

2014-2015 Annual Report

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EXECUTIVE OVERVIEW

Online Duke is an initiative of Duke University to advance educational excellence through online teaching and learning. In recent years, we have seen rapidly evolving trends in higher education challenge the traditional university with increasingly diverse pedagogical models, competition from new groups offering educational experiences and credentialing, and scalable technologies that promote connections with students, teachers and researchers outside the U.S.

In the 2014-2015 year, Online Duke supported projects and activities that responded to these trends and experimented with how new models and tools can benefit Duke's educational programs. We supported projects around three main goals: 1) promote teaching innovation, 2) contribute knowledge in the service of society and 3) showcase Duke's academic excellence.

Duke continued to be an early experimenter with new technologies and teaching models, helped prepare Duke Ph.D. students for teaching online in future faculty careers, and expanded research and assessment about teaching and learning. Project support staff and a growing video team became more efficient and creative in developing online materials and building courses. We improved communication about online innovation at Duke, including launching a searchable online gallery of online education projects developed at Duke.

Online education continued to broaden Duke's global impact, reaching millions of students around the world through massive open online courses and connecting students at Duke Kunshan University with faculty on-campus in Durham. These efforts showcase Duke faculty excellence and increase awareness of Duke programs in global priority areas such as India and Brazil.

In the year ahead, Online Duke will build on these successes to explore new activities that promote teaching innovation, contribute knowledge in the service of society, extend global connections, develop capacity to support increasingly complex projects and maintain Duke's position as an early innovator.

Online Duke Website: online.duke.edu

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ABOUT ONLINE DUKE

Online Duke advances educational excellence through online teaching and learning. We provide leadership and support to faculty and programs across the university to promote teaching innovation, contribute knowledge in service to society and showcase Duke's academic excellence.

Established in 2012, Online Duke initially focused on developing massive open online courses but quickly evolved to support a variety of non-traditional online and blended learning models. Online Duke is funded through the Provost's office and the Duke University Libraries and draws on staff from the Center for Instructional Technology, the Office of Information Technology, the Office of the Vice Provost for Academic Affairs, the Duke University Libraries and technology units in the schools.

TRENDS IN ONLINE EDUCATION IMPACTING HIGHER EDUCATION

Innovating with online education helps Duke learn what is educationally effective and best aligned with Duke's goals and allows us to influence the direction of online education more broadly. Our projects and activities in the 2014-2015 year reflect several trends affecting higher education that Duke University and our peer institutions will continue to face in the year ahead, including the following:

1. Pedagogical models are increasingly diverse and less tied to traditional campus courses.

While early online courses reflected campus courses and calendars, faculty now are using new technologies to create experiences that are less tied to time, place and classroom teaching techniques. This year's projects included shorter, modular, international, collaborative and self-paced educational experiments. We are developing our capacity for faster production, frequent assessment and data-driven iteration in course design.

2. Universities have competition from new groups in delivering educational experiences.

Museums, corporations, foundations and government groups now offer video lectures, educational apps, interactive courseware and online testing and certification. The number of MOOC platform providers has increased, with most of the newcomers emerging from countries outside the U.S. Several Duke projects this past year involved collaborative development and teaching with other universities or with non-

university partners. We are thinking carefully about where to focus our development efforts and where to adapt materials created by others.

3. New business models and credentials are challenging traditional educational programs.

Udacity's Nanodegrees, Harvard Business School's online Credential of Readiness and the University of Illinois' iMBA program all reflect experiments with program length, pricing and certification. Duke is experimenting with several Coursera Specializations (sets of related courses with a capstone project resulting in a Coursera certificate) as well as low-cost, online short courses for Duke Continuing Education Units.

4. Consumer technology trends are influencing student, parent and faculty expectations.

Students and faculty now come to Duke having used learning materials optimized for mobile devices, self-directed learning paths, on-demand tutoring and educational activities personalized by big data. Duke was an early experimenter with Coursera's on-demand learning platform and is actively exploring new tools and course delivery platforms to support both online and on-campus learning strategies.

