduate-level online courses and one or more demanding proctored exams. In June 2017, the first cohort of students received their MicroMasters certificates. More than 1,100 learners received verified certificates in all five online courses, 787 learners sat for the MicroMasters comprehensive exam, and 622 earned the certificate. The first accelerated residential master's program will be offered in FY2018; students who earn the MicroMasters certificate and are accepted into the MIT program are eligible for this program.
- *Launched second MicroMasters program*: A second MicroMasters program in Data, Economics, and Development Policy (DEDP), launched in February 2017. This program, run by the Department of Economics and the Abdul Latif Jameel Poverty Action Lab, focuses on the practicalities of conducting randomized evaluations to assess the effectiveness of social programs. It consists of five online courses, each with a proctored exam offered at testing centers worldwide, and experiments with a variable pricing model based on a learner's ability to pay.

- *Announced Jameel World Education Lab*: MIT Open Learning received a sizable gift to form the Abdul Latif Jameel World Education Lab (J-WEL) in May 2017. J-WEL will support educators, universities, governments, and companies in revolutionizing the effectiveness and reach of education through supporting research and convening a global community of collaborators to share research, policy, pedagogy, and practice. The new J-WEL organization will launch on July 1, 2017.

- *Developed recommendations of the Faculty Committee on the Future of OpenCourseWare*: A faculty committee convened to discuss the future of OCW, including new technological opportunities and the challenge of ensuring financial sustainability. The committee was chaired by Professors Karen Willcox and Sanjay Sarma and included Professors Hal Abelson, Tayo Akinwande, Paloma Duong, Eric Klopfer, Sam Madden, Tom Malone, Haynes Miller, and Hazel Sive along with graduate students Noam Buckman and Christopher Smith. The committee reviewed the digital learning landscape, analyzed underlying data, and identified three options going forward. It confirmed OCW's continued relevance and value and at the same time recognized that changes are needed to update technologies, serve learners' evolving needs, and achieve financial sustainability. The committee recommended that OCW transform itself, possibly by focusing on a subset of content or audiences so that it can add features and maintain updated infrastructure.

- *Introduced Institute-wide governance for digital workplace learning*: New processes, policies, and governance for professional (paid-only) digital offerings were introduced, with the goal of spurring Institute-wide development of online professional education while at the same time laying a foundation for cross-MIT collaboration and clear ownership of MIT intellectual property. A governance committee for online education was established consisting of Ezra Zuckerman, Anton Garcia-Abril, Ed Crawley, and Sanjay Sarma (chair). Also staffing the committee are Peter Berbergal, Suzanne Glassbuern, TC Haldi, and Lisa Schwallie.

- *Hosted inaugural Festival of Learning*: MIT Open Learning partnered with the Teaching and Learning Laboratory and the offices of the deans for undergraduate and graduate education to host over 200 faculty and students who shared recent advances in education technology. The event included workshops, a lightning round showcase, and a student hackathon.

Business Units

- Residential Education: The group continued to expand use of the Residential MITx course platform, creating 124 course sites for 76 courses, a record high. From fall 2016 through spring 2017, these courses served 8,818 active MIT students, corresponding to 96.7% of undergraduate students. Residential Education also led the work on the inaugural Festival of Learning, drawing more than 200 MIT community members. Communications were an area of emphasis, including a new faculty newsletter and updated public webpages. In addition, the group continued to develop and make accessible a new lightboard technology.

- MITx on edX: MITx launched 97 edX courses (34 new courses and 63 reruns), up from 72 last year. Approximately 1.1 million learners participated in these courses. Also, five courses for the DEDP MicroMasters program were developed and launched, along with the final course in the Supply Chain Management MicroMasters program. MITx generated $3.1 million in gross revenues from ID-verified certificates and licensing arrangements, much of this from MicroMasters courses.

- OpenCourseWare: OCW published 101 courses (48 new courses and 53 updates), of which 25 have OCW Educator "This Course at MIT" pages; five of these courses have complete video lecture series, and 13 more have other substantial video assets. Traffic averaged 2.3 million visits per month. OCW also began planning for financial sustainability and designed new workflows to self-author certain courses.

- Bootcamps: The Incubation group renamed itself "Bootcamps" to reflect its growing emphasis on developing bootcamp programs. In FY2017, the group delivered six bootcamps, including programs in Taipei, Taiwan; Guadalajara, Mexico; Istanbul, Turkey; and Brisbane, Australia. Bootcamps also expanded in topic areas, with new camps on the "Internet of Things" and "Beyond Food." In addition, the group began to engage bootcamp alumni as mentors, interviewers, and outreach partners.

- MIT xPRO: Digital Learning Solutions (DLS) rebranded itself as MIT xPRO and launched a four-course series, partially funded by Boeing, in systems engineering. Bruce Cameron of the MIT System Architecture Group served as lead instructor. This series generated $2.4 million in revenue for MIT in FY17. It also won the American Society for Engineering Education's 2017 Excellence in Engineering Education Collaboration Award. In addition, MIT xPRO continued its offering in entrepreneurial negotiations. Based on this success, MIT xPRO developed a strategic plan for upcoming years. Institute-wide, online professional education (new and continued offerings) generated over $6.5 million in revenue for MIT. MIT xPRO continued to lay the groundwork for new courses and started work on courses in 3D printing and leadership for scientists and engineers.

- Strategic Education Initiatives (SEI): SEI continued work on Open Learning Scholars (OLS) and the Connected Learning Initiative (CLIx), among other projects. CLIx is projected to impact 450 schools, 30,000 students, and 3,300 teachers in four states in India through 2017. SEI also developed an agreement with SRM University to sub-license eight MITx courses over three years. SEI continued to support MIT's pK-12 Action Group and associated initiatives. With the announcement of J-WEL, SEI began to plan for the future: the organization dissolved as of June 30, 2017. In FY2018, some former SEI staff members will lead J-WEL, while others will continue to work on strategic projects.

- Teaching Systems Lab (TSL): TSL continued work with the Woodrow Wilson Academy in creating learning modules for a competency-based school, developing new simulations and practice spaces for the academy, and awarding and managing teaching and learning innovation grants. Two series of grants, each with three projects, were awarded a total of $700,000. TSL also launched two Microsoft-funded massive open online courses (MOOCs) for school leaders and developed a series of Google-funded experiences to help teachers address

the negative effects of unconscious biases. In addition, TSL hosted six play-test events at which over 150 educators offered feedback on prototypes. Finally, TSL hosted 180 participants at the Learning @ Scale conference.

- MIT Integrated Learning Initiative (MITili): MITili hired two staff members, including Associate Director Jeff Dieffenbach, to support Director John Gabrieli and Deputy Director Parag Pathak. MITili engaged in substantive outreach to prospective funders and hosted five faculty talks designed to discuss and agree on potential transformational research projects. In addition, the first MITili research project was completed, an investigation that studied mind-wandering, memory, and reinforcement using functional magnetic resonance imaging and portable electroencephalogram technology.

- MIT Video Productions (MVP): MVP's Larry Gallagher, Joe McMaster, and Jean Dunoyer received a New England Emmy Award in the Education/Schools category for their film *A Bold Move*, produced as part of the 2016 celebration of a century in Cambridge. Throughout the year, MVP provided video and post-production services for customers at MIT, enhancing story-telling and providing several high-profile launch videos including The Engine and J-WEL. Also, MVP continued work on the installation of auto lecture capture equipment in MIT classrooms.

- Engineering and Technical Operations: Much of the focus in FY2017 was on establishing the MicroMasters portal in advance of the launch of the MicroMasters in Data, Economics, and Development Policy. Engineering built an end-to-end solution allowing learners to enroll, ask for personalized pricing, contact support, and pay for the DEDP program. Also, Engineering updated the residential platform and worked to streamline bootcamp enrollment and payments. FY2017 was the last year of operation for the Distance Education group.

- Resource Development: Resource Development continued to focus on the MIT Capital Campaign, obtaining $43.8 million in new gifts and pledges, including a $40 million gift to launch J-WEL. In FY2017, Resource Development brought in $9.8 million in gift revenue.

- Business Operations: The Business Operations group supported the launches of J-WEL, MITili, and MicroMasters and provided customer support to MicroMasters programs. In addition, the group continued to advance the digital learning strategic plan and to provide and improve services in finance, human resources, marketing, internal communications, media, administration, and space.

The reports of MIT Open Learning constituent units below provide further details on the year's accomplishments.

Finances and Funding

In FY2017, MIT Open Learning's external revenues increased to $23.5 million, up from $10.3 million in FY2016. Most of this increase was attributable to a $1.3 million rise in external revenues, largely due to MicroMasters verified ID fees; a $3.6 million increase in non-degree tuition as a result of the expansion of Bootcamps and MIT xPRO; and an $8.3 million increase in gifts. Sponsored revenues and internal fees were on the whole flat.

Provost funding increased from $13 million to $20.1 million. Of this amount, $2.3 million was due to a change in how we account for carry-forwards: in FY2016 we accounted for them as negative revenue, while in FY2017 we included them in the revenue total.

Total expenses increased from $23.1 million to $30.6 million. MIT Open Learning continued to invest, especially in MicroMasters, the MIT Integrated Learning Initiative, MIT xPRO (Digital Learning Solutions), and marketing. In addition, as products became revenue positive, revenue distribution to faculty members, departments, and the Office of the Provost increased from $0.4 million to $1.9 million. Also, departmental support increased from $3.1 million in FY2016 to $6.4 million in FY2017.

MIT Open Learning ended FY2017 with a net surplus of $13.1 million, as compared with $0.25 million in FY2016. The reason is that revenues exceeded budget, with strong showings in external revenues, non-degree tuition, and gifts. At the same time, expenses were managed under budget. Table below summarizes financial results for the year.

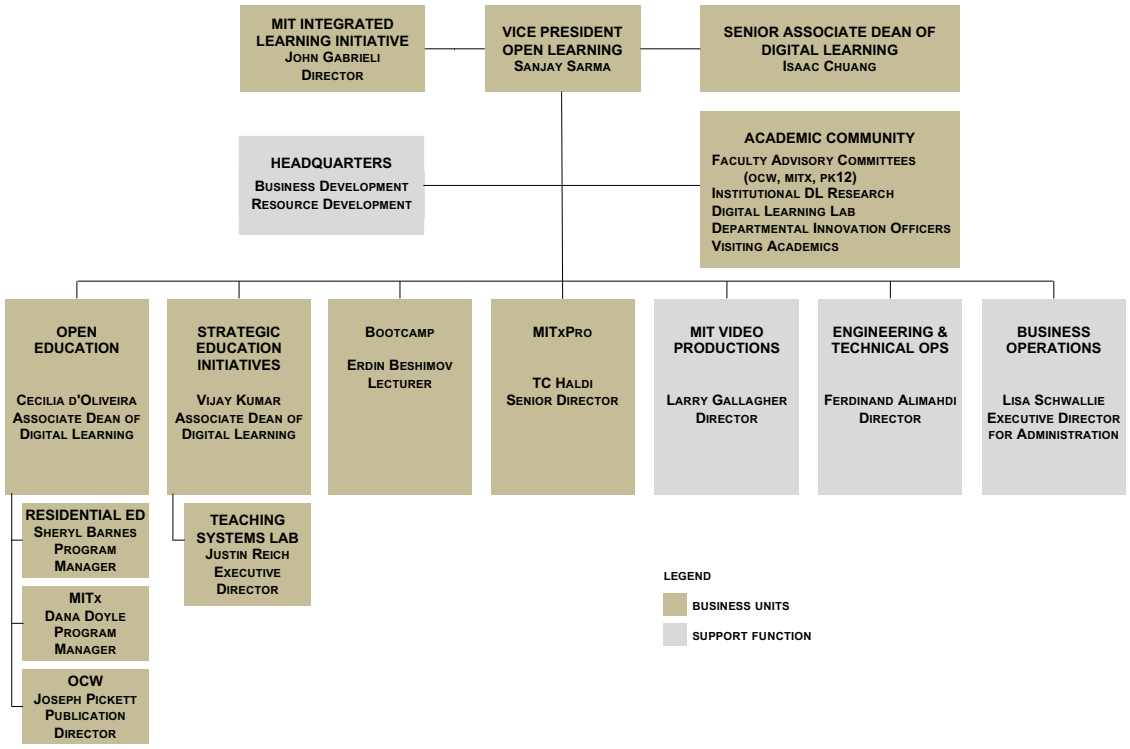
MIT Open Learning Income and Expenses–FY2017

Revenue	**Total ($000s)**
Sponsored revenues	3,437
External revenues	3,517
Non-degree tuition revenues	4,899
Internal fees	2,068
Gifts	9,632
Investment income	189
Transfers	(161)
Total Revenue	**23,581**
Total Provost Funding	**20,123**
Total Income	**43,704**
Direct Expenses	
Salaries and benefits	13,789
Department support	6,361
Revenue distribution	1,899
Other expenses	7,557
Total Direct Expenses	**29,606**
Indirect Expenses	**1,005**
Total Expenses	**30,611**
Net Surplus (Deficit)	**13,093**

Staffing

Figure below shows the overall organizational structure of MIT Open Learning as of June 30, 2017. Tables below identifies MIT Open Learning management team, and summarizes key personnel changes during the year.

