

Long Comment Regarding a Proposed Exemption Under 17 U.S.C. 1201 (Proposed Class #3)

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Item 1. Commenter Information

This Comment is submitted on behalf of Entertainment Software Association; Motion Picture Association of America, Inc.; and Recording Industry Association of America (collectively the “Joint Creators and Copyright Owners”). The Joint Creators and Copyright Owners may be contacted through their counsel, Steven J. Metalitz, J. Matthew Williams and Naomi Straus, Mitchell Silberberg & Knupp LLP, 1818 N St., NW, 8th Fl., Washington, D.C., 20036, Telephone (202) 355-7900.

The Joint Creators and Copyright Owners are trade associations representing some of the most creative and innovative companies in the United States.

The Entertainment Software Association (“ESA”) represents all of the major platform providers and nearly all of the major video game publishers in the United States. ESA is the U.S. association exclusively dedicated to serving the business and public affairs needs of companies that publish computer and video games for video game consoles, handheld devices, personal computers, and the Internet. ESA offers a range of services to interactive entertainment software publishers, including but not limited to: a global content protection program; business and consumer research; government relations; and intellectual property protection efforts.

The Motion Picture Association of America, Inc. (“MPAA”) is the voice of one of the country’s strongest and most vibrant industries – the American motion picture, home video and television industry. MPAA works to advance the business and the art of filmmaking and to celebrate its enjoyment around the world. MPAA members include: Walt Disney Studios Motion Pictures; Paramount Pictures Corporation; Sony Pictures Entertainment Inc.; Twentieth Century Fox Film Corporation; Universal City Studios LLC; and Warner Bros. Entertainment Inc.

The Recording Industry Association of America (“RIAA”) is the trade organization that supports and promotes the creative and financial vitality of the major music companies. Its members comprise the most vibrant record industry in the world. RIAA members create, manufacture and/or distribute approximately 85% of all legitimate recorded music produced and sold in the United States. In support of its mission, the RIAA works to protect the intellectual property and First Amendment rights of artists and music labels; conduct consumer, industry and technical research; and monitor and review state and federal laws, regulations and policies.

Item 2. Proposed Class Addressed

Proposed Class 3: Audiovisual Works—Educational Uses—Massive Open Online Courses (“MOOCs”).

The December 12, 2014 Notice of Proposed Rulemaking (“NPRM”) described this proposed class of works as allowing “students and faculty participating in Massive Open Online Courses (“MOOCs”) to circumvent access controls on lawfully made and acquired motion pictures and other audiovisual works for purposes of criticism and comment.” 79 Fed. Reg. 73,856, 73,860 (Dec. 12, 2014). This requested exemption would be for “audiovisual material made available in all formats, including DVDs protected by the Content Scramble System (“CSS”), Blu-ray discs protected by the Advanced Access Content System (“AACS”), and TPM-protected online distribution services.” Proponents Peter Decherney, Michael X. Delli Carpini, American Association of University Professors, College Art Association, International Communication Association, Library Copyright Alliance, and Society for Cinema and Media Studies (Joint Academics) submitted the only long-form comment with evidence supporting this exemption.

Item 3. Overview

The Joint Creators and Copyright owners oppose this proposed exemption. By their very definition, to the extent there is one,¹ MOOCs are open to anyone, and course enrollment in a single course can be in the tens of thousands. In 2014 alone, between 16 and 18 million people participated in a MOOC.² Thus, this proposed exemption for MOOC students and educators would have broad implications and should be approached with caution. Further, MOOCs are still in their infancy, having only entered the mainstream in 2012.³ Yet, the Joint Academics have failed to address concerns surrounding MOOCs or to admit the possibility of any limitations or safeguards that would ensure the proposed exemption is not misused. The sheer numbers and the very nature of MOOCs as “massive” counsel against adoption of this exemption: if even a small minority of students enrolled in MOOCs misunderstood the limitations of the exemption, it would result in tens of thousands of potential Section 1201(a) violations and potential infringements.

The main focus of this proceeding, bearing in mind the benefits of access controls, is to identify any particular class of works for which the prohibition on circumventing access controls

¹ See Jonathan Haber, *Define ‘MOOC’*, HUFFINGTONPOST, Dec. 5, 2013, http://www.huffingtonpost.com/jonathan-haber/define-mooc_b_4384207.html, Exhibit 1 attached hereto.

² Dhawal Shal, *Online Courses Raise Their Game: A Review of MOOC Stats and Trends in 2014*, CLASS CENTRAL (Dec. 27, 2014), <https://www.class-central.com/report/moocs-stats-and-trends-2014/>, Exhibit 2 attached hereto.

³ See Laura Pappano, *The Year of the MOOC*, N.Y. TIMES, Nov. 2, 2012, <http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?pagewanted=all>, Exhibit 3 attached hereto.

has diminished in a substantial manner the ability to make noninfringing uses. The proponents of each exemption bear the burden of demonstrating such diminution for a defined class, and showing that it outweighs the need for continuing the prohibitions set forth by the statute. *See* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies; Notice of Inquiry and Request for Petitions, 79 Fed. Reg. 55,687, 55,689 (Sept. 17, 2014) (“2014 NOI”).⁴ The Joint Academics have failed to satisfy their burden to show that this broad exemption for MOOCs is warranted.