5. Technologies of scale promote connections with students and researchers outside the U.S.

Duke's MOOCs have connected our faculty and students with millions of learners and instructors outside the U.S. This year, we explored ways to use online technologies to link the new Duke Kunshan University campus in China with the Duke University campus in Durham, North Carolina. We also developed new online courses with faculty in other countries, utilized video shot on location abroad and focused on topics of global interest, and shared online learning materials with faculty in other countries. We continue to seek ways our online innovation can further Duke's global connections in research and teaching.

GOALS AND ACCOMPLISHMENTS FOR 2014-2015

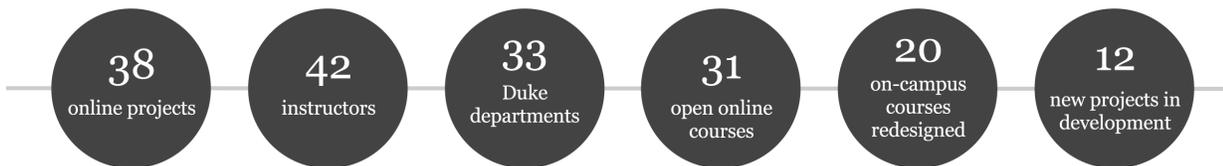
In 2014-2015, Online Duke supported projects around three main goals:

1. Promote teaching innovation.
2. Contribute knowledge in the service of society.
3. Showcase Duke's academic excellence.

I. PROMOTE TEACHING INNOVATION

Leading experimentation

Duke continues to be an early tester of new technologies and new teaching models. This gives our faculty a head start in understanding trends and allows us to shape the development of technology tools and educational models. The experience of using new technologies and organizing new approaches to learning has prompted deep discussion of educational goals, course design and educational effectiveness both on campus and online.



Early experimentation helps us develop an assessment and research agenda that is meaningful to Duke and contributes to national discussions about online education. As in earlier years, this year we sought projects from different schools and subject areas and with a variety of educational approaches.

Pedagogical experiments this year included:

- Converting previously developed online courses to shorter, modular, reusable components.
- Designing courses for a new on-demand format and redesigning session-based open online courses for use as self-paced learning materials.
- Re-purposing parts of MOOCs for use with targeted groups of learners, such as the Duke Alumni Forever Learning program and Duke Continuing Studies, for flipping courses at Duke, or for enrichment activities with students taking courses at Duke.
- Offering curricular groupings of courses with capstone projects through Coursera Specializations in *Reasoning, Data Analysis and Writing* and *Neuroscience: Perception, Action and the Brain*.

Preparing future faculty

Fourteen Duke Ph.D. students worked with Duke faculty to develop skills and gain direct experience with online teaching through Bass Online Apprentice Fellowships (<http://bit.ly/1SbDgWo>), a program developed through a partnership of the Graduate School and the Center for Instructional Technology.

Expanding research and assessment about teaching and learning

Working with faculty, the Office of the Vice Provost for Academic Affairs and researchers at other institutions, Online Duke supported research to assess the efficacy of courses and projects and to advance knowledge about online education, pedagogy, and technology. See Appendix C for a list of recent publications and presentations.



Improving course development and support

The rapid pace of change has pressured us to be more efficient in developing online materials and building courses. To ensure that Duke's courses stand out among the thousands of online courses now available, we have added variety and improved the quality of Duke's offerings.

- A growing video production team worked directly with instructors to coach them for on-camera performance, advise on content, and share creative ideas to enhance videos.
- We tried new video approaches, including more on-location filming (from the Duke Lemur Center to faculty labs and even a gas station), use of Ultra HD 4K video, visual demonstrations with a lightboard, and green screen recording in a remodeled Multimedia Project Studio.
- Our project support teams improved course planning strategies, staff communication and project monitoring activities.

Improving communication about online innovation at Duke

In response to Duke faculty requests for more information about what their colleagues are doing with online education and what the impact is, we launched a searchable gallery describing each recent online project, how it has been used, and any research or publications about the project (<http://online.duke.edu/projects>). We are in the process of rebranding our activities from Duke Online Education Initiatives to Online Duke and revising our website.

We shared information about our work through news stories, blog posts, research publications, and presentations at national and international conferences and professional meetings. Duke faculty and staff have been invited participants in national and international planning meetings around online education.