MIT Open Learning organizational structure as of June 30, 2017



MIT Open Learning Management Team as of June 30, 2017

Name	Position
Sanjay Sarma	Vice President for Open Learning
Isaac Chuang	Senior Associate Dean of Digital Learning
Erdin Beshimov	Lecturer and Director of Bootcamps
Cecilia D'Oliveira	Associate Dean of Digital Learning
Vijay M.S. Kumar	Associate Dean of Digital Learning with responsibility for Strategic Educational Initiatives
Ferdi Alimadhi	Director of Engineering
Lawrence Gallagher	Director, MIT Video Productions (MVP)
TC Haldi	Senior Director, Digital Learning Solutions
Lisa Schwallie	Executive Director for Administration

MIT Open Learning Position and Staff Changes–AY2017

Residential

Position	Person	Form of recruitment	Notes
Senior educational technologist	Meredith Davies	Outside hire	Replaces Ben Weeks
Learning engineer	Anindya Roy	Outside hire	New position

MITx

Position	Person	Form of recruitment	Notes
Intellectual property coordinator	Coleen Cressman	Departure	Replacement pending
Administrative assistant	Sarah Davis	Outside hire	New position
Educational technologist	Kenneth Hagberg	Outside hire	New position
Educational technologist	Allison Olivieri	Outside hire	New position

OpenCourseWare

Position	Person	Form of recruitment	Notes
Digital publication specialist	Caitlin Cooper	Outside hire	Replaces Brenley McIntosh
Digital publication specialist	Brian Remlinger	Departure	Not replaced
Digital publication specialist	Alessandra Rico	Departure	Not replaced

Bootcamps

Position	Person	Form of recruitment	Notes
Senior product manager	Vimala Palaniswamy	Outside hire	New position
Program manager	Chi-Chu Tschang	Departure	Replacement pending

MIT xPRO

Position	Person	Form of recruitment	Notes
Project manager	Beatriz Carramolino	Outside hire	New position
Senior project manager	Acacia Landfield	Conversion from contractor	New position
Video editor	David Ozug	Outside hire	New position
Digital program coordinator	James Stanton	Outside hire	New position

Strategic Education Initiatives

Position	Person	Form of recruitment	Notes
Program manager, pre-K–12 videos	Elizabeth Choe	Departure	Not replaced
Research scientist	Kimberle Koile	Departure	Not replaced
Coordinator	Judith Leonard	Departure	Not replaced

Teaching Systems Lab

Position	Person	Form of recruitment	Notes
Research scientist	Roy Daniel	Outside hire	New position

MIT Integrated Learning Initiative

Position	Person	Form of recruitment	Notes
Associate director	Jeff Dieffenbach	Outside hire	New position
Program coordinator	Steve Nelson	Internal promotion	New position

MIT Video Productions

Position	Person	Form of recruitment	Notes
Multimedia specialist	Benjamin Aron	Departure	Replacement pending
Administrative assistant	Jennifer Amaya	Conversion from contractor	New position
Operations manager	Charles Butler	Outside hire	Replaces Barbara Seidl
Business analyst	Anna Derment	Outside hire	Replaces Joanne Flood
Media systems specialist	Ian Jordan	Departure	Replacement pending
Operations coordinator	Dawn Morton	Outside hire	Replaces Susan Buice

Engineering

Position	Person	Form of recruitment	Notes
Senior software engineer	Matthew Bertrand	Outside hire	New position
Network engineer	William de Figueiredo	Departure	Not replaced
Software engineer	Anna Gavrilman	Conversion from contractor	Replaces Jamie Folsom
Senior software engineer	Sar Haidar	Internal MIT hire	Replaces Brandon DeRosier
Senior software engineer	Nathan Levesque	Outside hire	Replaces Justin Abrahms
Streaming media manager	Robert Sikkema	Departure	Not replaced

Business Operations

Position	Person	Form of recruitment	Notes
Financial analyst	John Archibald	Outside hire	Replaces Murad Wornum
Digital web channel coordinator	Joseph Giorgianni	Outside hire	New position
Administrative assistant	Travis Hill	Outside hire	Replaces Gracie Dorneus
Communications coordinator	Christopher Lanfranco	Outside hire	New position
Project manager, MicroMasters	Kayli Maffei	Internal promotion	New position
Senior administrative assistant	Melissa Manolis	Outside hire	Replaces Kayli Maffei
Senior administrative assistant	Cindy Sambataro	Outside hire	Replaces Sarah Jane Vaughan
Financial administrator, sponsored activity	Christian Yemga	Outside hire	New position

Residential Education

The mission of the Residential Education unit is to catalyze the revolutionary transformation of teaching at MIT, making it more effective and efficient for MIT students and faculty. We do this by collaborating with MIT faculty to instigate, explore, test, and institutionalize pedagogical models that enhance on-campus education through the use of digital technology. Our key strategies are to:

- Support digital learning experiments at MIT by providing technical expertise, consultation, facilities, funding collaboration, training, and support for such experiments
- Encourage wider institutional adoption of pedagogical approaches enabled by digital learning tools by proactively supporting faculty and the MIT community in leveraging digital tools to improve teaching at MIT
- Collaborate with faculty, departments, the Dean of Undergraduate Education and the Office of Graduate Education to encourage and enable faculty digital teaching and learning tools, to help departments grow their course production capacity, to build academic computing support mechanisms that leverage existing Institute resources, and to explore synergies with other initiatives across MIT

In pursuit of these strategies, Residential Education provides the following services:

- Instructional design and assessment consulting for instructors to promote more effective and efficient teaching and learning at MIT
- Support of experimental/innovative learning spaces
- Technical support for the Residential MITx course platform, which is the on-campus implementation of the edX course delivery platform used for residential education
- Outreach and events (xTalks and others) to promote innovative teaching and learning

Summary and Highlights

This was the second full year of operation for the Residential Education group. The group hit its stride in supporting faculty use of the Residential MITx course platform, creating 124 course sites for 76 courses with 8,818 active MIT student enrollments. Residential Education successfully launched a new Institute-wide event called the Festival of Learning, drawing more than 200 community members including approximately 50 faculty. It also launched a newsletter for faculty members and hired the first official learning engineer to help faculty transform teaching and learning at MIT. Finally, it delivered a robust set of public website pages highlighting key research-based teaching practices with examples culled from MIT faculty.

Goals and Objectives

As noted, the Residential Education unit strives to make MIT on-campus education more effective and efficient for both students and faculty by supporting digital learning experiments at MIT and encouraging wider institutional adoption of pedagogical approaches enabled by digital learning tools.

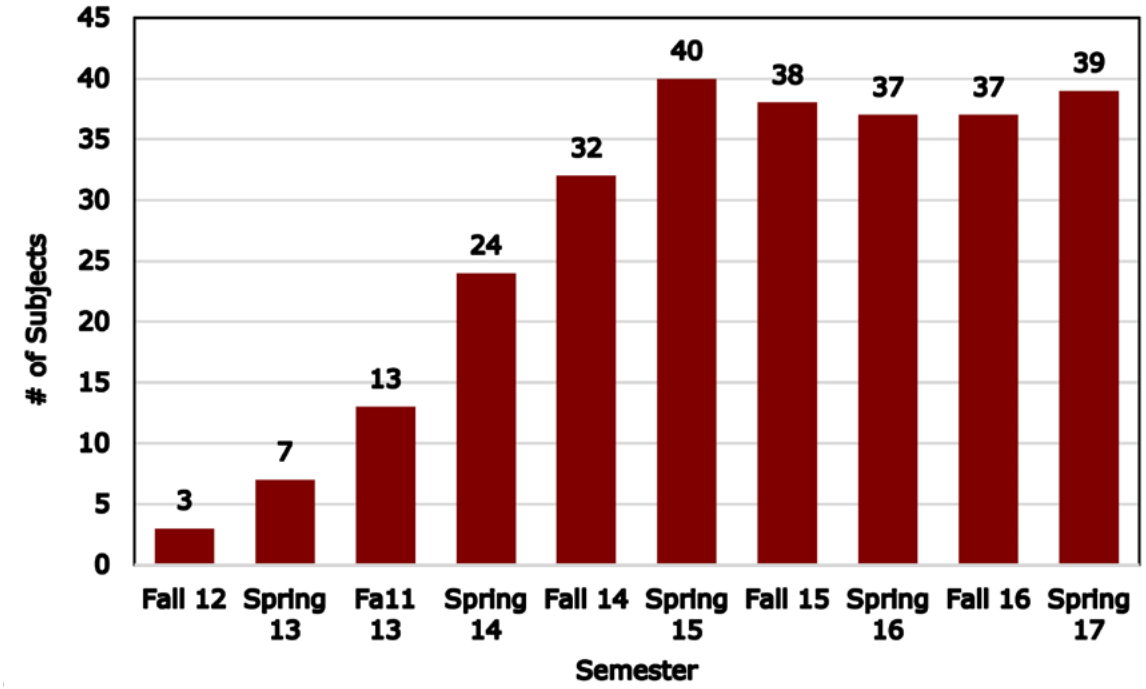
Accomplishments

We created 124 sites for 76 courses on the Residential MITx platform (Figure 2). There were 8,818 active MIT student enrollments in these courses.

We hosted 11 xTalks during AY2017. The xTalks seminar series facilitates awareness, deep understanding, and transference of educational innovations at MIT and elsewhere.

As noted above, we designed and launched the new Festival of Learning. We worked with MIT's Teaching and Learning Laboratory to accommodate its objectives as well. The event was a big success, as was our first student hackathon.

Growth in use of the Residential MITx platform for MIT



Special projects included the following:

- Managed the Teaching with Digital Technology Awards for the second year, produced a montage video of the award winners, and hosted a luncheon for the winners and nominees that was attended by more than 40 faculty.
- Contributed learning sciences and instructional design expertise to foster teaching innovation via the MITx grant proposal process.
- Managed the faculty survey regarding prior-year use of Residential MITx (with a 60% response rate), identified shared concerns, and communicated concerns to relevant stakeholders.
- Designed and produced instructional design resources for course teams, including a summary document incorporating five key research-based instructional practices and two instructional frameworks with broad applicability to blended and online learning courses/modules. This document was used to support the MITx grant process and was subsequently converted into six website pages containing examples of how these principles have been implemented at MIT.

- Researched and wrote four mini case studies highlighting faculty innovations and promoted the studies in xTalks mailings.
- Made significant contributions to an MITx grant project piloting a series of promising instructional experiments in 18.03x and worked with the course team to design, deliver, and assess the course and the experiments.
- Sustained the instructional design journal club.
- Assisted course and project teams with the development of online/blended courses.
- Initiated learning analytics projects with the MITx Digital Learning Lab and other groups.
- Supported five innovative MIT learning spaces and the equipment in them.
- Provided primary teaching space for 15 classes and supplemental teaching space for an additional seven classes throughout the fall and spring semesters.
- Hosted 16 seminars, workshops, and Independent Activities Period (IAP) sessions during the year.
- Constructed a second lightboard (video capture) facility for quasi-self-service video production and continued to support the first facility. This new facility is intended to scale up the development of video resources through the creation of a self-service video kiosk for faculty and staff. Residential classes, MITx programs, and other programs affected by this facility include the following: 8.01 Physics, 8.04 Quantum Mechanics 10.40 Thermodynamics, 15.053x Optimization Methods in Business Analytics, 2.008x Design and Manufacturing, and 11.405x Political Economy and Society.
- Gave many presentations highlighting digital learning and residential education work/accomplishments for colleagues and visiting delegations.
- Designed and taught an IAP course on theories of intelligence and their relationship to student learning and achievement.
- Facilitated brown bag sessions.
- Designed and led a workshop for Haitian faculty focusing on faculty and teacher training.

With respect to collaborations and committee work, we strengthened relationships with campus partners including Dean for Undergraduate Education Dennis Freeman, Janet Rankin (Teaching and Learning Laboratory), Gen Filiault (Office of Faculty Support), Sally Susnowitz (Division of Student Life), Karrie Peterson (MIT Libraries), and Oliver Thomas and Jeanne Chiang (Information Systems and Technology [IS&T]). In addition, we actively collaborated with IS&T on technical issues and Stellar road maps, served on the Academic Technology Ivy+ group and the MITx Faculty Advisory Committee, and participated in the Woodrow Wilson Academy Biology Focus Group and the MIT-Haiti Initiative.

Administration

- Hired the first official learning engineer, filling a key staffing need, and replaced the Residential MITx platform support person
- Served on the Product Council
- Supported digital learning conference room technology
- Improved the process of tracking use of and experiences with the residential platform and advocated for priority changes and improvements
- Developed, produced, and shared a standard monthly Residential Education report with key performance metrics

MITx on edX

MITx on edX is the Institute's interactive learning initiative that offers online versions of MIT courses on the edX platform, a collaboration in online education between MIT and Harvard University. MIT instructors teach MITx courses to learners around the world. With support from the Residential Education team, and using the resources, platform, and pedagogical innovations of MITx, faculty also develop digital learning courses and modules for use in on-campus education.

Many people refer to MITx courses as MOOCs (massive open online courses). The learning experience features multimedia and video content, embedded quizzes with immediate feedback, online laboratories, and peer-to-peer communications. It is also common for courses to use third-party tools as course enhancements. Courses are offered in two formats: self-paced and time bound. Self-paced courses offer all material at once, and learners can move through at their own pace. Time-bound courses have deadlines and tend to make content accessible only on a weekly basis. Learners who demonstrate their mastery of subjects can earn certificates of completion for a fee. MITx on edX operates on a cost-free, open-source, scalable software infrastructure. MITx and edX are building a global community of online learners.

The MITx platform is also used in a growing number of on-campus MIT courses to bring advanced digital learning technologies to residential education. MITx residential modules support online assessments with rapid feedback, active learning classrooms, flexibility in course delivery, and other emerging digital teaching and learning innovations. A digital learning ecosystem has developed whereby a faculty member can develop a course on the MITx platform to support teaching and learning in the classroom. Building on the experience, and benefiting from student feedback, the faculty member can then decide to transform the course for use on edX for global learners.

The vast array of data gathered through MITx global and residential use is helping educational researchers better understand how learners learn and how technology can facilitate effective teaching both on campus and online. Research findings are then introduced into new generations of learning tools, creating a continuous loop of educational innovation.

Summary and Highlights

During the 2016–2017 academic year, MITx on edX continued building more courses, supported new initiatives such as MicroMasters, and refined its course production processes both internally and externally. The MITx team had a number of accomplishments over the past year. Examples include the following:

- Launched 97 online courses, up from 70 last year.
- The MITx Grant Program held two successful calls for proposals, resulting in 12 funded projects from 20 proposals submitted by 14 academic departments and programs. This included a new type of grant for faculty members interested in experimenting with online courses, tools, or videos.
- The MITx Supply Chain Management MicroMasters program completed its first full cycle of five courses and a comprehensive final exam, resulting in 622 learners receiving the MicroMasters credential. This is the first MicroMasters program on edX to finish a full cycle. This was also the first use of a virtually proctored exam for an MITx course.
- Completed the Computer Science X-Series (seven courses, five years, 46 learners) and issued X-Series certificates.
- Introduced a second MicroMasters Program (Data, Economics, and Development Policy) involving five courses that run concurrently.
- Created and ran the MITx Prize for Teaching and Learning in MOOCs, a new award given to faculty and course teams that have made learner-focused innovations within their courses, contributed toward general best practices in the rapidly expanding realm of digital learning, and had an impact on the MOOC experience of global learners.
- Awarded three prizes at the MITx Significant Interest Group event in May 2017: 8.01x Mechanics Series (Deepto Chakrabarty, Peter Dourmashkin, Saif Rayyan, and Michelle Tomasik), 18.01x Calculus Series (David Jerison, Gigliola Staffiliani, Jennifer French, and Karene Chu), and 14.310x Data Analysis for Social Scientists (Esther Duflo and Sara Ellison).
- MITx supported the Open Learning Scholars program with the Al Ghurair Foundation for Education, including coordinating scholarships for learners in MicroMasters programs and participating in a blended learning workshop for the initiative's partner universities, the American University of Beirut and the American University in Cairo.
- The MITx Media Team helped launched the lightboard, a new genre of video capture. Now, 50% of our course teams use this tool for lecture capture.
- The Educational Technology group built and deployed a custom grader for the 6.008.1x team, a first for the group.
- Facilitated accessibility enhancements of MITx 18.01x and 18.03x Mathlets (in collaboration with Haynes Miller, Jennifer French, and Jean-Michel Claus).

- The ODL Online Accessibility Progress Report, outlining strategies, challenges, and the need for MIT-wide accessibility guidance, was presented to ODL leadership in January 2017.
- The IT Accessibility at MIT report, outlining the need for an Institute-wide working group on accessibility, was presented to the IT Governance Committee and faculty officers in May 2017.
- Participated in outreach events such as the MIT open house, Careers Across MIT, Family Weekend, and the Festival of Learning; collaborated with the MIT Libraries, The MIT Press, and the Media Laboratory; and met with several international guests to discuss MIT's views on digital learning.
- Offered 34 new MOOCs and 63 MOOCs that had been offered in prior semesters. We enrolled about 1.1 million learners from more than 200 countries across these 97 MOOCs, among whom roughly 583,000 actually participated in the courses.
- Provided additional support for several CCX (Custom Courses on edX) and Digital Learning Solutions courses.
- Generated $3.1 million in gross revenue in FY2017 through ID-verified certificates and licensing arrangements.
- Refined the MITx service model across the MITx sub-units (e.g., Media Services, Educational Technology), resulting in improved collaborations across teams, fewer errors, and streamlined communications.
- Finalized the MITx database for better course tracking and reporting and began implementing capacity tracking for course work.

