

C o m m u n i t y E x p e r i e n c e D i s t i l l e d

edX E-Learning Course Development

Design, develop, and deploy an interactive and informative
MOOC course for the edX platform

Matthew A. Gilbert

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informative MOOC course for the edX platform

Matthew A. Gilbert



BIRMINGHAM - MUMBAI

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Skilled in learning management systems such as Blackboard, Canvas, eCollege, edX, and Moodle, he develops and teaches communication, management, and marketing courses for adult learners online, on campus, and in blended learning environments. In corporate settings, he conducts business communication, decision-making, and social media marketing workshops. Having embraced an opportunity overseas, Matthew now teaches undergraduates at a university in Dubai, the United Arab Emirates.

A tech-savvy writer, his first book, *edX E-Learning Course Development*, was published for educators with the aim of designing, developing, and deploying MOOC courses on the edX platform. He has also authored scholarly papers, feature articles, and Doctorious – a blog about his adventures in academia. He is an unrepentant fan of the Oxford comma; the semicolon is another one of his guilty pleasures.

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For more information about Matthew, you can visit his website at matthewagilbert.com, connect with him on LinkedIn at [linkedin.com/in/matthewagilbert](https://www.linkedin.com/in/matthewagilbert), or follow him on Twitter at @MatthewAGilbert.

This book was written over many months and a multitude of miles: from California to Dubai, Abu Dhabi, Oman, and even 38,000 feet above the Arctic Circle on an Emirates Airbus A380! However, without the insight, input, and inspiration from the following individuals, this book wouldn't have happened. To each of you and to those whom I might have inadvertently not included, I extend my heartfelt gratitude. Thank you!

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About the Reviewers

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Rogério has been contributing to the Debian project (debian.org) since 2005 and has been an official Debian maintainer since 2008, maintaining about 20 software packages (also available for the popular Ubuntu Linux and Linux Mint). At the intersection of MOOCs, education, and free software, he is the coauthor of `coursera-dl` (<https://github.com/coursera-dl/coursera>) and `edx-dl` (<https://github.com/shk3/edx-downloader>), which are designed to facilitate learners to access the course material from Coursera and edX respectively.

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I would like to sincerely thank Mr. Gilbert for being incredibly warm and welcoming, providing me with his advice as I sought after my own career goals, and for granting me the opportunity to take part in this wonderful project.

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Carla was recently named a Research Fellow by the University of Phoenix, and conducts research in online mentoring at the doctoral level. This research is part of a grant from the university. She has taught online for the university since 1991 and has received the Quality Award for her work.

For 15 years, Carla was with WestEd – a regional educational laboratory – as a senior researcher. She was also the project director of the Star Schools dissemination project – the Distance Learning Resource Network (DLRN).

She is a master trainer in distance learning for UCLA and teaches in several doctoral programs that involve specialization in educational technology and instructional design for online learning. She has written for, and has been funded for grants through, Star Schools, PBS Mathline and PBS TeacherLine, Challenge, NTIA, TIIAP, the California Department of Education, the California Community College Chancellor's Office, the United States Department of Justice, the Los Angeles County Office of Education, and NASA.

Carla earned a doctorate in education (educational leadership research design/statistics, adult education, and educational technology) from the University of Missouri-St. Louis, an MA in mass communication from Webster University, and a Bachelor of Science in English from Washington University, St. Louis, Missouri. She also holds a degree in broadcast engineering.

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A commerce graduate from Bangalore University, Santhosh followed his passion for multimedia, beginning as a novice learner and progressing to an expert, with a wide range of technical qualifications that span the spectrum of content development. His strength lies in being a self-starter who needs no external motivation to learn new technologies. He uses his knowledge of various content authoring tools and couples it with interactive multimedia design to create engaging content for his organization.

Santhosh has worked with companies such as Purpleframe Technologies, Epiance, and Mentorware India. He is an avid reader who loves to spend his free time reading and listening to music – both oldies and the latest tracks. Nonetheless, it is just as much a holiday for him to spend his time learning what the world is doing in the field of online education and coming back with ideas in this field.