II. CONTRIBUTE KNOWLEDGE IN THE SERVICE OF SOCIETY

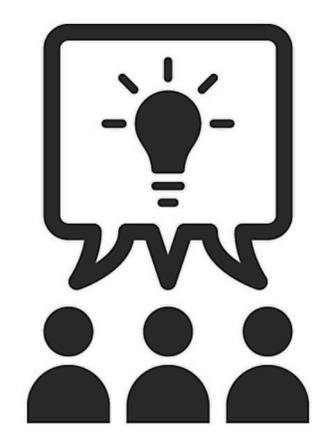
Online technologies allowed new ways for Duke faculty to educate individuals worldwide, fulfilling the university’s strategic goal of contributing knowledge in the service of society.



31 open online courses have been created by Duke faculty and **63** course sessions have been taught on Coursera.



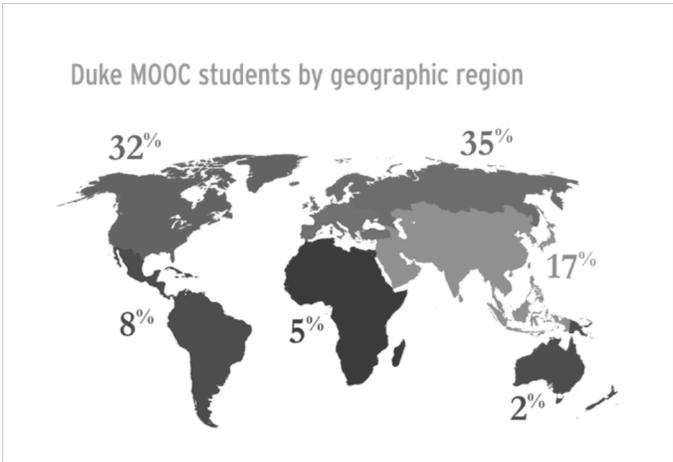
1.68 million learners (out of a total of 11.5 million Coursera students) have generated **2.9 million** registrations for Duke’s open online courses.



71,000 course completions

Duke’s continuing partnership with Coursera extended the knowledge and expertise of Duke’s remarkable faculty to learners across the globe, most of whom would never have access to Duke. Over 1.68 million learners from 217 countries have participated in Duke massive open online courses, earning 71,000

certificates of completion. Of the individuals taking Duke MOOCs, 4,660 who have registered for Signature Track have received financial aid from Coursera, due to economic hardship.



New partnerships at home and abroad created opportunities for individuals to learn from Duke and advance their knowledge and careers. One of Duke Kunshan University’s inaugural courses, *Fundamentals of Global Health*, combined online and on-site activity at Duke’s Durham and DKU campuses to allow greater flexibility for the instructor while providing a rich educational

experience for students (<http://bit.ly/1LYTjI2>).

The open online course *Tropical Parasitology: Protozoa, Worms, Vectors and Human Disease* built on Duke's ongoing research and teaching site in Tanzania (at the Kilimanjaro Christian Medical Centre), modeled collaborative course development and teaching with an African institution, resulted in materials being used in on-campus classes at both institutions and was promoted for use at a network of 13 African medical schools.

Duke improved its reach to Chinese learners on Coursera (1 million registered and growing) by making most of its courses accessible to Chinese learners via Chinese servers. Three of Duke's courses have video subtitles translated into Chinese, and Duke's popular *Introductory Human Physiology* course has all course materials translated into Chinese.

Duke became one of four American universities and a handful of other organizations providing free professional development courses to K-12 teachers through Coursera's partnership with the U.S. Department of Education (<http://bit.ly/1vvZSvh>).

III. SHOWCASE DUKE'S ACADEMIC EXCELLENCE

Duke's online education projects showcase the excellence of faculty, increase awareness of Duke programs and expand Duke's global reach. Learners report using Duke MOOCs to prepare before coming to Duke and as a factor influencing their decision to apply to or enroll at Duke. Current Duke students enroll in Duke MOOCs to sample a subject, prepare for medical exams and learn specific topics for which they do not need a full course.

Learners across all Duke Coursera courses were asked,
After taking this course, how likely are you to take another online course from the same institution?

83% said *Very Likely* or *Likely*.

How has this course changed your perception of the university/institution offering it?

74% said *Much More Favorable* or *Favorable*.