Table below shows the cumulative impact of MITx on edX since its inception in 2012.

Cumulative Worldwide Impact of MITx

Metric	Total
Cumulative total enrollment	5.7 million*
Cumulative total participation	3.3 million
Certificates of completion	160 thousand
ID-verified certificates	51 million

*2.7 million unique enrollments

Goals and Objectives

The mission of MITx is to support the development of free, openly licensed, scalable, MIT-quality courses for academically talented learners worldwide; support the use of digital learning tools and techniques in the delivery of MIT residential programs; and further the understanding of best practices in emerging digital and scalable learning environments via data collected from MITx learners. MITx goals are as follows.

- Reach: Expand access to education worldwide
- Residential: Improve teaching and learning across campus

- Research: Advance teaching and learning through educational research
- Revenue: Generate revenue to help sustain MITx and other ODL units

MITx major operational priorities during FY2017 were:

- Develop best practices for the implementation of accessible course content in the edX platform by providing guidance on how to incorporate the necessary technical or instructional elements
- Experiment with faculty group training in order to use time efficiently while encouraging faculty collaboration
- Normalize course intake procedures in accordance with the MITx grant process
- Develop synergies, improved efficiencies, and communications with other ODL units, the MIT community, and external resources

MITx Courses on edX–AY2017

Course	N/R*	Title	Instructor(s)	Reg.**	Participants	Passed	Certs†
Fall 2016							
2.008x	N	Fundamentals of Manufacturing Processes	A. J. Hart, S. Sarma	14,208	9,474	132	163
3.032.1x	R	Mechanical Behavior of Materials, Part 1: Linear Elastic Behavior	L. Gibson	10,177	5,882	128	149
3.032.2x	R	Mechanical Behavior of Materials, Part 2: Stress Transformations, Beams, Columns, and Cellular Solids	L. Gibson	5,226	2,080	88	81
3.032.3x	R	Mechanical Behavior of Materials, Part 3: Time Dependent Behavior and Failure	L. Gibson	4,560	1,719	51	53
3.086x	R	The Iterative Innovation Process	E. Fitzgerald	10,043	4,381	77	173
3.091x	R	Introduction to Solid State Chemistry	M. Cima	7,750	3,886	47	57
4.605x	R	A Global History of Architecture	M. Jarzombek	21,469	12,614	355	356
6.00.2x	R	Introduction to Computational Thinking and Data Science	E. Grimson, J. Guttag	18,376	10,669	573	745
6.004.1x	R	Computation Structures—Part 1: Digital Circuits	C. Terman	23,122	14,420	150	250
6.004.2x	R	Computation Structures—Part 2: Computer Architecture	C. Terman	12,341	5,003	82	109
6.005.1x	N	Software Construction in Java	R. Miller	50,109	29,063	406	777
6.008.1x	N	Computational Probability and Inference	P. Golland, G. Wornell, L. Zheng	18,566	12,245	217	274
7.00x	R	Introduction to Biology: Secret of Life	E. Lander	10,119	7,282	10	82
7.QBWx	R	Quantitative Biology	J. Gore, P. Blainey, E. Lander, E. Fraenkel	6,648	3,746	0	80
8.01.1x	N	Mechanics: Kinematics and Dynamics	D. Chakrabarty, A. Frebel	12,218	8,712	177	117
8.01.2x	N	Mechanics: Momentum and Energy	D. Chakrabarty	6,053	2,892	144	69
8.371x	N	Quantum Information Science II	I. Chuang	3,226	1,900	21	58

Note: In September 2015, edX eliminated the honor code (free) certificate. Courses that were open for enrollment prior to the announcement of this change still awarded honor code certificates. Courses opened for enrollment after the announcement offered only ID-verified (paid) certificates.

*New / Reprised

**Registrations

†ID-Verified Certificates

Course	N/R*	Title	Instructor(s)	Reg.**	Participants	Passed	Certs†
11.127x	R	Design and Development of Games for Learning	E. Klopfer	16,533	6,366	64	201
14.100x	N	Microeconomics	E. Duflo, J. Gruber	13,803	7,951	280	268
14.310x	N	Data Analysis for Social Scientists	E. Duflo, S. Ellison	13,288	7,458	115	351
14.73x	R	Challenges of Global Poverty	E. Duflo, A. Banerjee	4,993	2,230	71	153
14.740x	R	Foundations of Development Policy: Advanced Development Economics	E. Duflo, A. Banerjee, B. Olken	6,483	3,140	45	161
15.053x	N	Optimization Methods for Business Analytics	J. Orlin	16,065	9,383	218	234
15.671.1x	R	u.lab: Leading From the Emerging Future	O. Scharmer	24,584	14,229	262	1,475
16.00x	R	Introduction to Aerospace Engineering: Astronautics and Human Spaceflight	J. Hoffman	26,347	13,446	556	1,193
CTL.SC0x	N	Supply Chain Analytics	C. Caplice	40,472	20,746	596	4,910
JPAL 101x	R	Evaluating Social Programs	R. Glennerster, M. Shotland	5,473	2,894	15	156
JPAL 350x	N	Measuring Health Outcomes in Field Surveys	R. Glennerster, M. Shotland	2,372	1,153	19	57
Spring 2017							
3.054.1x	R	Cellular Solids Part 1: Structures, Properties and Engineering Applications	L. Gibson	2,520	1,282	18	34
3.054.2x	R	Cellular Solids Part 2: Cellular Solids in Medicine	L. Gibson	834	218	12	9
3.054.3x	R	Cellular Solids Part 3: Cellular Solids in Nature	L. Gibson	683	154	11	9
6.00.1x	R	Introduction to Computer Science and Programming Using Python	E. Grimson, J. Guttag	69,420	44,570	1,582	2,341
6.00.2x	R	Introduction to Computational Thinking and Data Science	E. Grimson, J. Guttag	18,290	10,022	431	492
6.004.3x	R	Computation Structures—Part 3: Computer Organization	C. Terman	8,161	1,865	38	84
6.005.2x	N	Advanced Software Construction in Java	R. Miller	21,212	8,118	101	310
6.041x	R	Introduction to Probability: The Science of Uncertainty	J. Tsitsiklis	25,479	17,498	241	318
7.00x	R	Introduction to Biology: Secret of Life	E. Lander	10,683	7,229	7	100
7.28.1x	R	Molecular Biology: DNA Replication and Repair	S. Bell, T. Baker	7,228	3,767	70	126
7.28.3x	N	Molecular Biology: RNA Processing and Translation	S. Bell, T. Baker	4,253	2,396	211	107
8.01.3x	N	Mechanics: Rotational Dynamics	D. Chakrabarty	4,832	2,033	107	60
8.422.1x	N	Atomic and Optical Physics: Quantum States and Dynamics of Photons	W. Ketterle, D. Pritchard, D. Kleppner, I. Chuang	2,968	1,771	47	30
8.422.2x	N	Atomic and Optical Physics: Atom-Photon Interactions	W. Ketterle, D. Pritchard, D. Kleppner, I. Chuang	1,695	702	41	17
8.422.3x	N	Atomic and Optical Physics: Optical Bloch Equations and Open System Dynamics	W. Ketterle, D. Pritchard, D. Kleppner, I. Chuang	1,376	481	40	14
11.132x	R	Design and Development of Educational Technology	E. Klopfer	6,431	2,773	53	170

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**Registrations

†ID-Verified Certificates

Course	N/R*	Title	Instructor(s)	Reg.**	Participants	Passed	Certs†
11.154x	N	Launching Innovation in Schools	J. Reich, P. Senge	8,576	4,292	104	305
11.155x	N	Design Thinking for Leading and Learning	J. Reich	13,918	5,762	125	405
11.405x	R	Just Money: Banking as if Society Mattered	J. P. Thompson	6,078	3,266	158	180
14.100x	R	Microeconomics	E. Duflo, J. Gruber	13,161	6,612	1	0
14.310x	R	Data Analysis for Social Scientists	E. Duflo, S. Ellison	10,062	4,985	0	0
14.73x	R	Challenges of Global Poverty	E. Duflo, A. Banerjee	6,912	3,164	0	0
14.740x	R	Foundations of Development Policy: Advanced Development Economics	E. Duflo, A. Banerjee, B. Olken	5,358	2,309	0	0
15.662x	R	Shaping the Future of Work	T. Kochan	3,069	1,595	49	83
18.031x	N	Introduction to Differential Equations	H. Miller, D. Jerison, B. Poonen, L. Demanet, J. Dunkel, A. Mattuck	15,523	10,517	277	215
20.305x	R	Principles of Synthetic Biology	R. Weiss	5,308	3,095	15	110
21W.789x	R	Mobile Application Experiences	E. Barrett, F. Bentley	7,833	2,869	0	37
Bootcamp0	R	You Can Innovate: User Innovation & Entrepreneurship	E. von Hippel	3,228	1,279	18	12
Bootcamp1	R	Entrepreneurship 101: Who Is Your Customer?	B. Aulet	9,414	2,325	65	25
Bootcamp2	R	Entrepreneurship 102: Do You Have a Product?	B. Aulet	3,229	554	9	6
Bootcamp3	N	Entrepreneurship 103: Show Me the Money	B. Aulet	11,014	4,109	76	14
CTL.SC0x	R	Supply Chain Analytics	C. Caplice	27,187	12,610	140	1,636
CTL.SC1x	R	Supply Chain Fundamentals	C. Caplice	31,532	16,235	230	2,713
CTL.SC2x	R	Supply Chain Design	C. Caplice	22,469	6,840	109	1,181
CTL.SC4x	N	Supply Chain Technology	C. Caplice	23,280	8,182	204	1,984
HST.936x	N	Global Health Informatics to Improve Quality of Care	L. Celi, K. Paik	4,712	2,178	132	166
JPAL 102x	N	Designing and Running Randomized Evaluations	J. Doyle, B. Olken, F. Schilbach, T. Suri	4,573	2,148	1	0
LaunchX	R	Becoming an Entrepreneur	L. Stach	68,080	38,170	0	1,050
Summer 2017							
3.15.1x	R	Electronic Materials and Devices	C. Ross	5,099	2,080	35	66
3.15.2x	R	Optical Materials and Devices	C. Ross	1,625	1	0	24
3.15.3x	R	Magnetic Materials and Devices	C. Ross	1,085	3	0	2
6.00.1x	R	Introduction to Computer Science and Programming Using Python	E. Grimson, J. Guttag	65,191	33,470	0	2,988
7.28.2x	R	Molecular Biology: DNA Transcription and Transposition	S. Bell, T. Baker	1,898	738	0	51
7.28.3x	R	Molecular Biology: RNA Processing and Translation	S. Bell, T. Baker	1,191	8	0	5
8.422.4x	N	Atomic and Optical Physics II	W. Ketterle, D. Pritchard, D. Kleppner, I. Chuang	1,204	446	29	12
8.422.5x	N	Atomic and Optical Physics II	W. Ketterle, D. Pritchard, D. Kleppner, I. Chuang	1,246	394	5	16
14.01x	N	Introductory Microeconomics	J. Gruber	2,390	4	0	26

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**Registrations

†ID-Verified Certificates

Course	N/R*	Title	Instructor(s)	Reg.**	Participants	Passed	Certs†
14.100x	R	Microeconomics	E. Duflo, J. Gruber	11,792	4,695	0	0
14.310x	R	Data Analysis for Social Scientists	E. Duflo, S. Ellison	22,051	8,206	0	0
14.73x	R	Challenges of Global Poverty	E. Duflo, A. Banerjee	5,126	1,850	0	0
14.740x	R	Foundations of Development Policy: Advanced Development Economics	E. Duflo, A. Banerjee, B. Olken	5,731	2,140	0	0
15.071x	R	The Analytics Edge	D. Bertsimas	19,474	8,838	0	634
15.390.1x_SPA	R	Entrepreneurship 101: ¿Quién es tu cliente? (Entrepreneurship 101: Who Is Your Customer?)	B. Aulet	1,037	5	0	115
18.01.1x	R	Calculus 1A: Differentiation	D. Jerison, G. Staffilani	9,041	4,992	0	216
18.03Lx	N	Transfer Functions and the Laplace Transform	H. Miller, D. Jerison, B. Poonen, L. Demanet, J. Dunkel, A. Mattuck, G. Staffilani	3,233	1,218	0	61
24.00x	R	Introduction to Philosophy: God, Knowledge, and Consciousness	C. Hare	5,909	1,882	0	61
Bootcamp0	R	You Can Innovate: User Innovation & Entrepreneurship	E. von Hippel	3,502	618	10	6
Bootcamp1	R	Entrepreneurship 101: Who Is Your Customer?	B. Aulet	3,865	1,118	0	7
Bootcamp2	R	Entrepreneurship 102: Do You Have a Product?	B. Aulet	2,774	405	11	6
Bootcamp3	R	Entrepreneurship 103: Show Me the Money	B. Aulet	1,676	7	0	2
CITE 101x	N	Technology Evaluation for Global Development	B. Sanyal, D. Frey	1,139	446	0	45
CTL.CFx	N	Supply Chain Comprehensive Exam (Virtual)	C. Caplice	2,726	1,344	19	749
CTL.CFx	N	Supply Chain Comprehensive Exam (UTC-5)	C. Caplice	155	83	0	72
CTL.CFx	N	Supply Chain Comprehensive Exam (UTC+1)	C. Caplice	79	36	0	28
CTL.CFx	N	Supply Chain Comprehensive Exam (UTC+8)	C. Caplice	217	24	0	19
CTL.SC1x	R	Supply Chain Fundamentals	C. Caplice	18,476	6,161	0	871
CTL.SC3x	R	Supply Chain Dynamics	C. Caplice	19,503	1,102	0	518
JPAL 101x	R	Evaluating Social Programs	R. Glennerster, M. Shotland	3,064	1,556	14	130
JPAL 101x_SPA	R	Evaluación de Impacto de Programas Sociales	M. Shotland	605	5	0	182
JPAL 102x	R	Designing and Running Randomized Evaluations	J. Doyle, B. Olken, F. Schilbach, T. Suri	3,430	1,091	0	0
LaunchX	R	Becoming an Entrepreneur	L. Stach	18,589	7,017	0	418
STL.161x	N	Entrepreneurial Land Redevelopment Approach: Land Readjustment	Y. Hong	909	471	16	13
STL.162x	N	Socially-Responsible Real Estate Development	L. Susskind	1,355	564	8	38

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*New / Reprised

**Registrations

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Administration

In AY2017, we focused on stabilizing our structure with good management practices. Accomplishments are detailed below.