Dexler Information Solutions is a learning solutions provider that leverages technology to enable companies and institutions to manage and enhance their knowledge pool. Dexler's endeavor has been to provide strategic educational services and products, developed on robust delivery platforms using innovative learning enablers. Dexler is recognized for offering customized learning content in a flexible framework for individual learning, corporate education, and community training. It has evolved from an instructor-led training (ILT) organization to a complete integrated learning solutions provider. Dexler believes in being gamechangers for their customers and providing customized solutions that enhance their businesses.

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*This book is dedicated to my sons, Jacob and Max. You are my greatest teachers,
my favorite students, and my most edXceptional inspirations!*

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Preface

edX is an open source learning management system (LMS) and course authoring tool launched by Harvard University and the Massachusetts Institute of Technology (MIT) as a nonprofit partnership. A massively online open course (MOOC) platform, edX offers students self-paced learning, online discussion groups, Wiki-based collaborative learning, assessment of learning, online laboratories, and other interactive learning tools.

If you're an educator creating a course for edX, or a corporate trainer using Open edX to achieve learning and development initiatives, then *edX E-Learning Course Development* is ideal for you. Whether you're developing an online course for the first time or you are a veteran LMS scholar, this book gets you up and running with edX.

Walking you through eight essential steps for creating an edX course, each chapter signifies a step in the curriculum development and implementation process. We begin with an overview of MOOCs and the history of edX, detail curriculum development and video production best practices, and then explore exercises and assessment options. We then integrate everything, managing your edX course's administrative options while facilitating your students' learning experience. Finally, we suggest strategies to market your course using traditional tools, edX's internal options, and social media.

What this book covers

Chapter 1, Getting Started, introduces edX and reviews your role and responsibilities helping you to discover best practices in the process. You will be guided through the process of signing up for edX, creating a Studio account, and taking the first steps towards creating your first course.

Chapter 2, Planning the Curriculum, concerns planning your course's curriculum and understanding the elements within edX necessary for launching it.

You will learn about the edX Course Matrix, and how to prepare your course's About page, write the various preliminary documents for your course, improve your knowledge of learning sequences, design exercises and assessments, choose textbooks and materials, moderate the discussion forum, launch your course's Wiki, and finally, preview the necessary information for the certificate of mastery.

Chapter 3, Producing Videos, explores the idea and intent of instructional videos to your course, presents video production pointers, reviews post-production processes, explains the process of transcript creation, and outlines how to create playlists on YouTube for each of your courses.

Chapter 4, Designing Exercises, demonstrates how to develop exercises, discusses ways to engage students, reviews problem components, and explains interactive exercises. You will also learn about four problem types: general exercises and tools, image-based exercises and tools, multiple-choice exercises and tools, and STEM exercises and tools. A/B split tests, in conjunction with content experiments, are also explored.

Chapter 5, Integrating the Curriculum, focuses on course components where your curriculum converges, introduces integration of curriculum, and presents practices that enrich your students' learning experiences. You will also establish your course outline, define course sections, include course subsections, input course units, develop course components, add pages, upload files, post updates and handouts, upload PDF textbooks, and address accessibility issues.

Chapter 6, Administering Your Course, outlines administrative functions, best practices, and online resources that make your job easier. You will also learn how to establish a grading policy, control content visibility, include student cohorts, tackle beta testing, export and import your course, make the most of edX resources, and finally, launch your course.

Chapter 7, Facilitating Your Course, offers insight into assigning staff roles, inviting students to enroll, directing your discussions, managing your messaging, creating your course wiki, reviewing course data, supervising student data, overseeing answer data, managing the gradebook, and issuing course completion certificates.

Chapter 8, Promoting Your Course, shares strategies for marketing your edX course before it is offered, and shows you how to create networking opportunities for your students after it concludes. In this chapter, you get to tackle traditional marketing tools, identify options from edX, discuss social media marketing, explore the basics of personal branding, review marketing metrics, and define the role of student feedback.

What you need for this book

XBlock is the SDK for the edX MOOC platform, which is written primarily in Python 2. It is a component architecture that enables developers to create independent course components – XBlocks – that will work seamlessly with other components in an online course. Course authors can combine XBlocks from various sources, including text, video, Wikis, and online laboratories.