Of the twenty Coursera courses with the highest all-time enrollments, three are from Duke:

- o A Beginner's Guide to Irrational Behavior (Ariely)
- o Think Again: How to Reason and Argue (Sinnott-Armstrong and Neta)
- o Data Analysis and Statistical Inference (Çetinkaya-Rundel)

In addition, Duke has had broad, positive coverage in the press for its work with online education. See Appendix C for a list of selected media coverage.

THE YEAR AHEAD

Our goals remain the same for the year ahead, but with new activities.

1. PROMOTE TEACHING INNOVATION

Several innovative projects have already been selected for the 2015-2016 academic year and additional projects will be added throughout the year. We will:

Increase the variety of education models.

Instructors will create stand-alone modules that can be shared across multiple courses in a department, short courses that can be taken either in sequence or independently, and learning activities that are driven by student projects. Online experiments represent a variety of subject areas, from an Engineering course that uses remote labs supported by online tutorials and online communication tools to a humanities course that connects Duke students with socially-engaged art projects.

Design online projects that enhance campus courses or programs.

New online projects will have specific plans for use in existing campus courses, Alumni Education, Continuing Education or new programs for Duke-enrolled participants. We will experiment with using online materials to prepare students before entering degree programs, to supplement coursework while they are at Duke and for professional development after they leave Duke. Faculty members will explore how materials developed for a new Specialization in data analytics can help Duke students gain data management and analysis skills for course projects and their future careers.

Explore new revenue models.

Duke is pursuing development of eight new courses that focus on topics with high learner demand and that have the potential for new revenue streams.

Support new approaches to collaborative course development.

Several projects will involve teams of faculty working across departments or schools at Duke, or with partners outside Duke.

Increase research and discussion around the effectiveness of online education.

Building on last year's research program at Duke, we will work more extensively with research units at other universities to expand the topics we study and the types of assessment activities we conduct. Some initiatives underway include participating in a consortium of 14 leading universities working to develop standard measures of learner engagement and collaborating with other research centers to explore questions around on-demand open online courses.

See Appendix B for a list of projects planned for 2015-2016.

2. CONTRIBUTE KNOWLEDGE IN THE SERVICE OF SOCIETY and EXTEND GLOBAL CONNECTIONS

Online education projects will strengthen Duke's global partnerships and enhance international connections within Duke campus education. Two planned projects will provide training and tools for social entrepreneurs globally; another will help family members, health and social welfare professionals, undergraduate and graduate students and health practitioners to address rehabilitation of people with disabilities in low- and middle-income countries.

Instructors from Computer Science and from Electrical and Computer Engineering will create online curricula to improve university-level computer science education at a wide variety of institutions and develop models to ensure the success of students who are currently underserved or underrepresented in computer science.

3. DEVELOP CAPACITY TO SUPPORT INCREASINGLY COMPLEX PROJECTS AND MAINTAIN DUKE'S POSITION AS AN EARLY INNOVATOR

In the fast changing environment of online education, we need to be able to support a larger number of projects efficiently, have the flexibility to seize unexpected opportunities and establish processes for continual improvement of our online offerings. To that end, we will:

Test new online learning technologies.

Online Duke will test new online education platforms and tools that may better meet the growing diversity of instructor and student teaching and learning needs.

Expand support for digital content creation.

The number of faculty interested in using digital educational resources for their Duke campus courses is growing. We have upgraded existing media production studios and added contract-based personnel but need to find ways to scale support across Duke to meet instructors' requests for creating digital content and content tuned for mobile devices.

Develop new processes for project selection.

We will use Requests for Proposals for online projects that reflect new topics or techniques the university especially wants to explore. At the same time, we need to be able to respond to internal and external opportunities for exciting new projects outside the RFP process. It will take careful balancing of staffing and resources to address both types of projects and unpredictable schedules.

Appendix A: New Online Education Projects June 2014–June 2015

More detailed information about each project is available in a new gallery of Duke's online education projects at <http://online.duke.edu/projects>.

Teaching Statistical Thinking: Part 1 Descriptive Statistics | Dalene Stangl, Kate Allman and Mine Çetinkaya-Rundel | Statistical Science and the Duke Program in Education, a course to help high school teachers teach statistical concepts from the Common Core.

Copyright for Educators and Librarians | Kevin Smith | Duke University Libraries, co-developed and taught with copyright law experts from Emory University and the University of North Carolina at Chapel Hill.