- Organization: Changed our educational technologist's title to senior educational technologist and hired two new people in entry-level educational technology positions and focused on creating a consistent professional development plan by working with MITx managers to research and create personal development plans.
- Services and support: The Intellectual Property (IP) team developed course reuse policies for internal and external queries, MOOC educational technologists supported the Residential spring course rush in the absence of a Residential educational technologist, and the IP team issued a reading request guide for using copyright content in MOOCs. In addition, the MITx database application was upgraded to include an IP portal for course team use in order to track individual items and their permission status. Finally, the MITx Media Team, along with other media teams from ODL, created the ODL video studio and ODL audio studio, both of which are running successfully.
- Training: Completed two group faculty training sessions, allowing faculty to connect with each other.
- Capacity management: Piloted new capacity management tracking in order to better plan efforts, tailored accommodation processes for MicroMasters exams to provide time extensions to qualified learners with disabilities, and resolved 22 accessibility requests from global learners with disabilities.
- Marketing and communications: Continued to streamline and improve our email marketing program with a new email template design and began more efficient data reporting via the MITx database. In addition, we began experimenting with paid brand-level social media advertising to increase overall brand visibility and general enrollments and continued to support marketing of MicroMasters programs on MITx channels.
- MITx Digital Learning Lab: Continued to grow and develop a community of practice among lab members. We held a two-day offsite retreat focusing on professional development and future goal setting for job searches and funded nine members to attend professional conferences and events both nationally and internationally.
- MITx database: Added fields and automation to several of our processes, including Office of Foreign Asset Control reporting on countries that should be blocked from edX courses due to embargos.
- Community building: Held two faculty special interest group events to bring the digital community together to share best practices and innovations.
- Support: MITx team members contributed to a variety of ODL-wide projects and committees, including the Capital Campaign Open Learning Scholars project.
- edX: Continued to work on the edX/MITx partnership through weekly touch-base calls, monthly pipeline review meetings, custom reports for edX program managers, and monthly marketing/communication team meetings.

In terms of professional development, MITx team members participated in a number of conferences, seminars, and workshops:

- David Chotin and Brad Kay.Goodman attended the OLC (Online Learning Consortium) Innovate conference.
- Brad Kay.Goodman attended a Nercomp seminar on learner success strategies.
- Lisa Eichel and Dana Doyle attended the Open edX conference in Madrid and an Al Ghurair Foundation/OLS blended learning workshop in Dubai.
- Lisa Eichel attended the Confab Higher Ed Conference in Philadelphia.
- Mary Ziegler presented a slide share ("Accessibility in Online Learning: Users as Learners") at the User Experience Professional Association meeting in Boston.
- Geoff Wilson attended the 2017 Copyright Society meeting in Philadelphia.
- Colleen Cressman attended the 2017 Creative Commons Global Summit in Toronto.
- Lindsey Weeramuni attended the 2017 American Libraries Association conference in Chicago.
- Shira Fructman and Shelly Upton attended the Learning @ Scale conference.
- Shelly Upton attended the 2016 edX global forum, presenting a lightning talk and sitting on a course author panel. She also attended the Open edX conference, co-presenting with Saif Rayan and Peter Pinch.

MITx Faculty Advisory Committee

Purpose

The purpose of the MITx Faculty Advisory Committee is to provide oversight and guidance for MITx courses. The committee:

- Offers clear guidelines on topics related to MITx and is responsive to the MIT faculty with regard to MITx governance.
- Provides oversight on subjects or modules produced for MITx. The residential benefit of each MITx proposal is considered; the budget, timing, and sustainability of each module (learning unit), subject, or subject sequence are assessed based on the strategy described by each department; and each proposal is assessed for whether it adequately reflects the diverse "face of MIT," especially with regard to equity in the demographics of faculty teaching each subject.
- Promotes innovative approaches to an MIT education. The Faculty Advisory Committee evaluates and facilitates innovative new approaches proposed for MITx courses and experiments in digital learning. Also, it guides MITx in seeking to bring innovative new approaches to digital learning and education for MIT students. Such new approaches for developing, employing, and maintaining online materials will emerge over the years ahead, in blended classrooms, modular content, novel approaches to video, animations, simulations, or production tools.

Membership

The committee's chair is Hazel L. Sive, professor of biology. Members are as follows:

- W. Craig Carter, professor, Department of Materials Science and Engineering
- Isaac Chuang, professor, Department of Electrical Engineering and Computer Science, and senior associate dean of digital learning
- Michael Cuthbert, associate professor, Music and Theater Arts
- Woodie Flowers, professor emeritus, Department of Mechanical Engineering
- Dennis Freeman, professor, Department of Electrical Engineering and Computer Science, and dean for undergraduate education
- Mark Jarzombek, professor, Department of Architecture
- S.P. Kothari, professor, Sloan School of Management
- Jennifer S. Light, professor, Program in Science, Technology, and Society and Department of Urban Studies and Planning
- Krishna Rajagopal, professor, Department of Physics, and chair of the faculty
- Pawan Sinha, professor, Department of Brain and Cognitive Sciences
- Iain Stewart, professor, Department of Physics

OpenCourseWare

MIT OpenCourseWare is a free, open, publicly accessible web-based resource that offers high-quality educational materials from more than 2,400 MIT courses, reflecting undergraduate- and graduate-level teaching in all five MIT Schools and 33 academic units. This coverage in all disciplines makes OCW unique among open education offerings around the world. MIT continually updates OCW, adding new courses as they become available and refreshing existing courses with new materials. More than 300 MIT OCW courses are available in six languages from formal translation affiliates, and more than 700 additional courses have been translated by independent organizations and individuals.

Through OCW, MIT faculty share their teaching materials with a global audience of teachers and learners. Educators use these resources for teaching and curriculum development, while students and self-learners draw upon the materials for self-study or supplementary use. On average, OCW attracts about 2.3 million visits per month, and to date more than 230 million people from virtually every country on earth have accessed these resources.

Beyond its service to a worldwide audience, OCW has a significant impact at MIT, where both faculty and students embrace it. Students use OCW resources such as problem sets and exams for study and practice. New freshmen often report that they checked out MIT by looking at OCW before deciding to apply. Instructors often refer students to OCW for part of their coursework. OCW staff work extensively with faculty to develop and refine course materials for publication, and faculty frequently use these updated materials in their classroom teaching. Alumni access OCW materials to continue their lifelong learning.

OCW course content includes thousands of individual resources such as syllabi, lecture notes, course calendars, problem sets and solutions, exams, reading lists, selected readings, videos, simulations, animations, sample programming codes, and more. More than 100 courses and

supplemental resources include complete, captioned video lectures for the entire course. Beyond core academic content, the OCW Educator initiative allows MIT faculty to share their pedagogical insights, with tips on how they teach their courses to students on campus.

Course materials contained on the OCW website are offered under a Creative Commons license and can be freely used, copied, distributed, translated, and modified by anyone, anywhere in the world, for non-commercial educational purposes.

Summary and Highlights

OCW became a smaller organization in AY2017, as three digital publication specialists departed and were not replaced. Two staff members also shifted to part-time status. The decrease in labor resulted in a corresponding decrease in publication volume.

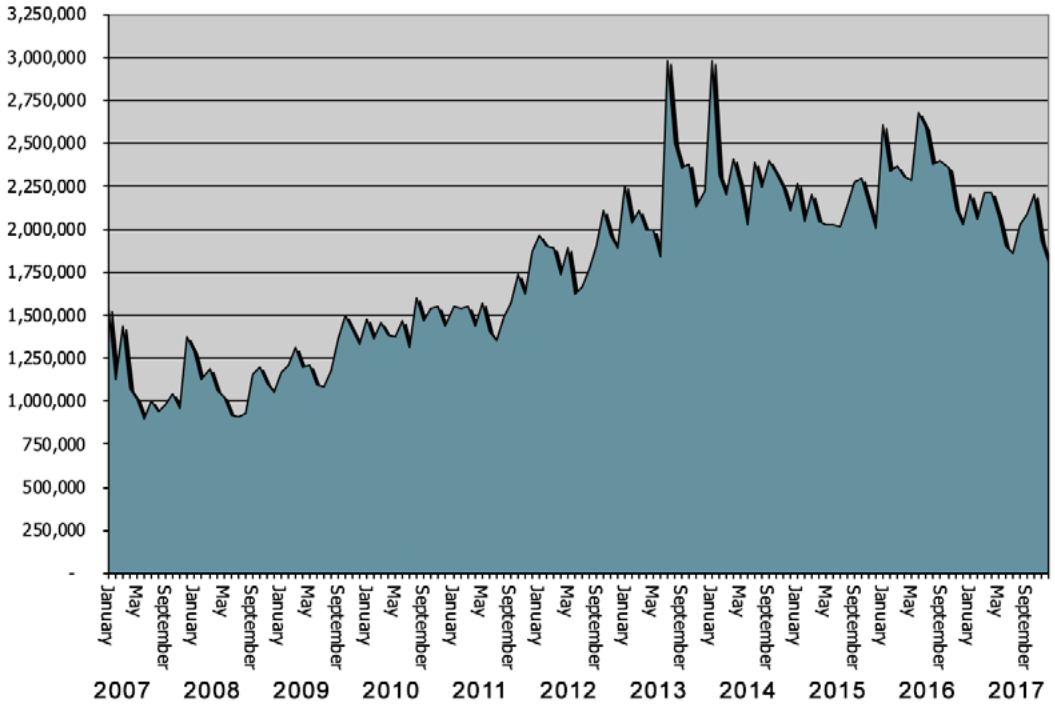
Finances were largely the reason for not maintaining recent levels of staffing. OCW is funded in part through the Office of the Provost and in part through a reserve fund of grants and gifts. This latter fund has been declining gradually for years, and it became necessary to reduce operating expenses accordingly.

Major highlights for AY2017 include the following:

- Published 101 courses and supplemental resources (48 new, 53 updated)
- Published 25 OCW Educator This Course at MIT pages, all with instructor insights
- Logged an average of 2.3 million visits per month.

OCW materials continue to be made available through other sites such as YouTube, iTunes U, VideoLectures.net, and the Internet Archive, as well as through translation affiliates. In fall 2016, the number of subscribers to OCW's YouTube channel surpassed one million. Figure below shows how traffic to the OCW website has grown over the years.

Traffic to the OCW website through June 30, 2017



The table below summarizes OCW's publication status as of June 30, 2017.

OpenCourseWare Publication Metrics as of June 30, 2017

Metric	Total
Courses published on OCW website	2,401
OCW courses archived on DSpace	1,052
Full video lecture series*	117
Exemplary video lectures (partial series)	59
Total sites with audio or video resources	194
Total openly published textbooks	66

*94 courses and 23 supplemental resources.

Goals and Objectives

OpenCourseWare has a formal, hierarchical goal structure that we use for developing the annual operating plan and for monitoring progress against that plan. OCW's goals are as follows.

- Publish high-quality, up-to-date MIT course materials: expand the OCW publication with new MIT course materials in step with the MIT curriculum, maintain the currency of published content, continually improve the depth and quality of materials, continually improve user features and the site structure to optimize the user experience, maintain and enhance an effective technology infrastructure, and continually refine effective and efficient work processes
- Increase use of OCW for teaching and learning: increase awareness of OCW, increase traffic to OCW content via multiple distribution channels, tailor OCW content to the needs of key external audiences, foster the development of communities of learning around OCW content, and support the use of OCW content by educators and educational systems globally
- Maximize the benefits of OCW for the MIT community: support MIT initiatives, create lifelong connections between MIT and our students and alumni, catalyze improvements in teaching and learning at MIT, and showcase MIT's curriculum, strengthen its reputation, and promote international engagement
- Support worldwide open educational resources (OER) and the OCW movement: support the Open Education Consortium (formerly the OCW Consortium) and engage with other OER programs to increase the collective benefits of open resources
- Sustain the MIT OCW program: continually develop the OCW team as a responsive, professional organization; maintain communications to keep stakeholders informed; evaluate and report on OCW programs; manage OCW finances responsibly; ensure the long-term financial viability of OCW; and ensure a vibrant future for OCW through effective planning

Accomplishments

Course Publication

Course publication is the heart of the OCW mission. OCW courses typically include planning materials, such as a syllabus, calendar, pedagogical statement, and faculty

introduction of the course; subject matter content in the form of lecture notes, reading lists, full-text readings, and video/audio lectures; and learning activities, which may include problem sets and solutions, essay assignments, quizzes, exams, labs, and projects depending on the nature of the course.

Faculty take great pride in their teaching, and this is reflected in the depth and quality of the materials they provide for publication on OCW. This year, we:

- Published 96 courses (45 new courses, 51 updated courses) with the following distribution across MIT schools: Architecture and Planning, 14; Engineering, 18; Science, 10; Humanities, Arts, and Social Sciences, 44; and Sloan School of Management, 8 (two other courses were also published, one each for the Edgerton Center and the Experimental Study Group).
- Published five supplemental resources (four new resources and one updated resource): RES.2-006, RES.10-001, RES.15-002, RES.15-003, and RES.21G-001. (In addition to publishing MIT course materials, OCW undertakes many special projects to produce supplemental resources that enrich its educational content. As of June 30, 2017, there were 59 substantial supplemental resources on OCW.) Supplemental resources may be accessed at http://ocw.mit.edu/resources/.
- Processed or cleared more than 2,600 intellectual property objects.
- Published 13 courses and supplemental resources with video assets, along with two Educator video materials (e.g., 3.054, 6.0001, 6.042J, 8.01SC, RES.10-001, RES.2-006, 11.016J). (All new media assets are published with subtitles.)
- Piloted authoring course sites in-house with the goal of reducing vendor service expenses in AY2018.

Highlights for High School

In addition to the regular course publication, OCW also offers Highlights for High School (HFHS), which was launched in 2007. This program takes advantage of our trove of exceptional teaching resources to better serve high school constituencies. Since its inception, the HFHS portal has received more than 5.2 million visits and currently averages more than 35,000 visits per month.

During AY2017 we added Girls Who Build Cameras, a one-day, hands-on workshop for high school girls to learn camera physics and technology, to the HFHS site. This is the second Girls Who Build workshop on the site.

In addition, we published nine IIT Joint Entrance Exam Preparation course videos. These videos are part of a series conceived by an MIT graduate student interested in helping less privileged students in India do well on the entrance exam for the Indian Institutes of Technology. OCW is very popular among students in India, and the video series offered an easy way to serve this important constituency. The videos use lightboard technology (the first appearance of lightboard on OCW) to teach concepts included on the exam. The videos have links to the graduate student's website containing dozens more.

OCW Educator

OCW Educator was conceived by the OCW Faculty Advisory Committee in 2012, and the first of the initiative's resources were published in 2013. OCW Educator enhances the value of OCW for educators at MIT and around the world. Its two main goals are to articulate and share the educational ideas, practices, and pedagogical expertise of MIT faculty and to enhance users' ability to take advantage of course materials on OCW by helping them understand the context and manner in which the materials are used here on campus. Amidst the proliferation of MOOCs and other online courses, this project also supports a developing role for OCW: using the Internet to inspire and enhance innovative classroom teaching, both at MIT and around the world.

The primary component of OCW Educator is This Course at MIT, an OCW section that provides information about how a given course was taught at MIT, including course outcomes, prerequisites, other curriculum information, the kinds of students taking the class, assessments, and student time investment. Typically, this section also includes insights from instructors on how they structured and taught the course.

Segments with instructor insights often have multiple pages in which the instructor expands on the thinking that went into the course. Sometimes the insights section includes video interviews with the instructor interspersed with video highlights showing what happened in the class.