You can access the edX open source platform technology along with platform developments from Stanford, Harvard, MIT, edX, and other contributors at openedx.org. If you plan to run Open edX, you will be pleased to know that there are hosting providers, or you can install and run the software on your own server. However, edX does not provide direct support for independent installations. If you are a developer who wants to get involved with edX, you can find its technical details at openedx.org, including documentation, source code repositories, mailing lists, and IRC channels.

Who this book is for

If you are an educator who is creating a course for edX, or a corporate trainer using Open edX for learning and development initiatives, then *edX E-Learning Course Development* is the ideal book for you. Whether you are developing an online course for the first time or you are a veteran LMS scholar, this book will get you up and running with edX.

Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "It is formatted as HH:MM:SS, and its maximum value is 23:59:59."

New terms and **important words** are shown in bold. Words that you see on the screen, for example, in menus or dialog boxes, appear in the text like this: "Clicking on **Check** reveals whether the answer is correct or not."

[ Warnings or important notes appear in a box like this.]

[ Tips and tricks appear like this.]

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1

Getting Started

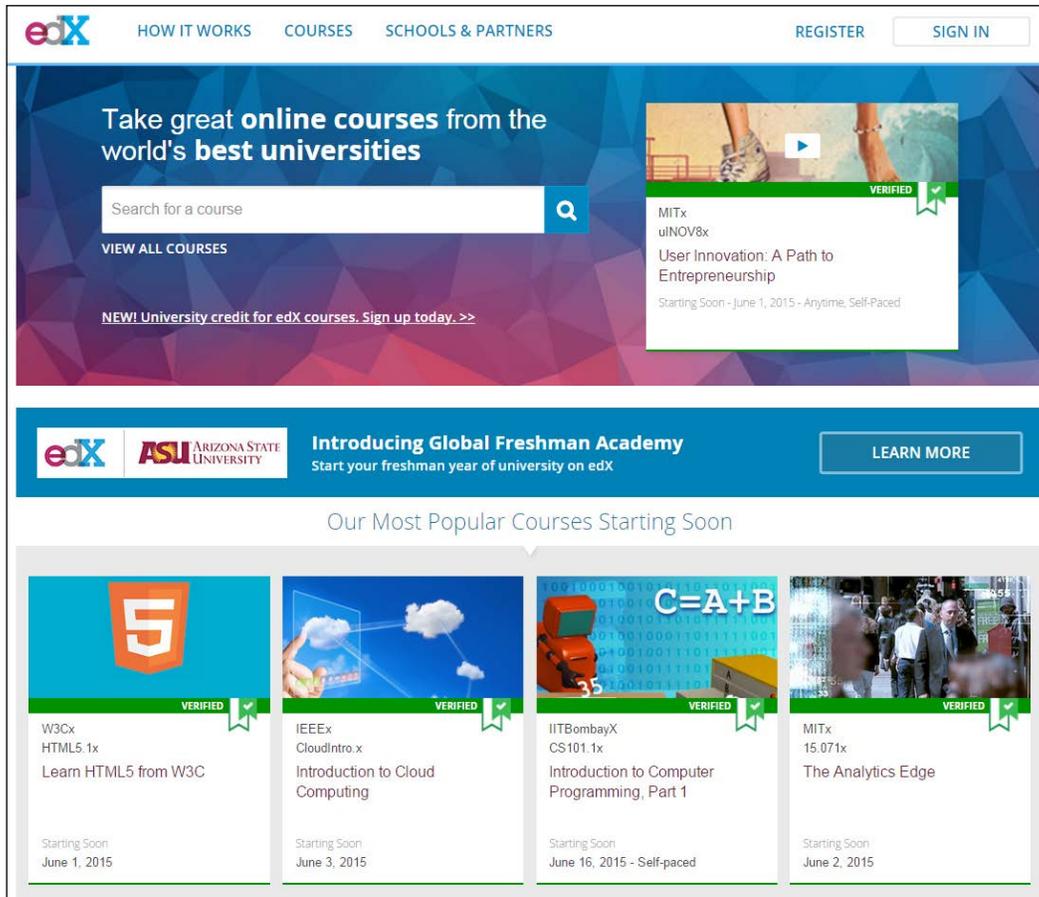
Curiosity is the engine of achievement.