Fundamentals of Global Health | Rukmini Balu | Duke Global Health Institute, a blended course using online materials and technologies to teach on site and remotely for a course at Duke Kunshan University.

Advertising and Society | William O'Barr | Cultural Anthropology, highlighting Special Collections from Duke University Libraries and developed in partnership with the Advertising Educational Foundation.

Visual Perception and the Brain | Dale Purves | Neurobiology, a look at the visual system drawn from neuroscience, psychology, science history and philosophy.

Responding to 9/11: Counterterrorism Policy in the 21st Century | David Schanzer | Public Policy, a follow-up to *9/11 and Its Aftermath* examining the global impact of U.S. counterterrorism policy.

Introduction to Chemistry: Reactions and Ratios and *Introduction to Chemistry: Structures and Solutions* | Dorian Canelas | Chemistry, a set of modular materials supporting Duke undergraduate students in Chem 99.

Capstone Project for Perception, Action and the Brain | Leonard White, Jennifer Groh and Dale Purves | Brain Sciences, Community & Family Medicine, Neurobiology and Psychology & Neuroscience, the conclusion to Duke's second Coursera Specialization.

Tropical Parasitology: Protozoa, Worms, Vectors and Human Disease | John Bartlett | Duke Global Health Institute, Duke's first course co-developed with an African university.

Capstone Project for the Reasoning, Data Analysis and Writing Specialization | Walter Sinnott-Armstrong, Ram Neta, Mine Çetinkaya-Rundel and Denise Comer | Philosophy, Statistical Science and the Thompson Writing Program, the conclusion to Duke's first Coursera Specialization.

Foundational Neuroscience for Perception and Action | Leonard White | School of Medicine and Duke Institute for Brain Sciences, a shorter, less clinically focused version of the medical school-caliber course *Medical Neuroscience*.

The Challenges of Global Health | David Boyd | Duke Global Health Institute, an introduction to key challenges and concepts in global health, and one of the first courses to be offered on-demand on Coursera.

Dog Emotion and Cognition | Brian Hare | Evolutionary Anthropology, a course on dog psychology with the opportunity for students to contribute data for a dog cognition research project.

Data, Statistical Inference, and Modeling | Mine Çetinkaya-Rundel | Statistical Science, a three-part course offering Duke Continuing Education Units.

Appendix B: Planned Online Education Projects for 2015-2016

Open Organic Chemistry | Dorian Canelas | Department of Chemistry, a collaborative effort of faculty in Duke's Chemistry department to develop a library of videos for undergraduate students in Organic Chemistry courses.

Music as Biology Coursera Course | Dale Purves | Duke Institute for Brain Sciences, a course on the relationship between music and the brain featuring video of performances by musicians visiting Duke to help demonstrate concepts covered in the course.

Social Entrepreneurship Online Modules | Cathy Clark | Fuqua School of Business, online modules to help global social entrepreneurs at the Center for the Advancement of Social Entrepreneurship (CASE) more effectively scale their impact.

Energy and the Environment Coursera Course | Lincoln Pratson | Nicholas School of the Environment, a course that will provide students with a technical, business and societal understanding of the world's current energy system; course videos will also be used in the on-campus version of the course.

Online Hardware Labs | Martin Brooke | Electrical & Computer Engineering, a pilot project in which Duke students in an electronics lab course will conduct experiments outside the lab using online tutorials and portable electronics kits.

Art of the MOOC Coursera Course | Pedro Lasch | Art, Art History & Visual Studies, a course on contemporary socially-engaged art in which the instructor will experiment with using the Coursera platform as an art medium and connect the course with international art events.

Innovation & Design for Global Grand Challenges Coursera Course | Alex Dehgan | David Rubenstein Fellow, a course that will equip students to address global challenges in conservation and development featuring world-class innovators and entrepreneurs as guest speakers.

Data Analytics for Business Coursera Specialization | Daniel Egger, Jana Schaich Borg | Center for Quantitative Modeling, Neuroscience, a Specialization that will be developed with support from Coursera about how "Big Data" interacts with business, and how to use data analytics to create value for businesses.

Introduction to Software Development Coursera Specialization | Susan Rodger, Owen Astrachan, Robert Duvall, Drew Hilton | Computer Science, Electrical and Computer Engineering, a Specialization to teach students to write code as well as to think like a professional engineer and solve meaningful problems.