Significant OCW Educator accomplishments during AY2017 are described below.

Publication

- Published 25 This Course at MIT pages, all of which have instructor insights and three of which have video instructor insights. In addition, two pages have teaching assistant insights and three have student insights.
- Captured footage for our next dual-language instructor insights videos (21G.503), in which instructors describe in both English and Japanese their pedagogical approaches to teaching Japanese at MIT.
- Captured footage of two discussion-based humanities courses (24.908 and 24.912) and interviewed the instructor about his teaching approaches in these courses. This is the first time that OCW has video recorded student discussions.
- Continued collaborating with the OCW publishing team to author This Course at MIT pages in-house.

Educator Portal

- Modified the Educator finder tool by shifting the "teaching materials" tab to the left position in an effort to help teachers find these resources more quickly
- Updated the portal "splash" image to reflect recently published teaching materials and included a link to the spotlighted resources
- Updated featured video segments that allow teachers to quickly access useful instructor insights
- Increased the visibility of the Educator portal by featuring links to the Educator finder tool on the OCW find courses mega-menu

Educator Outreach

- Increased visits to the Educator portal from 43,000 in AY2016 to 252,000 in AY2017
- Published an OCW Educator feature in *Said and Done* magazine, published by the School of Humanities, Arts, and Social Sciences (September 2016)
- Created informational handouts about OCW Educator for new MIT faculty orientations
- Presented information on OCW Educator at the Online Learning Consortium Accelerate Conference in Orlando (November 2016)
- Shared OCW Educator with the MIT community at the Festival of Learning on-campus event (February 2017)
- Shared OCW Educator at the OEB Midsummit in Reykjavik (June 2017)
- Shared OCW Educator with more than 1,000 teachers at the National Education Association's annual meeting in Boston (June 2017)
- Successfully requested the posting of a description of OCW Educator along with a link to 5.95J active learning videos on Harvard's activity-based learning website
- Posted periodically on MIT OCW's Facebook page to remind users that OCW Educator offers free MIT teaching materials, organized by subject, and to spotlight specific teaching resources

Project Assessment

- Used a Google Analytics dashboard to track visits to the Educator portal
- Transferred project data to an online database in order to dynamically track publication goals, outreach efforts, and workflows

Site Curation

Site curation refers to deliberative efforts to continually improve the usefulness of OCW and to highlight the breadth, depth, and vitality of the OCW collection. Site curation includes identifying and promoting featured content, enhancing website usability (especially for course browsing and searching), and improving the OCW collection's currency and relevance in relation to the MIT curriculum.

During AY2017, we undertook the following site curation activities:

- Improved tagging of different assignment types to better highlight OCW's rich range of written, hands-on, and design activities
- Collaborated with Professor Karen Willcox to launch an OCW curriculum map that provides an interactive visual representation of the MIT undergraduate curriculum and its coverage on OCW
- Adjusted the mega-menu on the OCW site to emphasize the new course list and downplay the master course list, boosting new course list traffic by 15%

- Supported MITx with automated, dynamically updated linking to related MITx courses on relevant OCW course pages
- Supported the Health of the Planet campaign by collaborating with the Environmental Solutions Initiative on a completely revamped environment courses cross-disciplinary list page
- Improved site currency by launching a streamlined method for renumbering subjects in line with MIT department changes

Accessibility

Accessibility features broaden the reach of OCW to learners with disabilities. OCW now has access to the MITx accessibility manager, hired this year, for advice and review. During AY2017, we:

- Published all new media assets with subtitles
- Extended interactive transcripts to all media players site-wide
- Removed all Real Media files site-wide and converted the files to MP4
- Replaced inaccessible social sharing features with fully accessible features
- Created new fully accessible banner functionality for fundraising campaigns
- Created a new feature that allows users to zoom in on images that are illegible at a small size
- Participated in the alpha pilot of 3Play audio description functionality
- Added subtitles to eight courses that were previously published without subtitles
- Completed minor adjustments to the website to better support accessibility devices

Singapore University of Technology and Design

The Singapore University of Technology and Design (SUTD) project, which has operated under a contract with SUTD, came to a close with the delivery of the final course in December 2016.

Technology

The OCW website and publishing infrastructure rely on a highly technical backend and support team. This technology and team not only support learners and educators across the globe, but also support internal OCW efforts in the areas of outreach, site curation, feedback, publication, and the Educator Project. This year, OCW has made significant efforts to increase the usability, reliability, and functionality of both our website and infrastructure for all parties. To do this, we:

- Executed 41 production releases to the OCW content management system, in which nearly 60 artifacts were released/resolved
- Added an MIT/OCW curriculum map to the site

- Created new functionality to illustrate/highlight MITx and OCW course relationships
- Implemented the Secure Sockets Layer site-wide to augment site security
- Made several usability improvements to the Educator portal
- Added a new test preparation section to Highlights for High School
- Created a white paper to highlight the need for mobile enablement of the OCW site
- Conducted analyses to simplify the site's code and improve page load time
- Established a simpler method for renumbering courses so that the site's publications remain in sync with departments when they change the numbering of their course offerings
- Made several user experience improvements to the site's top navigation
- Supported site curation efforts to better define assignment metadata that will allow sorting/filtering by users
- Supported outreach efforts celebrating 15 years of OCW
- Cleaned up the technical side of the mirror program to improve performance and ease of use
- Worked with an OCW user to build a better OCW mobile app for iOS and Android
- Moved all website analytics from Webtrends to Google Analytics as a cost-saving measure
- Lessened the number of redirects in OCW's redirect chain to improve search engine optimization
- Initiated and nearly completed an upgrade of the OCW content management system to the latest version
- Initiated and nearly completed a transfer of critical infrastructure components to Amazon Web Services
- Began freeing course lists from HTML tables to allow user sorting/filtering of lists

Communications

OCW communications efforts are varied and involve much of the publication team in one way or another. In AY2017, we:

- Maintained the OCW newsletter and blog and the OCW Twitter, Facebook, Pinterest accounts
- Increased the open rate of e-newsletters from 7% to 9.8% and the click-through rate from 0.8% to 0.9%
- Processed more than 5,000 user feedback emails
- Began monitoring YouTube comments by auto-feed in the same manner as emails
- Produced and promoted two Facebook Live events that resulted in 10,818 views and reached 170,528 people

Administration

AY2017 was another successful year for online fundraising. OCW received 3,626 donations in FY2017, an increase of 4% over the previous year. These donations, which included online and matching gifts, totaled $323,134 and came from 2,154 individual donors (down 7% from the previous fiscal year). The median gift remains at $25.

OCW participated in the Institute's first Giving Day on March 14, 2017. We created and managed the marketing and fundraising efforts targeted to OCW learners. The campaign resulted in 169 gifts for a total of $8,810, the largest number of gifts OCW has received in one day.

OCW saw a unique surge in organizations interested in advertising on OCW and OCW social channels. OCW's average advertising revenue in a given fiscal year is about $4,000. Advertising revenue came from three advertisers and totaled $48,878 in FY2017, with 50% for banner advertising and 50% for marketing on OCW social channels (Facebook, Twitter, e-newsletter, blog).

OCW Faculty Advisory Committee

The Faculty Advisory Committee is an internal oversight group that advises on OCW policy, sustainability, and relations with the MIT faculty and with academic departments. Committee members in AY2017 were as follows:

- Hal Abelson, Electrical Engineering and Computer Science
- Noam Buckman, Mechanical Engineering
- Cecilia d'Oliveira, Office of Digital Learning (ODL)
- Eric Klopfer, Urban Studies and Planning
- Vijay Kumar, Office of Educational Innovation and Technology
- Stuart Madnick, Sloan School of Management
- Haynes Miller, Mathematics
- Shigeru Miyagawa, Foreign Languages and Literatures
- Hazel Sive, Biology
- Karen Willcox (chair), Aeronautics and Astronautics
- Dick Yue, School of Engineering

Bootcamps

Summary and Highlights

FY2017 was a year of scale up and new programs for MIT Bootcamps. The program ran six bootcamps/workshops (as compared with one in FY2015 and two in FY2016), including the largest open-enrollment bootcamp (118 participants) to date. The program

also had a number of firsts: the first Internet of Things bootcamp, the first corporate innovation bootcamp, and the first innovations in education bootcamp. The unit exceeded its revenue target of $2 million by approximately 25%.

Goals and Results

Functional Area Goals and Results–FY2017

Functional area	Goals / Priorities	Results
Faculty: build scalable support for faculty to experiment and succeed	Involve 10 new faculty in MIT Bootcamps	We have engaged five new faculty and six new MIT researchers as instructors in Bootcamps
	Produce two 2 non-entrepreneurship bootcamps	We have delivered three new bootcamps (Internet of Things, corporate leadership and innovation, and innovations in education)
Financial: invest in areas that promote financial sustainability, monitor costs	Generate Bootcamps revenue of $2 million	Bootcamps have generated approximately $2.6 million in revenue (approximately $1.3 million in sponsorships/fees and approximately $1.3 million in tuition)
Organizational: generate Bootcamps revenue of $2 million	Build on the strategy of "harmonization," involving the larger ODL team in bootcamp development	We have begun to engage TLS (Teaching, Learning, Scholarship) in reviewing our curriculum
	Further pursue the strategy of "virtualization," involving Bootcamps alumni and other collaborators in the Bootcamps work stream on a virtual, remote, part-time basis; transform from a "squad of team members" to an "army of collaborators"	Bootcamp alumni are actively involved as mentors, interviewers, and outreach partners
Leadership and innovation: support strategic initiates	Conduct experiments linking DLS and Bootcamps via the MIT-Barcelona collaboration	We are working with MIT Professional Education on the MIT Beyond Food Program
	Continue driving the internationalization of Bootcamps by holding camps in Turkey, Australia, Spain, and Malaysia	We held bootcamps in Turkey, Mexico, Australia, and Taiwan
Customer insights/ experience	Build a 50-member advisory council (composed of MOOC learners, MicroMasters candidates, and bootcamp participants) and involve the council in MOOC/MicroMasters/ Bootcamps product development	We do not have a formal advisory council

Administrative Initiatives and Accomplishments

Bootcamps entered into its first joint agreement with another MIT department as a sponsor for the Beyond Food Program in Taiwan. Working with both MIT Bootcamps and Professional Education, the sponsor has been able to reach multiple target groups (individual innovators, corporate innovators, academics, and senior managers). This has also allowed the MIT Bootcamps team to expand its networks within the Institute.

MIT Bootcamps is also continuing to streamline and optimize its internal systems, particularly the admissions process. In addition, the group has been working with Finance and Engineering to streamline accounts, external compensation, and tuition payments.

Bootcamps–FY2017

Bootcamp	Date	Location(s)	Participants (#)	Countries (#)	Sponsor(s)	Sponsorship type/amount
MIT Global Entrepreneurship Bootcamp, Class 4	August 2016	Cambridge, MA	80	35	n/a	n/a
MIT Turkcell Innovation and Leadership Bootcamp	January 2017	Tuzla, Istanbul, Turkey	153	Turkey	Turkcell	$600,000 fee
MIT-UDG You Can Innovate CCX and Workshop	CCX: fall 2016; workshop: February 2017	Online and Guadalajara, Mexico	200 online; 83 at workshop	Mexico	University of Guadalajara	$200,000 fee
MIT Global Entrepreneurship Bootcamp, Class 5	March 2017	Brisbane, Australia	118	35	Queensland State government and Queensland University of Technology	$278,000 sponsorship
MIT Beyond Food Minibootcamp	May 2017	Taipei, Taiwan	180	Taiwan	Hao-Shi Foundation / Ting-Ji Development Corporation	$200,000 sponsorship
MIT Internet of Things Bootcamp	May-June 2017	Cambridge, MA	55	13	Cash: Telit and Resin.io; in-kind: Sensoro, Texas Instruments, Particle.io, Electric Imp, and Solidworks	$13,000 cash; $15,200 in-kind

MIT xPRO

MIT xPRO (formerly Digital Learning Solutions) develops and delivers online, fee-based programs targeted to adult learners who wish to expand their knowledge and build their skills, primarily in the context of professional education. MIT xPRO was formed in spring 2015 in response to market demand for MIT professional education, especially in rapidly changing technology and business disciplines, where MIT is recognized as a leader.

Summary and Highlights

In its second year of operations, MIT xPRO:

- Partnered with Boeing and the National Aeronautics and Space Administration (NASA) to launch a four-course, online program (Architecture and Systems Engineering: Models and Methods to Manage Complex Systems) that leads to an MIT professional certificate
- Offered the Entrepreneurial Negotiations course for a second time
- Generated $3.39 million in gross revenue for the Architecture of Systems Engineering program, $38,000 in gross revenue for Entrepreneurial Negotiations, and $3.43 million in total gross revenue
- Oversaw an information-sharing group of cross-functional leaders from MIT who are spearheading digital initiatives within their respective departments
- Developed a strategic plan

Goals and Objectives

Goals for FY2017 were as follows:

- Develop the Architecture and Systems Engineering: Models and Methods to Manage Complex Systems four-course program
- Generate $3 million in gross revenues through B2B and B2C sales
- Develop a strategic plan/product road map for MIT xPRO
- Grow the marketing and sales functions
- Grow the product development team to support the demand for more courses / programs
- Serve as a knowledge aggregator for all digital paid offerings across campus and partner with departments, labs, and centers to kick start new efforts

Accomplishments

Accomplishments over the past year included:

- Partnered with Boeing to launch the Architecture and Systems Engineering: Models and Methods to Manage Complex Systems program. Course 1 (Architecture and Complex Systems) launched in September 2016, course 2 (Models in Engineering) in October 2016, course 3 (Model-Based Systems Engineering: Documentation and Analysis) in January 2017, and course 4 (Quantitative Methods in Systems Engineering) in February 2017. The program had approximately 1,900 enrollees and generated about $2.3 million in gross revenue. The courses were re-offered beginning in March 2017. Architecture and Systems Engineering won the 2017 American Society for Engineering Excellence in Engineering Collaboration Award.
- Reran the entrepreneurial negotiations course, generating approximately 230 enrollments and $38,000 in gross revenue.
- Exceeded overall gross revenue targets by $430,000.
- Developed an MIT xPRO strategic plan and road map for FY2018–FY2022.
- Grew the team by hiring two project managers, one video editor, and one digital marketer.
- Convened a group of cross-functional leaders from MIT who are guiding digital initiatives in their respective areas. The group meets quarterly to share knowledge, provide updates on projects, and collaborate on work going forward.

Administrative Initiatives and Accomplishments

- Established a governance committee to oversee and monitor all online professional education activities across the Institute
- Conducted market research on course development/course platform vendors and created a list of four pre-approved vendors for others across the Institute to partner with (edX, Get Smarter, Emeritus, Exec Online)

Strategic Education Initiatives

Strategic Education Initiatives supports partnerships between MIT and other universities, foundations and trusts, nongovernmental organizations, and national governments in their efforts to advance and transform educational opportunity through digital learning. SEI projects span classrooms and community colleges in the United States and hundreds of schools in India, helping to advance the field of digital learning and prepare students for the science, technology, engineering, and math (STEM) workforce. SEI supports the Institute's overall strategy for pre-kindergarten to grade 12 (pre-K–12) education.