According to Sir Ken Robinson – a leader in creativity, innovation, and human resource development – curiosity drives our desire to acquire knowledge. This educational exploration leads us to a deeper understanding of human creativity and intelligence.

Whether you are teaching in a traditional classroom or online in a learning management system, as an educator, it's your task to cultivate your students' curiosity. As education has evolved into an increasingly interactive experience, new online options have emerged to facilitate this function.

One emerging option is a **Massive Open Online Course (MOOC)**. As defined by the Oxford Dictionary, a MOOC is "a course of study made available over the Internet without charge to a very large number of people." A nonprofit partnership between Harvard University and Massachusetts Institute of Technology (MIT), edX is a MOOC platform designed to engage your students' curiosity while activating the engine of their achievement.

Here is a screenshot of the edX home page, which you can find at <http://edx.org>:



This book walks you through the steps to create your first course with edX. By the time you finish this book, you should be able to develop or adapt the curriculum, produce instructional videos, design exercises and assessments, administer your course, and facilitate your students' learning experience while marketing it on social media.

Organized sequentially, each chapter represents a progressive step in the curriculum development and implementation process. To get started, we will cover the following topics in this first chapter:

- Review edX's potential and purpose
- Define your role and responsibilities

- Explore available edX courses
- Create your edX user account
- Explain signing up for Studio
- Outline the creation of your course
- Preview your course's characteristics

edX's potential and purpose

Understanding the potential of edX requires a realization of online learning trends. Let's consider the 2014 Babson Survey Research Group survey of online learning, *Grade Level: Tracking Online Education in the United States*. The survey found the following facts:

- 3.7 percent more students enrolled in at least one distance-education course in 2014 than in the previous year. This is the slowest rate of increase in over 10 years, but the pace of online learning accounts for almost three quarters of all increases in enrollment to higher education in the United States.
- 70.8 percent of chief academic officers agree that online education is critical to their institution's long-term strategy, a 48.8 percent growth from 2002.
- 80.9 percent of for-profit institutions report that online education is critical to their long-term strategy. 72.9 percent of public institutions and 63.5 percent of private nonprofit institutions report the same.

Survey data for MOOCs shows that they have promise, but present unique challenges. This makes sense, given their relative newness in the online-learning landscape, along with their increased scale and scope. Findings from the survey indicate the following facts:

- 8.0 percent of higher-education institutions currently have a MOOC, up from 2.6 percent in 2012 and 5.0 percent in 2013
- 16.3 percent of academic leaders believe MOOCs offer a sustainable method of offering courses online, a drop from 28.3 percent in 2012
- 39.9 percent of academic institutions are still undecided about MOOCs, while 46.5 percent have no immediate plans to launch a MOOC



You can download the 2014 Babson Survey Research Group (BSRG) survey of online learning, *Grade Level: Tracking Online Education in the United States*, from <http://onlinelearningconsortium.org/read/survey-reports-2014/>.

Growth of the MOOC market

Despite the mixed results from the Babson Survey Research Group report, there is much about MOOCs that is positive. Both educational institutions and private organizations are exploring ways to meet their learning objectives with MOOCs.

A January 2015 report by Visiongain, an independent business information provider for the telecoms, pharmaceutical, defense, energy, and metal industries, anticipates the worldwide revenue from MOOCs will reach \$1.5 billion in 2015.

The findings of the report, *Massive Open Online Course (MOOC) Market 2015-2020: mEducation, Distance, Open & e-Learning in Higher Education & Enterprise*, were based on the growing use of mobile devices, increasing rates of enrollment in MOOC courses, the growing use of MOOCs for enterprise-level training, and a strong demand for low-cost, high-quality globalized education.



You can review the summary and table of contents of the Visiongain MOOC report at <http://www.reportlinker.com/p02720992-summary/Massive-Open-Online-Course-MOOC-Market-mEducation-Distance-Open-e-Learning-in-Higher-Education-Enterprise.html>.