Appendix C: Publications, Presentations, and Media Coverage

Publications:

Writing to learn and learning to write across the disciplines: Peer-to-peer writing in introductory-level MOOCs. Denise K. Comer, Charlotte R. Clark, Dorian A. Canelas. *The International Review of Research in Open and Distributed Learning* (Vol 15, No 5, 2014). - <http://bit.ly/1AAa4UU>

Coursera's Introductory Human Physiology Course: Factors that Characterize Successful Completion of a MOOC. Deborah Engle, Chris Mankoff, Jennifer Carbrey. *The International Review of Research in Open and Distributed Learning* (Vol 16, No 2, 2015). - <http://bit.ly/1NboHQC>

Fulfilling the Promise: Do MOOCs Reach the Educationally Underserved? Lorrie Schmid, Kim Manturuk, Ian Simpkins, Molly Goldwasser, Keith Whitfield. *Educational Media International* (Vol 52, No 2, 2015). - <http://bit.ly/1gqAa4O>

Presentations:

Future Trajectories of MOOCs in Higher Education. Lynne O'Brien presented at the Coursera Partners Conference held April 1, 2014 in London, UK. - <http://bit.ly/1GbZPmv>

MOOC Planning, Pedagogy and Production. Presentation by Lynne O'Brien for XII Jornadas CRAI: MOOCs & CRAIs at Universitat Pompeu Fabra in Barcelona, Spain, May 22, 2014.

Understanding MOOC Audiences (Learners). Presentation by Lynne O'Brien for XII Jornadas CRAI: MOOCs & CRAIs at Universitat Pompeu Fabra in Barcelona, Spain, May 23, 2014.

IEEE Conference Presentation. Roger Barr spoke about his Bioelectricity MOOC at the 36th Annual International Conference of the IEEE in held in Chicago (September 2014).

Reimagining Teaching and Learning in a Digital Age. Presentation by Lynne O'Brien for the Signature Lecture for the American Medical Education Institute, Duke-NUS Medical School, Nov. 12, 2014.

Educational Technology Trends and Pedagogical Challenges. Presentation by Lynne O'Brien at the International Alliance of Research Universities (IARU), National University of Singapore, November 14, 2014.

In the Magical Land of MOOCs. Orin Starn presented as part of a panel, *The Anthropology of Educational Futures: MOOCs as Cultural Production Learning, and Labor*, at the 2014 Annual Meeting of the American Anthropological Association (December 2014).

Coursera and the Future of MOOCs. Mine Cetinkaya-Rundel presented on findings and experiences developing the Data Analysis and Statistical Inference MOOC for Bass Connections on January 20, 2015.

Beyond Flipping: Campus Impacts of Massive Open Online Courses. Presentation by Kim Manturuk, Manager for Program Assessment at the Center for Instructional Technology, at the Coursera Partners Conference (April 2015).

Media Coverage:

Duke to expand mix of in-person and online education - The Chronicle - <http://bit.ly/1EGEq9F>

Duke bridges gap between online and classroom, to mixed results - The Chronicle - <http://bit.ly/16AdSZN>

Duke seeks faculty ideas for digital initiatives - The Chronicle - <http://bit.ly/1uYneE4>

A second shot at that class that got away - Duke Today - <http://bit.ly/1I2oGjQ>

A Coursera Course on Visual Perception - Starts Jan. 7 - Illusion Chasers blog on Scientific American - <http://bit.ly/1F6BZdW>

For some research universities, flexibility and modularity influence long-term plans - Inside Higher Ed - <http://bit.ly/1zg9s4I>

A Passion for Stats and the Beauty of Bayes: A Duke Professor on Teaching Online - Class Central - <http://bit.ly/1Heyqax>

More than Meets the Eye: Dr. Len White on Perception and the Brain - Class Central - <http://bit.ly/1FBqCsa>

New Online Course on Energy and the Environment To Be Developed - Duke Environment News - <http://bit.ly/1GIl42V>

Duke Professor Brian Hare teaches psychology of dogs - Duke Chronicle - <http://bit.ly/1GIkSkp>

Duke professor offering free online course on dog psychology - USA Today College - <http://usat.ly/1Kd2GDi>