SEI offers a variety of solutions and products including those that incorporate MITx courses and modules, blended learning experiences for configuring and developing new programs and institutions, and capacity-building opportunities through professional development. SEI also partners with faculty to create new digital tools for use in MITx courses and in residential teaching.

Through these initiatives, MIT furthers its mission of advancing learning worldwide. Moreover, SEI's work in other settings can lead to new pedagogy and curriculum design at MIT.

Summary and Highlights

In FY2017, SEI made significant headway in addressing its mission through contributions that will help to shape the future of education at MIT and elsewhere by means of an increased emphasis on digital learning. Notable SEI accomplishments and activities have included:

- Contributing to the Connected Learning Initiative project, including supporting the design and development of curriculum modules in English, math, and science; developing an assessment platform and interactive tools; supporting teacher professional development; and conducting ongoing research
- Supporting the MIT pre-K–12 initiative through the pK-12 Action Group and contributing to the launch of the Abdul Latif Jameel World Education Lab
- Producing freely available web series, live outreach events, and on-campus digital media courses to promote STEAM (science, technology, engineering, arts, and mathematics) literacy
- Supporting the development of an agreement with SRM University to sub-license eight MITx courses for delivery to more than 1,500 students in the next three years
- Managing the sunset of SEI as an organization in conjunction with the J-WEL launch

Goals and Objectives

During FY2017, SEI's broad goals were to:

- Develop (and explore) new strategic education initiatives on behalf of the Institute, including the SRM University project
- Support the Institute-wide pre-K–12 initiative
- Manage the following ongoing initiatives: Connected Learning Initiative, Open Learning Scholars, the MIT-Haiti Initiative, MIT+K12 Videos, Fly-by-Wire (FbW), Learning @ Scale, iLab, the Video Concept Browser, and Backstage

Accomplishments

SRM University Project

In FY2017, SEI led the development of an agreement with SRM University to sub-license eight MITx courses over the next three years and to provide annual training to prepare SRM faculty to teach courses based on MITx course materials. Courses are as follows:

- 6.00x Introduction to Computer Science and Programming
- 6.002x Circuits and Electronics
- 6.004x Computation Structures
- 8.01x Introduction to Classical Mechanics
- 8.02x Introduction to Electricity and Magnetism
- 18.01x Single Variable Calculus
- 18.03x Differential Equations
- 2.01x Elements of Structure

Pre-K–12 Initiative

The pK-12 Action Group was formed to bring MIT's unique "mind and hand" learning approach beyond the campus to pre-kindergarten through grade 12 learners and teachers around the world, building upon existing efforts and developing new ones. The MIT pre-K–12 initiative engages MIT faculty, staff, students, and researchers in pursuing two interrelated goals, as follows.

- Changing the world through learning: bringing the MIT hands-on, minds-on approach to pre-K–12 learners and teachers through the development of new technologies, services, and curricula ranging from low-cost laboratory instruments and innovative computing environments to new strategies for connecting learners around the world
- Changing the world of learning: advancing understanding of what we know about teaching and learning through a diverse set of research methodologies

The pK-12 Action Group harnesses activities already in progress at MIT while providing new opportunities, synergy, and coordination for the more than 100 pre-K–12 activities and projects across the Institute. In FY2017, key accomplishments included:

- Coordinating and managing the growth of the pre-K–12 community through a series of academic and social events
- Designing and supervising market research for a new pre-K–12 alliance
- Establishing the first learning grants for the MIT pre-K–12 community
- Organizing a STEAM camp for students and teachers in Hong Kong that will be taught by a team of faculty, staff, and students from MIT

Open Learning Scholars

OLS is a collaboration between MIT and the Abdulla Al Ghurair Foundation aimed at expanding access to and use of digital STEM learning environments among learners worldwide. The goal is to make some of the best STEM education in the world available to Arab youth through innovative online and blended learning offerings. OLS leverages digital (online) learning in the Arab world, especially for displaced populations, and supports educational transformation and capacity building through blended learning using curricula from MITx courses. FY2017 key accomplishments included:

- Hosting a blended learning workshop in Dubai (with the American University of Beirut and the American University in Cairo) to begin the process of sharing MITx curricula from 7.00x Introduction to Biology, 6.00.1x Introduction to Computer Science and Programming Using Python, 6.00.2x Introduction to Computational Thinking and Data Science, and 18.03x Linear Differential Equations
- Supporting the Al Ghurair Foundation's efforts to provide scholarships for learners in the MicroMasters Supply Chain Management and Data, Economics, and Development Policy programs

Connected Learning Initiative

The Connected Learning Initiative is a bold and innovative collaboration between the Tata Groups (Tata Trusts, Tata Institute of Social Sciences Center for Education Innovation and Action Research) and MIT. Its goal is to improve the professional and academic prospects of high school students in underserved communities in India. CLIx will reach approximately 450 schools, 30,000 students, and 3,300 teachers in four states (Rajasthan, Telangana, Chhattisgarh, and Mizoram) through 2017.

At MIT, SEI is collaborating with Professor Eric Klopfer and his team in the Education Arcade to support curriculum teams in India in designing and developing English, science, and mathematics modules for grades 8 and 9.

Key CLIx accomplishments during FY2017 are outlined below.

Technology

In the area of technology, MIT's CLIx activities focused on the design and development of platforms and interactive digital tools:

- Developed an assessment authoring platform that enables the authoring of 11 question types and updated open embedded assessment players. An estimated 400,000 assessments were delivered to students.
- Developed *Run Kitty Run*, a physics velocity game in which the player trains a mechanical cat to be a better mouse catcher.
- Updated existing tools including the physics video player, the open story tool, and StarLogo Nova.

- Developed a chatbot enabling Telegram users (typically learners in teacher professional development programs) to interact with content in Open EdX–based teacher professional development courses.
- Updated the Unplatform and content player for delivering CLIx curriculum ePubs on stand-alone computers in rural schools.
- Supported the team in India in implementing Digital Learning Toolkit services, adding service abstraction to the CLIx platform, and developing RESTful service endpoints.

Research

MIT's CLIx research activities focused on the evaluation of the overall project, as well as providing support for the research activities of the domain and teacher professional development teams:

- Supported development of research instruments and analysis of data from a baseline study of students in grades 8 and 9
- Consulted with domain teams on their research designs for evaluation studies and design-based research
- Conducted studies including an investigation examining various stakeholders' perspectives on CLIx and a joint observation study of classroom implementation in Rajasthan
- Created an evaluation plan for teacher professional development in CLIx, implemented selected studies, and developed course evaluation instruments

Teacher Professional Development

Teacher professional development team members at MIT worked closely with the math, science, and English development teams in India:

- Planned and implemented a teacher professional development design camp that focused on integrating new pedagogies into professional development materials and designed the overall curriculum for a new blended-learning certificate program offered by the Tata Institute for the Social Sciences (TISS). This program is being offered to all CLIx teachers as of June 2017.
- Supported the creation of TISS certificate program courses for math, science, and English. We guided teams toward optimal use of the Open EdX platform and other online tools to convey course content and worked with them to design the relevant types of online course activities. Also, we collaborated on drafts of all online lessons and face-to-face sessions in each course, providing feedback to improve instructional design and increase integration of desired pedagogies into the course content. In addition, we assisted with the design of community of practice activities centering around the Telegram chat app to help teachers share ideas.
- Established instruments and processes for evaluation of instructional materials.

Curriculum

The MIT CLIx curriculum team continued to work with partners in India on the design and development of an inquiry-based, technology-rich curriculum. FY2017 efforts focused particularly on physics, biology, and astronomy and included hosting a design camp in October 2017 at MIT. Work with the teams ranged from consultation on conceptual design to collaborative development of interactive digital tools.

MIT+K12 Videos

MIT+K12 Videos is an educational outreach media program seeking to spark curiosity and a love of learning among kids and kids at heart. The project produces original and freely available web series, live outreach events, and on-campus digital media courses to promote STEAM literacy (Science, Technology, Engineering, Arts, and Math) and open the door to MIT and the STEAM world. Its goal is to spark STEAM curiosity among pre-college students, particularly those who may not be STEM inclined. The media work is informed by and contributes to best practices for multimedia and informal learning and helps equip the MIT community to share its love of STEAM with the world. Key accomplishments in FY2017 included:

- Released two reports for the media and learning community (Optimizing Video for Learning and Video Production as a Pathway for Building Identity)
- Offered CMS.S62 Writing and Hosting the Educational Show during the 2017 IAP
- Reached almost 2 million YouTube views, with a 44% female audience (growing from 100,000 views and a 17% female audience in 2011, the program's first year)
- Worked with almost 300 Boston-area middle schoolers as part of the SciVids101 science video workshops
- Produced a five-part original web series with the Department of Nuclear Science and Engineering and the MIT Nuclear Reactor Laboratory
- Produced a five-part original web series with the Early Childhood Cognition Lab
- Ended the program and released the MIT+K12 Videos impact report

MIT-Haiti Initiative

The mission of the MIT-Haiti Initiative is to promote technology-enhanced active learning and the use of the Kreyòl language in STEM disciplines. The initiative's goal is to create tools and resources for active learning and teaching of STEM subjects in Kreyòl as a means of building a solid basis for faculty and curriculum development. With a grant from the National Science Foundation, the MIT-Haiti INSPIRE project conducted seven workshops in Haiti and introduced new active learning pedagogical techniques to more than 300 Haitian faculty, teachers, and administrators. In FY2017, key accomplishments of the initiative were:

- Hosted a two-day symposium in Haiti in March 2017 to share accomplishments and look to the future. The symposium featured panels and open discussions that highlighted the genesis and rationale of the initiative, the milestones and impact so far, and opportunities for future progress.

- Extended the project with additional funding from MIT to share the work developed by the project—an array of objects in both digital and paper format—for availability in Haiti. This library of resources will serve as a guide to the active learning principles communicated through the project workshops.

Fly-by-Wire

The Fly-by-Wire project is a collaboration among MIT, Quinsigamond Community College, and Arapahoe Community College in Colorado. A key accomplishment in FY2017 was the development of adaptive assessment features required for the initial release of the FbW assessment authoring tools. FbW assessment questions are linked to learning outcome maps, providing pathways for student knowledge.

Learning @ Scale

SEI organized the 2017 ACM (Association for Computing Machinery) Learning @ Scale conference, which brought 200 participants from different countries and academic institutions to MIT.

iLab Project

iLabs are real experiments accessed over the Internet using the iLab shared architecture. MIT iLab efforts have included experiments in microelectronics, physics, radiant cooling, and spectrometry. MIT iLabs has collaborated with teams around the world, including groups in Uganda, Nigeria, Austria, Spain, China, Mexico, Brazil, and Australia. MIT iLab project funding has ended, and currently accessible iLabs will be phased out.

Video Concept Browser

The Video Concept Browser allows MIT students to browse and watch lecture videos grouped according to concepts (or learning outcomes). Using this self-service tool, MIT faculty or graduate students upload and tag videos by concept; students can watch the videos to make up for a missed class, to review a concept, and/or to prepare for exams. The Video Concept Browser is used primarily in 2.002 but has also been used in 2.02A, 8.02, and 3.032.

Backstage

Backstage is SEI's suite of educational infrastructure services designed to support next-generation innovative educational applications being developed at MIT and elsewhere. Backstage provides foundational functionality to support the needs of educational applications.

Backstage's assessment services have been deployed in schools in India as part of CLIx, and to date an estimated 400,000 assessments have been delivered to grade 9 students. Backstage's assessment, learning pathway, and content management services have been used by the FbW project to support authoring and delivery of adaptive assessments for community college students.

Key accomplishments in FY2017 are as follows:

- Implemented assessment sequencing functionality and wrong-answer learning outcome tagging to support FbW adaptive assessment requirements
- Developed additional assessment item types, including drag-and-drop, movable word, and audio recording, to support CLIx
- Packaged underlying component technologies for easier distribution and installation
- Supported the development of an assessment authoring tool for use by CLIx curriculum authors
- Trained the CLIx development team in India to implement Backstage services using their locally developed technology

Other Projects

SEI closed out a number of projects in FY17, as follows.

- INK-12: INK-12 (Teaching and Learning Using Interactive Ink Inscriptions in K-12), a collaboration with math educators at TERC, developed and tested pen-based digital tools that focused on multiplication and division in elementary math.
- Technology for Mathematical Argumentation (TMA): The TMA project, a collaboration between MIT and TERC, developed mathematical computation tools for early elementary grades, allowing students to learn and demonstrate algebraic reasoning.
- AIM Photonics Academy: SEI's participation in the AIM Photonics (American Institute for Manufacturing Integrated Photonics) Academy ended. SEI provided website and communications support to the academy, as well as consulting on digital learning.
- Woodrow Wilson Academy: SEI provided input and consulting on the development of the Woodrow Wilson Academy's next-generation platform using the educational system models behind the Backstage service suite.

Teaching Systems Lab

The MIT Teaching Systems Lab investigates the complex, technology-rich classrooms of the future and the systems we need to help educators thrive in those settings. Broadly speaking, our efforts fall under three categories: (1) designing and researching the future of online and blended learning for educators, (2) developing a series of teacher practice spaces that allow educators to rehearse for and reflect upon important decisions in teaching, and (3) leading pilot efforts to "see the future first"—to identify future trends in academia and the working world—and identify how to support K–12 systems in preparing for these trends.

Goals and Objectives

Specific aims for 2016–2017 included the following:

- Develop and launch two Microsoft-funded MOOCs for school leaders (Launching Innovation in Schools and Design Thinking for Leading and Learning)
- Develop and pilot a series of Google-funded online and blended learning experiences to help teachers address the negative effects of unconscious bias
- Regularly test new innovations with pre-service teachers, in-service teachers, and teacher educators and present our work widely at conferences and other scholarly venues
- Develop new partnerships with schools, systems, and networks to deploy more of our innovations in the field
- Provide continued support to the development of the Woodrow Wilson Academy of Teaching and Learning
- Support online learners across Harvard, MIT, and Stanford by developing and delivering targeted psychological support based on social psychology and behavioral economics

Accomplishments

- Received a $650,000 grant from Microsoft to develop two school leadership courses. In their first runs, these courses had a combined enrollment of 18,000 students from more than 160 countries. We published two research reports demonstrating how the courses led to tangible impacts on educator practices; for instance, one participant committed to bringing design thinking to the reform efforts in Worcester.
- Received a $150,000 grant from Google to test the use of our mobile simulation platform, TeacherMoments, with computer science teachers addressing issues of unconscious bias. We created multiple scenarios and developed partnerships for field testing our efforts.
- Hosted six lab play-test events at which teachers and teacher educators offered feedback on our prototypes and learned more about games and simulations in teacher education. These events exposed over 150 local educators to K–12 innovations at MIT.
- Hosted several education stakeholder meetings, including a 50-person meeting.
- Presented our research at venues such as the annual meetings of the National Council for Teachers of Mathematics and the Society for Information Technology and Teacher Education, the Digital Media and Learning Conference, the Learning Analytics and Knowledge Conference, and the Advances with Field Experiments Conference. In addition, we gave invited talks at the University of Virginia's Curry School of Education, TU Delft, the Harvard Graduate School of Education, and a meeting of the Florida Council of Independent Schools. We published papers in *Science*, *AERA Open*, and *The Bridge*, and we have work forthcoming in the *International Journal of Artificial Intelligence in Education*.