Likewise, in a December 2014 EdSurge article, *MOOCs in 2014: Breaking Down the Numbers*, Dhawal Shah shares similarly compelling statistics supporting MOOCs:

- The top three subjects in which students enrolled include humanities, computer science and programming, and business and management.
- The top five MOOC providers by student enrollment are Coursera (10.5 million), edX (3 million), Udacity (1.5 million), MiradaX (1 million), and FutureLearn (800,000). You can review a list of courses offered by each MOOC provider at <https://www.class-central.com/providers>.
- The number of top 25 United States universities included in the US News World Report rankings offering courses online for free has grown to 22.
- The number of universities now offering MOOCs has doubled to 400.
- The number of cumulative MOOC courses doubled to 2,400.

Shah's article indicates that, while MOOCs are in a phase of early adoption, they are on the precipice of pronounced growth. There are already intriguing examples of what the future holds for MOOCs. Top trends include the following:

- MOOC providers offering credentials for their paid courses
- Increased focus on the quality of course videos and materials

- A shift to an on-demand model of delivery, such as lynda.com and Udemy, in which a student can complete a course at their pace, and not in alignment with a traditional academic quarter or semester

The emergence of Open edX

Another intriguing evolution acknowledged in Shah's article is that Open edX—the open source version of edX—has emerged as the preferred MOOC platform for organizations and groups. It has already been adopted by organizations in locations such as Jordan, Japan, France, China, India, and the United States.



You can read Dhawal Shah's article, *MOOCs in 2014: Breaking Down the Numbers*, online at <https://www.edsurge.com/n/2014-12-26-moocs-in-2014-breaking-down-the-numbers>.

Further strengthening the standing of Open edX among organizations, November 2014 saw the launch of a conference for developing and using the edX open source platform. Hosted by the Open edX community in Cambridge, Massachusetts, the conference welcomed developers, system administrators, education specialists, and anyone working with or wanting to learn more about Open EdX.



You can learn more about the Open edX Conference at <http://con.openedx.org>, review slides, or watch YouTube videos of the presentations online at <https://openedx.atlassian.net/wiki/display/OPEN/Open+edX+Conference+Presentations>.

Emerging educational opportunities

MOOCs are also making inroads into higher education. In 2013, Georgia Institute of Technology announced plans to offer an online MS degree in computer science. Powered by Udacity's MOOC platform and offered in partnership with AT&T, the program—informally called "OMS CS"—is estimated to cost \$7,000, a fraction of an equivalent on-campus program. Enrollment opened in January 2015, with the first cohort of classes beginning that fall.



You can learn more about the Georgia Institute of Technology "OMS CS" program at <http://www.omscs.gatech.edu>.

MOOCs are making their mark in emerging educational markets. In March 2015, the US Agency for International Development (USAID) and CourseTalk.com, an online course review company, launched a two-year, 1.55-million-dollar initiative, Advancing MOOCs for Development, to expand education and career training globally.

As part of the initiative, the Technology and Social Change Group (TASCHA) at the University of Washington will analyze more than 70,000 CourseTalk student reviews to understand the awareness and usage of MOOCs among 18- to 35-year olds in Colombia, the Philippines, and South Africa. IREX, a nonprofit development organization, will provide support for the program.

The research will be used to design a MOOC-centric training framework and create a campaign to increase MOOC enrollment and completion rates in those countries.



You can learn more about the Advancing MOOCs for Development program at <http://www.coursetalk.com/advancingmoooc>.

Another unique way MOOCs can be used is a **Small Private Online Course (SPOC)**. SPOCs are basically smaller-scale versions of MOOCs that are used with on-campus students or special interest groups who want to share knowledge. SPOCs work well with a flipped classroom approach, combining online interaction with resources in conjunction with real-time engagement in a classroom.

The impact of edX

Founded in May 2012 as a partnership between Harvard University and Massachusetts Institute of Technology (MIT), edX has established itself as one of the leading MOOC platforms. edX is currently led by CEO Anant Agarwal, PhD, who taught the first edX course on circuits and electronics from MIT; 155,000 students from 162 countries were enrolled.



You can watch a YouTube video of Anant Agarwal explaining how edX works: https://youtu.be/B-EFayAA5_0.

Working from MIT's OpenCourseWare initiative, edX is unique among MOOCs as the only one that is both nonprofit and open source (a feature it released in June 2013). Dedicated to a desire to democratize education, edX was designed for students and institutions seeking to transform themselves using leading technology, innovative pedagogy, and rigorous courses, regardless of location, gender, income, or social status.



Learn more about Open edX in this video from ExtensionEngine, a team of passionate engineers, designers and product managers focused on making a difference in online and blended education: https://youtu.be/yDE8vN6DI_k. You can also learn about the services they offer to assist you in the implementation of your edX course at <http://extensionengine.com/services/open-edx/>.

As of January 2015, edX has more than 10 million course enrollments, with more than 3 million students from every country. Approximately 70 percent of edX students come from outside the U.S. edX learners range in age from 8 to 95, with a student body consisting of 60 percent continuing learners, 24 percent university-age learners, and 4 percent high-school students which comprise edX's High School Initiative.

A powerful platform, edX can enhance education both on-campus and online. To achieve that goal, in September 2013, edX partnered with Google to build mooc.org—a free, open-source platform for universities, institutions, businesses, and individuals to create courses on the cloud. Still in development, this project will very likely revolutionize online learning just as WordPress reimagined online publishing.

The previously mentioned 4 percent enrollment of high school students reflects edX's High School Initiative, which it launched in September 2014. Students can enroll in AP-level courses on subjects including English, history, mathematics, and science, among others. Teachers can also use the materials of these courses to supplement their classroom curriculum. Students can take a course for free or pay for a Verified Certificate to share with teachers or college admissions.



Learn more about edX's High School Initiative at <https://www.edx.org/high-school-initiative>

October 2014 saw the addition of professional development courses to edX. Designed for working professionals, these courses offer students a convenient, time-saving online learning experience that fits into their busy schedules. Courses can run for a few days to several weeks. Content is geared to a specific industry or skill set, with an emphasis on hands-on scenarios from the field. All professional education courses are fee-based; the fees vary by course. Many offer continuing education or professional education credit, and all courses give students the option for Verified Certificates of Achievement.



Learn more about edX's professional development courses at <https://www.edx.org/professional-education>

Around the same time edX launched the professional development courses, they announced that they were beginning to offer their partners the ability to host their courses on a white-labeled site, branded by the institution and powered by the edX platform. You can look for this option to emerge more actively over time.



Explore an example of edX's white label initiative via MIT Professional Education's course *Tackling the Challenges of Big Data* at <https://mitprofessionalx.mit.edu> and *Energy Technology and Policy* from UT Austin at <https://utaustinx.edx.org>.

In March 2015, edX partnered with Microsoft to make courses available for individuals wanting to build innovative applications, services, and experiences on the Microsoft platform. Initial courses include Programming with C#, Introduction to TypeScript, Introduction to Bootstrap, Querying with Transact SQL, Building Cloud Apps with Microsoft Azure, Introduction to Office 365 APIs, and Windows PowerShell Fundamentals.



Explore edX at <https://www.edx.org> or get started with Open edX at <https://open.edx.org>. Learn about edX's High School Initiative at <https://www.edx.org/high-school-initiative>, its partnership with Microsoft at <https://www.edx.org/school/microsoft>, and professional education programs at <https://www.edx.org/professional-education>.

In April 2015 edX announced the Global Freshman Academy (GFA), a partnership with Arizona State University (ASU). This one of a kind collaboration lets learners worldwide earn freshman-level university credit after passing a series of digital immersion courses. Courses are designed and taught by ASU faculty, while being hosted by edX. There are no application, transcript, no GPA requirements, and no entrance exams. Plus, you only pay for credit when you pass! The result is a reimagined freshman year that's accessible, cost-effective, and personalized.



Learn more about the Global Freshman Academy and sign up for email notifications about GFA updates and new courses at <https://www.edx.org/gfa>. You can also watch the video *Getting Started Global Freshman Academy* at <https://youtu.be/4DDBoI92NoE>