- Co-hosted two meetings on educational technology and equity. The meetings, held at Data & Society and Google headquarters, included representatives from companies and foundations such as the Emerson Collective, Google, Facebook, Kapor Capital, Bridge Capital, Ulu Ventures, the Silicon Valley Education Foundation, the Schustermann Foundation, Common Sense Media, the Gates Foundation, the Hewlett Foundation, the Aspen Institute, code.org, the Lego Foundation, Quizlet, Khan Academy, and other organizations.
- Continued our design and development support for the Woodrow Wilson Academy of Teaching and Learning. We developed a series of simulations and practice spaces for the academy, including Eliciting Learner Knowledge, TeacherMoments, and MetaRubric. With funding from Woodrow Wilson Academy, we completed one cycle of teaching and learning innovation grants and started a second cycle, with awards going to support the Edgerton Center, the MIT Media Lab Learning Initiative, and the Computer Science and Artificial Intelligence Laboratory's INK-12 project.
- Deployed targeted interventions to support plan making and a sense of belonging among students in all publicly available MOOCs published through MITx, HarvardX, and Stanford Open EdX, reaching tens of thousands of learners in one of the largest MOOC-related experimental studies ever conducted. We received a $300,000 grant from the National Science Foundation to analyze the study data.

Administration

- We completed a rebranding effort with a new logo, website, and communications.
- With colleagues from ODL, we hosted 180 scholars from around the world at the 2017 ACM Learning @ Scale conference. Justin Reich was the conference's program committee chair.
- Dan Roy served on the organizing committee for the first annual Connected Learning in Teacher Education meeting.
- Lab director Justin Reich was appointed as an assistant professor in comparative media studies. He will continue to lead TSL in that role. He was also appointed as a faculty associate of the Berkman-Klein Center for Internet and Society at Harvard University.

MIT Integrated Learning Initiative

The MIT Integrated Learning Initiative (MITili) funds, connects, and disseminates research on the science of learning. We drive fundamental research on learning to improve approaches to teaching and educational technologies for all levels of learning (pre-K–12, higher education, workplace learning).

MITili researchers develop theories, rigorously test them in the lab, and then work to see them through to implementation in the field across a broad range of scales, including groups, classes, and teams; schools and units; districts and companies; and individual learners. The group's research, divided into three core areas (learners, instruction, and policy), examines conditions necessary for learning to occur.

Summary and Highlights

In May 2016, MITili held its initial kick-off retreat and laid the groundwork to grow from an idea on paper to an operational group with transformative research undertakings supported by specific projects. John Gabrieli (Department of Brain and Cognitive Sciences) was named director, and Parag Pathak (School Effectiveness and Inequality Initiative) was named deputy director.

In August, MITili hired its first two staff members: Associate Director Jeff Dieffenbach and Program Coordinator Steve Nelson. Over the past year, we have joined the McKinsey-led Consortium for Advancing Adult Learning and Development and the IBM-initiated Digital Learning Consortium.

Highlights over the past year included funding of MITili's first sponsored research project, outreach to prospective corporate and foundation research funders, work on a data use agreement, creation of a business plan for the launch of the Lookit research tool, support of the J-WEL launch, and implementation of a communication plan. Further details are offered below.

Goals and Objectives

MITili's work in 2016–2017 focused on accomplishing the following goals and objectives:

- Hiring initial staff
- Continuing and extending fundraising
- Establishing a MITili faculty advisory committee
- Creating a template for a data use agreement
- Designing and implementing a communication plan
- Participating in relevant conferences
- Beginning to distribute funds to support research projects

Accomplishments

- Reached out to large companies (directly) and foundations (via Resource Development) to raise research funds. The J-WEL initiative changed MITili's plan for raising and distributing corporate funds. Under the new model, corporate members will belong to J-WEL, which in turn will provide funding to MITili for learning science research in early FY2018. Active work is under way with Resource Development to procure large foundation grants.
- Established a template for a data use agreement.
- Promoted the program through events, newsletters, social media, and word of mouth. This has led to an increase in website traffic and interest in the program. Our outreach spans the globe, with interest from countries including Mexico, India, South Korea, the Netherlands, Venezuela, Argentina, Canada, Germany, Spain, the United Kingdom, and Kenya.

- Participated in the Office of Digital Learning open house.
- Presented MITili's first sponsored research project at the Elliott Masie 2017 conference. This study examined attention to and outcomes from video-based instruction in an authentic workplace learning environment.
- Initiated a faculty transformational research talk series.
- Created a pre-K–12 system in which the promise of access to quality education is fulfilled for all students and families.
- Established a learning lab dedicated to providing early childhood education practitioners with a space for experimental design to develop best practices.
- Helped secure funding for sponsored research programs aimed at increasing the effectiveness of workplace learning. This effort was a collaboration with the Department of Brain and Cognitive Sciences and the Gabrieli lab.
- Attended the LearnLaunch Across Boundaries conference in Boston, which focused on brand building across pre-K–12 education, higher education, and workplace learning.
- Began visiting local schools and working with personalized learning experts to understand and determine personalized learning's impact on students. MITili aims to be at the forefront of researching the effectiveness of programs in this area.
- Began work as a chief contributor to J-WEL, helping launch the initiative, identifying potential membership opportunities, and planning the initial on-campus summit.
- Teamed with Laura Schulz and the Lookit initiative to plan the launch of the program as a standalone not-for-profit entity. Lookit is an online laboratory in which parents and children can participate in developmental research from home by completing an activity in a web browser while the child's responses are observed via webcam.
- Attended the CLO Symposium in Fort Myers, FL, which focused on business development for workplace learning research.
- Participated in the ODL innovation market.

Business Development

The Business Development group focuses on establishing strategic relationships that support MIT Open Learning's mission and operations. Business Development generates revenue through the commercialization of digital programs for professionals, such as the Architecture and Systems Engineering program created in collaboration with Boeing and NASA.

The Business Development group continuously explores relationships with industry, academic institutions, and nongovernmental organizations (NGOs) to increase the exposure of MIT's online educational assets to professional learners worldwide. We also work closely with Sloan and departments, labs, and centers in developing online and blended programs that both maximize learning impact and ensure sustainable operations.

Summary and Highlights

The group has shifted its focus to establishing long-term strategic relationships with major corporations and organizations that regard learning as a key driver for their businesses. Major accomplishments during the past year included:

- Supported the DLS director in developing a strategy for professional learning solutions (MIT xPRO)
- Successfully collaborated with the marketing team to achieve revenue goals for bulk enrollments for the Architecture and Systems Engineering online program
- Helped instructors secure a deal for a seminar at MIT for 60 deans in the second largest university in Mexico.
- Continued to build relationships with industry and other nonprofit and nongovernmental institutions to set the stage for a successful launch of the newly created J-WEL

Accomplishments

Business Development continued to build a robust pipeline of strategic relationships:

- Supported bulk corporate enrollments for the first and second runs of the Architecture and Systems Engineering online program, generating revenues of more than $3 million.
- Closed on a $200,000 proposal with the University of Guadalajara for delivering an MIT innovation seminar to 60 deans.
- Transitioned the revenue pipeline to support the workplace learning collaborative at J-WEL. Work will continue with companies and NGOs to assess and explore different ways to engage with our new lab.
- Worked with Harvard to deliver our professional online learning programs to their base of extension school students.

Administration

- Continued use of Salesforce as the main business development support tool. In addition, in close collaboration with MIT xPRO, efforts are being made to establish a sustainability plan for that unit.

MIT Video Productions

MIT Video Productions provides video support for academic programs, departments, and Institute initiatives. MVP offers a variety of services on a cost-recovery basis, including video production, distance education support, post-production, and publishing video to the web.

Summary and Highlights

In FY2017, MVP continued to expand on the suite of services it provides to the MIT community, particularly the custom video production and event support/lecture capture business lines.

- Building on the success of 2016, we grew our story-telling business line. MVP was called upon to produce several high-profile video projects in support of major new MIT initiatives, including launch announcement videos in support of The Engine and J-WEL.
- We offer an expanded suite of services in support of special events throughout the Institute, primarily in the recently opened Samberg Conference Center.
- We continue our collaborations with the MIT News Office to produce video content in support of high-profile events, announcements, and press conferences.
- We continue to digitize, catalog, and digitally archive selections from the MVP analog videotape library. Our "digital from analog" file library totals 4,000 assets.
- *A Bold Move*, a documentary produced by MVP in support of the MIT2016 celebration, was recognized with a 2017 New England Emmy Award.
- We have expanded our auto lecture capture experiment by installing a system in Room 6-120.

Goals and Objectives

MVP provides media production and publication services to the MIT community in support of education, research, and outreach. These services include:

- Lecture capture
- Event support, including video production, video capture/delivery, and lighting
- Custom video production
- Video editing
- Video publication
- Duplication services
- Video conferencing
- Webcasting
- Connection to media outlets

During the coming year, MVP will continue to offer auto lecture capture services on an experimental basis to faculty teaching in 34-101 and 6-120. We will also be installing auto lecture capture capabilities during the fall semester in 32-123. In addition, we have received requests to install similar systems in classrooms that were recently or are soon to be renovated.

For more than 35 years, MVP has produced a diverse variety of video content, creating an historical archive of special events that have transpired during that time. With ongoing support from the Office of the Provost, we have continued the process of systematically preserving our vast analog tape library by digitizing and archiving the digital files. To date we have digitized 4,000 analog tapes and we will be digitizing an additional 1,000 tapes during FY2018.

The work we have produced in support of key Institute initiatives has further solidified our reputation as talented storytellers. We launched an ongoing collaboration with the MIT Office of Communications in support of a communications goal articulated by MIT president Rafael Reif: to "make MIT known, the world over, for making a better world." To that end, we have produced a series of videos featuring the important work of MIT's faculty, staff, and students.

Over the past year, we have had the opportunity to work extensively in the newly opened Samberg Conference Center. We are now working closely with the Samberg Center management team to identify and implement improvements in the audiovisual and event support infrastructure. These improvements will include enhanced lighting, staging, and display capabilities. This work overlaps with our ongoing objective for MVP to provide "one-stop shop" solutions for supporting events at MIT.

Accomplishments

MVP continued to provide reliable, valued, and high-quality video production services to clients throughout the Institute. In many cases, we are also called upon to produce content that becomes a programmatic contribution to these events. We continue to work with departments in crafting custom video programs in support of their communication objectives. MVP accomplishments over the past year include the following:

- Successfully completed and screened a documentary for the Chemical Engineering Department Practice School.
- Produced a high-energy video opener for the launch announcement of The Engine for the Office of the Executive Vice President and Treasurer.
- Produced a Building 2 opening/dedication ceremony documentary, an MIT Music Library 20th-anniversary documentary, and a 2.12 Introduction to Robotics class/competition documentary.
- Continued a collaboration with the MIT News Office wherein MVP produces a variety of stories about the "MIT experience." These stories are featured on the MIT.edu homepage or on MIT's social media sites (e.g., Facebook, Twitter).
- Continued to provide robust and cost-effective "media link" services enabling electronic news organizations to interview MIT faculty subject experts from the comfort of our Building 24 studio.
- Won a New England Emmy Award in the Outstanding Education/Schools category for the first installment of *A Bold Move*.

Administration

MVP continues to streamline and implement improvements in its work order/scheduling/invoicing application. Improvements included rolling out a versatile time tracking system that allows for more efficient and accurate invoicing.

During FY2017, MVP created a management team that includes a new business manager position added to reflect the growing complexity of our business models and financial systems. Since the position was added in late December, we have seen immediate improvements in our accounting and invoicing processes.

Finances and Funding

MVP is charged by the provost with providing its products and services on a cost-recovery basis to fully cover costs. During FY2017, MVP met this goal despite the absence of an anchor project such as last year's MIT2016 celebration. We are becoming more diversified in our client base, and our ongoing objective is to apply our talents and resources in as wide a spectrum as possible in support of education, research, and outreach. Measured against any number of metrics—mission-centric support of key MIT initiatives, quality and quantity of content produced, client satisfaction with our products and services, overall revenue generated—FY2017 was a very successful year.

We continued to judiciously apply gift funds, generously provided by Jane and A. Neil Pappalardo '64, in support of lecture capture and high-profile productions. The Emmy Award–winning *A Bold Move* was funded in part by gift funds. We are enormously grateful for the continuing commitment of the Pappalardos.

Engineering and Technical Operations

The Engineering and Technical Operations group develops and maintains the technology infrastructure that supports development and delivery of digital learning content and tools. The group also consults internally with other ODL units on technical matters.

A related sub-unit within Engineering and Technical Operations is the Distance Education and Streaming Operations group. The Distance Education and Streaming Operations group operates and maintains four advanced technology–enabled classrooms that offer recordings and broadcasts of MIT classes and other events to audiences on campus and around the world, either in real time or asynchronously. Distance Education also manages the Institute-wide MIT TechTV video platform and service, providing video upload, hosting, and delivery services for MIT departments, faculty, and students.

The Distance Education and Streaming Operations group ceased operations as of June 30, 2017. Two staff members received layoff notices, and three others were redistributed within ODL. The Building 9 classrooms have been shut down pending reuse within ODL. Remaining staff have been helping the System Design and Management program set up 1-390 for distance capability. Existing DE-hosted content servers in Building 9 have been shut down.

Summary and Highlights

During AY2017, Engineering and Technical Operations continued to support the growth of MITx residential courses at MIT and increased the production of MITx courses for edX. In addition, Engineering worked on several projects to extend the reach of MITx courses on edX. Specifically, the group:

- Delivered the MITx MicroMasters portal.
- Contributed API (application programming interface) code to Open edX, making it possible to integrate web applications (e.g., the MITx MicroMasters portal) with edx.org and other Open edX installations.
- Created the ODL Bootcamps e-commerce website, which integrates with MIT payment and accounting systems.
- Delivered an initial release of an ODL internal business intelligence website.
- Improved the functionality and performance of Custom Courses on edX (CCX) in collaboration with other edX partners. CCX was used by more than 600 blended learning programs this year.
- Worked with several MITx course teams to develop and integrate new tools and assessment features.
- Released two new code libraries: release-script for automating our software release process and redux-hammock for automatically creating interfaces between our web front-end code and REST (Representational State Transfer) APIs. We have also started publicly releasing much of our code for infrastructure automation and management.
- Completed the instructor interface for STAR CellBio.
- Presented our work at the May 2017 Open edX conference and at a Boston-area Open edX meet-up.
- Discontinued work on the MIT Teachers Portal. The code written was reused in the MITx MicroMasters portal.

In addition, the Distance Education group had a number of achievements:

- Supported experimental lecture capture hosting and streaming of content for 2-131, 2-190, 6-120, and 34-101. One highlight was a new math course (18.065) that was shared with learners at Lincoln Laboratory.
- Increased the impact of live webcasting from MIT to include more than 410,000 connections over the past year, reaching a larger global audience for MIT initiatives through Facebook Live, Twitter, Twitch, Periscope, Snappy TV, and YouTube Live.
- Increased remote interaction for MITx live course sessions (e.g., 11.405x, 15.662x).
- Provided classroom and webcast support for the first MicroMasters cohort celebration event on June 26, which engaged students from around the world.

- Provided webcasts of MIT Symphony Orchestra events to the community.
- Streamed the 2017 Commencement webcast to more than 81,000 viewers on the MIT homepage and Facebook pages.
- Neared completion of the MIT TechTV video restoration, with over 10,000 videos restored to the service and additional content returned to collection owners for hosting on YouTube and other services.

Goals and Objectives

During AY2017, the goals of Engineering and Technical Operations were to:

- Faculty: Build scalable support for faculty to experiment and succeed through development and operational support of the MITx Residential systems (including Open edX) and the MITx MicroMasters portal
- Financial: Develop the MITx MicroMasters portal to support e-commerce and financial aid initiatives
- Organizational: Continue to build relationships with edX, other ODL departments, IS&T, MIT, and the open source community
- Lead and Innovate: Provide a modern infrastructure for digital learning apps, continue to develop tools for humanities education (e.g., support for human grading), and support work to maintain the integrity of online courses, including a proctored exam pilot with Pearson
- Customer Insights /Experience: Provide marketing and administrative tools to help faculty, course teams, and administrators obtain insights into MicroMasters

Accomplishments

MITx MicroMasters

We launched the MITx MicroMasters portal, a site for building a community around MIT's multiple new MicroMasters programs. The portal also supports the custom requirements of the DEDP MicroMasters program, including personalized pricing and integration with Pearson's in-person proctoring service. The portal currently has more than 15,000 users.

Bootcamp e-Commerce

We launched a small web application to support MIT bootcamp applicants making tuition payments. This site integrates with MIT's online payment vendor (Cybersource) and streamlines delivery of accounting data to the ODL financial team. Because we reused much of our learning and code from the MITx MicroMasters project, we were able to deliver this site in six weeks.

MITx Residential Support

Engineering continued to support a growing number of MITx online courses, both on campus and hosted at edX. To make this possible, we collaborated with edX to improve support of Open edX and establish it as a reliable product. We upgraded the systems used on campus to support edX's Dogwood release in August 2016. We are now working on an upgrade to the Ficus release. We have also invested in streamlining the upgrade process to increase the level of automation related to testing and delivery of future upgrades.

Business Intelligence

We launched a new service, based on the open-source ReDash software, for creating reports and visualizations using data generated by Engineering projects. We currently use the service to generate regular financial reports from the MITx MicroMasters portal and the Bootcamps e-commerce website. We also generate reports on learner demographics for course teams and the marketing team. We plan to expand these services once a data scientist is hired.

New Code Libraries

Engineering developed several open source tools to help accelerate the process of building new web applications. We use release-script to automate the release of our code. Using this code and some process changes, we are now able to release code daily instead of weekly. In addition, redux-hammock is a reusable library that provides a consistent interface between REST APIs and our front-end web code using the open source React and Redux libraries. We expect this library to help us reduce the tedious repetitive tasks involved with creating new web interfaces. We also released several repositories of our infrastructure management code.

Staff Graded Assignments

The Staff Graded Assignment (SGA) XBlock continued to be popular, as well as the new SGA application that we developed last year for distributed grading.

STAR CellBio

We completed the instructor interface for STAR CellBio, allowing faculty to create their own experiments for the simulator. We also supported the use of STAR CellBio at SUTD again in the spring of 2017.

Custom Courses on edX

We collaborated with our edX partner institutions and technology developers to continue support and development of CCX, a feature that makes it easier to reuse edX course materials. New edX partners such as IsraelX have used the feature extensively, and there is significant community interest in extending its functionality. More than 600 online courses were delivered in the past year with CCX, mostly to high school students.

Distance Education

Residential Education Support

The Distance Education group provided lecture capture support for experimental classroom capture systems as well as synchronous distance education support for Institute collaborative initiatives, including on-demand residential viewing for the following courses: 1.258, 6.002, 6.003, 6.02, 6.036, 6.046, 6.172, 6.819, 6.781, 6.S978, 7.016, 8.02, 8.022, 8.03, 10.302, 10.34, 10.40, 12.702, 12.708, 12.717, 12.742, 12.743, 12.744, 12.801, 12.802, 12.808, 12.870, 12.S992, 14.01, 14.02, 16.S899, 17.50, 18.065, 18.086, 18.330, 18.404, 18.650, 18.783, 20.305, EM.411, EM.412, and EM. 413.

Lecture Capture Experiment

Lecture capture experimentation continued in 34-101 and was expanded to 2-131, 2-190, and 6-120 for residential capture and use in OCW course publications.

MITx Course Support

The DE group also continued to provide classroom and interactive webcast support services for several MITx courses, including 15.671x, 11.405x, Ulab 2.0, and 15.662x live course sessions.

Distance Education and Classroom Recording

During the year, DE continued to provide support for the System Design & Management program, the MIT/Woods Hole Joint Program in Oceanography and Applied Ocean Science and Engineering, and live classes delivered to the University of California, Berkeley (20.305); Georgetown University (6.S978); and the Skolkovo Institute of Science and Technology (16.S899).

Webcasting

DE supported webcasting of nearly 100 live events during the year, from monthly interactive alumni "chatcasts" to Institute events such as Commencement, the press conference for The Engine, and Rahm Emanuel and John Kerry's lectures at MIT. More than 35 departments and centers sponsored live webcast events, including the Zero Robotics programming competition in conjunction with the International Space Station and interactive webcast support for MITx courses. The final event webcasted from the DE classrooms was the first MicroMasters cohort celebration in June.

Video Conferencing

DE supported video conferencing systems on campus and provided contracted services to more than a dozen clients, serving over 60 different video conferencing systems installed on campus. These systems allow collaboration over vast geographic distances, reduce travel costs, and optimize the use of faculty time.

MIT TechTV

Restoration of content for collection owners continued throughout FY2017, and the bulk of content that could be restored from DE backup tapes is back on TechTV. Work

is planned to replace this service with a newer, streamlined self-service option for residential viewing of secure content.

Administration

We hired our final senior software engineer. Unless our scope of work changes, we do not plan to hire any additional engineers. We began interviews for a data scientist position that would interface with all ODL departments and help gather and curate business data.

We moved the Engineering team offices from One Main Street to NE49, along with the remainder of ODL. In addition, we installed new centralized storage systems for video production and designed and managed the installation of 13 conference room audiovisual systems.

Resource Development

Resource Development provides leadership in gift and revenue generation and donor relations, working closely with the vice president for open learning and key faculty to develop and execute plans to secure funds from individuals, foundations, corporations, and other organizations. The unit serves as a central coordinator and information source on all development activities.

Primary responsibilities include cultivating, soliciting, and stewarding support from those with the capacity to make a financial commitment of $1 million or more. The unit works in collaboration with faculty leads, the campaign office, MIT senior administration, and other leadership giving groups at MIT, including Foundation Relations and Alumni Relations.

Summary and Highlights

Resource Development led Capital Campaign efforts for the Office of Digital Learning, the MIT Integrated Learning Initiative, and the pK–12 Action Group, as well as other areas under the leadership of MIT Open Learning. The group signed $43.8 million in new gifts and pledges in FY2017, including a $40 million endowed and expendable gift to launch the Abdul Latif Jameel World Education Laboratory, and brought in $9.8 million in gift revenue and an additional $145,000 in gift revenue transfers.

Accomplishments

Key accomplishments in FY2017 include the following:

- Strengthened MIT Open Learning participation in the Capital Campaign for a Better World, working on numerous high-impact gift solicitations in close collaboration with colleagues across the Institute
- Moved a number of prospective donors in the pipeline from cultivation to solicitation and closing
- Supported the J-WEL launch by developing goals and action plans, providing strategic support to faculty and the executive director, and leveraging donor relationships to solicit J-WEL memberships

- Supported the launch and expansion of the Boston STEM Week collaboration with i2 Learning as part of our work in strengthening donor relations with key supporters and local leaders
- Helped facilitate faculty strategic discussions on a number of new initiatives, including workforce STEM education and pre-K–12 implementation strategies and collaborations
- Launched the MITx Annual Fund campaign
- Maintained the success of the OpenCourseWare Annual Fund and corporate underwriting support

In addition, we engaged with hundreds of individuals, foundations, corporations, and other organizations, our small team producing beyond expectations.

Administration

We improved our reporting of gifts and revenue projections with the Business Operations finance team; improved stewardship efforts with individuals, foundations, corporations, and alumni through timely gift acknowledgments, annual impact reports, and other means; and developed custom stewardship plans for high-impact donors. In addition, we launched a quarterly MIT Open Learning newsletter for leadership giving officers in Resource Development, the Alumni Association, and MIT Schools to support donor communication and cultivation.

Business Operations

Business Operations includes finance and accounting, human resources, marketing and communications, space, media strategy, learner experience, MicroMasters, and general administration. It provides support for the other sections of MIT Open Learning in defining and implementing strategic, operational, and organizational improvements and facilitating ongoing operations. It also collaborates across the Institute to ensure that MIT Open Learning's work is in accord with MIT best practices and policies and that it aligns with the Institute's broader purpose.

Goals and Objectives

During AY2017, the priorities of Business Operations were to build scalable support for faculty to experiment and succeed; invest in areas that promote financial sustainability and monitor costs; support a healthy, productive MIT Open Learning; continue to support strategic initiatives; and develop insight and enhance experience.

Accomplishments

Business Operations had key achievements in these five goal areas during AY2017.

Faculty: Building scalable support for faculty to experiment and succeed

- Maintained financial reporting, including by course and by department, to track real-time spending on courses and enhanced reporting by developing new reports for sponsored projects and professional education courses
- Managed the revenue distribution process and reports for MITx courses and professional education courses
- Marketed professional education and MicroMasters courses, working with faculty to define and deliver target audiences
- Coordinated and developed goals, budgets, strategies, and plans for the new Jameel World Education Lab
- Supported faculty who were considering or already offering a MicroMasters course and provided data and insight to help better understand learners
- Supported MITili faculty in developing strategies and sharing information
- Developed videos for a series of four systems engineering courses

Financial: Investing in areas that promote financial sustainability and monitoring costs

- Led an Open Learning–wide annual strategic planning process that resulted in an increased focus on marketing, Digital Learning Solutions, Business Development, and Resource Development
- Continued cross-organization processes to establish clear goals, including Open Learning–wide goals and supporting business unit goals, and conducted semiannual goal reviews and individual project reviews to monitor progress
- Developed the MIT Open Learning budget for FY2018; continued quarterly financial reporting on budgets, actual expenditures, and projections; and enhanced reporting by separating operating, designated, and sponsored costs and revenues
- Generated financial reporting for large, ongoing projects (e.g., Woodrow Wilson Academy, Connected Learning Initiative) and supported faculty in amending strategies and budgets to reflect evolving priorities and technologies
- Developed budgets for numerous potential new projects
- Supported the execution of all contracts, including those for Bootcamps, CCX, and other products, by reviewing business terms and liaising with the Office of the General Council for review and Institute approval
- Enhanced self-serve financial reporting, creating more—and more useful—reports that managers can download in real time
- Supported the Institute in enacting a new buy-to-pay system

- Partnered with Engineering to develop systems allowing MIT Open Learning to take payments directly
- Developed and enacted external marketing plans for professional education and MicroMasters courses and supported communications for selected MITx courses, helping to increase course revenues and target spending more effectively
- Continued support of the Capital Campaign by developing ad hoc budgets
- Supported coordination across MIT for all groups serving executive and professional audiences with digital learning
- Supported discussions with edX to amend the operating agreement for Professional Education, improving outcomes for both parties

Organization: Supporting a healthy, productive MIT Open Learning

- Developed and delivered financial, administrative, marketing, media, and other training across MIT Open Learning and better publicized MIT training, leading to more staff use of this resource
- Continued performance reviews, discussing performance versus individual FY2017 goals and developing FY2018 goals for each member of MIT Open Learning
- Continued enacting a website maintenance plan to ensure that site content is up to date
- Created a video and media strategy for MIT xPRO professional education offerings, including workflows and templates, to improve efficiency and effectiveness
- Hired and trained a MicroMasters team and developed a reporting and project ownership structure within MIT Open Learning
- Executed an MIT Open Learning internal communications program comprising town halls, an open house, an innovation market, and routine sharing of work among business units through brown bag lunches
- Supported Open Learning's participation in MIT-wide communications and human relations initiatives, including the MIT open house and the job fair
- Maintained and continued to develop human relations policies to improve clarity of expectations and enhance equity across MIT Open Learning
- Developed, documented, and shared approval processes for new MicroMasters offerings
- Developed and executed customer service processes for MicroMasters
- Led the move into our new space in NE49, ensuring strong communications, addressing concerns, and creating new norms and habits
- Completed development and deployment of a shared NE49 video infrastructure, including a video studio and a dedicated video network
- Supported planning and coordination of conference participation across MIT Open Learning

Lead and Innovate: Continuing to support strategic initiatives

- Launched Hive, an initiative designed to create a vibrant, enduring, self-perpetuating digital community of MITx learners and MIT students, faculty, and alumni. Version 1.0, a low-cost platform that attracted nearly 1,000 users, was launched in the fall. Version 1.5, launched in the spring, included an enhanced user experience and improved functionality; this version attracted more than 1,000 users.
- Supported the launch of J-WEL by developing the initial budget and staffing plan, working across MIT Open Learning to define the benefits of membership, and ushering a membership agreement through Institute support.
- Supported the conceptualization and early documentation of MIT Open, intended to become a scalable site to open MIT to the world.
- Assisted in designing and delivering a virtual graduation ceremony for the first cohort of students completing the Supply Chain Management MicroMasters program.
- Supported the launch of the MicroMasters DEDP program by developing the program model and defining faculty requirements.
- Supported the development of new initiatives across MIT Open Learning, including bootcamps in Taiwan, Australia, and Mexico and projects with SRM University, Google, and Emerson.
- Supported the creation of productized offerings by developing standard models and boilerplate contracts for bootcamps, course sales agreements, and customized courses on edX.
- Assisted in efforts to accelerate the development of professional offerings MIT-wide by changing policies to allow all units to develop courses, conducting a study of available vendors and designating recommended vendors, and developing and communicating new models of governance.
- Investigated new possibilities for virtual reality, including technologies, vendors, and options.

Customer: Developing insights and enhancing experiences

- Conducted marketing analytics research to enhance understanding of effective marketing tools and shared best practices across MIT Open Learning
- Analyzed data on use of video by learners in professional education courses and shared findings
- Analyzed learner interactions via Hive and conducted user testing to increase understanding of learners' desires and priorities
- Supported the development of a consortium framework allowing MIT Open Learning and J-WEL to create a membership model

Administration

- Provided information and support to the Governance Committee for Online Professional Education so that it could evaluate and recommend Institute-wide revenue-sharing policies and practices
- Established a dedicated MicroMasters team
- Developed new tableau reports to allow for easier and more accurate tracking of expenses by project, course, and other metrics
- Developed boilerplate contracts for membership, bootcamps, and custom courses on edX
- Implemented a training program for new employees in finance and administration

In addition, four members of the MITx/DLS finance team—Marine Brown, Corinne Hamilton, Andrea Sullivan and Marisol Tabares—were presented an MIT Infinite Mile Award in recognition of their work in developing and executing financial structures allowing MIT Open Learning to budget, track, and communicate course costs.

Sanjay Sarma
Vice President for Open Learning