First, the proponents have not demonstrated that all uses of audiovisual works by MOOC instructors or participants are noninfringing. Nor have they established that any purported noninfringing uses “are or are likely in the ensuing three year period to be adversely affected by the prohibition against circumvention,” 2014 NOI at 55,690, because the uses sought could be achieved by accessing materials without circumvention.

The proponents also did not satisfactorily address the Copyright Office’s detailed questions regarding how to define MOOCs or “how access to materials resulting from the circumvention of technological protection measures (“TPMs”) could be limited to the intended audience.” NPRM at 73,861. Without a clear way to limit access to the intended audience, the proposed exemption, which is not even limited to uses of short portions of motion pictures, would almost certainly facilitate infringement. The proponents have not shown any significant harm from the prohibition on circumvention that would outweigh the significant risks of granting a proposed exemption. *See* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies; Notice of Inquiry and Request for Comments, 76 Fed. Reg. 60,398, 60,403 (Sept. 29, 2011) (“2011 NOI”) (“In some circumstances, the adverse effect of a proposed exemption . . . may be greater than the harm posed by the prohibition on circumvention of works in the proposed class.”).

In addition to their failure to demonstrate a need for an exemption for MOOCs, the proponents have certainly not demonstrated a substantial adverse impact due to the inability to circumvent AACS on protected Blu-ray Discs. Nor have they identified significant uses of audiovisual materials other than motion pictures, as defined in 17 U.S.C. § 101. Finally, there is no evidence in the record whatsoever of a need for circumvention in any MOOC other than film studies or other courses requiring close analysis of film and media excerpts.

Item 4. Technological Protection Measure(s) and Method(s) of Circumvention

The CSS technology used to protect DVDs, the AACS technology used to protect Blu-ray Discs, and many of the assorted technologies used to protect motion pictures available from

⁴ The burden of coming forward with evidence in support of the proposed exemption, as well as the burden of persuasion that the exemption should be recognized on the narrow grounds authorized by the statute, must always remain with the proponent of an exemption. 2014 NOI at 55,689. This burden applies to both factual and legal issues. It also applies without regard to how closely (or not) a proposed exemption resembles one granted in the previous rulemaking cycle.

online distribution and streaming services are TPMs that effectively control access to copyrighted works.

As discussed further below, these access controls have increased the availability of works and have allowed for a vast proliferation of platforms on which consumers can enjoy authorized access to an increasing variety of content. It is easier than ever to access a broad selection of films and television shows, and on many different devices. The confidence afforded by the security of TPMs, and the flexibility in business models that such TPMs enable, are essential marketplace pillars which have led creators of motion pictures to expand their streaming and downloading options and to experiment with a broad range of business models to increase access to their works, such that some films can now be purchased and digitally downloaded before they are made available on physical discs.

Item 5. Asserted Noninfringing Use(s)

Proponents claim that the noninfringing uses sought to be made are the “same kinds of non-infringing uses as Proposed Class 1.” Joint Academics’ Class 3 Comment at 4. As explained in the Joint Creators and Copyright Owners’ comment regarding Proposed Class 1, it is not the case that all uses of motion pictures by university educators and students are noninfringing and/or fair use.⁵ It is the proponents’ burden to show that the TPMs sought to be circumvented inhibit noninfringing uses, which they have failed to do. *See* 2014 NOI, at 55,690 (“[T]here is no ‘rule of doubt’ favoring an exemption when it is unclear that a particular use is a fair use.”).

Indeed, it is not at all clear that the fair use factors balance for uses in MOOCs in the same way they do when evaluating use of a work in a traditional classroom. Because of the size and openness of MOOCs, any “effect ... upon the potential market” from use of a clip would be much greater than in a traditional, limited classroom setting. Further, while MOOCs are purportedly educational, this does not mean that they are inherently non-commercial,⁶ or that they serve a different function than the audiovisual works they seek to use: rather, in addition to providing educational content, MOOCs function as marketing tools for universities,⁷ generate significant income for the for-profit MOOC providers,⁸ and are used as a form of entertainment.⁹

⁵ *See Princeton Univ. Press v. Mich. Document Servs.*, 99 F.3d 1381, 1385 (6th Cir. 1996) (“[W]hether a use referred to in the first sentence of Section 107 is a fair use in a particular case . . . depends upon the application of the determinative factors.”).

⁶ The Joint Academics concede this point and highlight that two of the largest MOOC providers are for-profit enterprises. Joint Academics Class 3 Comments at 6.

⁷ Jake New, *MOOCS, Nothing But A Marketing Tool?*, ECAMPUS NEWS, Jan. 20, 2014, <http://www.ecampusnews.com/top-news/moocs-marketing-015/>, Exhibit 4 attached hereto.

⁸ Max Chafkin, *Udacity’s Sebastian Thrun, Godfather Of Free Online Education, Changes Course*, FAST COMPANY, December 2013/January 2014, <http://www.fastcompany.com/3021473/udacity-sebastian-thrun-uphill-climb>, Exhibit 5 attached hereto (describing a deal between Udacity and AT&T to fund several courses offered by the Georgia Institute of Technology, which will charge significant fees to be split between the university and Udacity); Jon Weiner, *Inside The Coursera Hype Machine*, THE NATION, Sept. 23,

These issues go to the “purpose and character of the use,” including whether it is “transformative,” and to the effect “upon the potential market” for the copyrighted works.¹⁰

The broad definition of MOOC offered by the proponents makes it particularly difficult to assess whether uses sought to be made are in fact noninfringing. The Joint Academics would define MOOCs as “free online versions of college and university courses open to anyone, with essentially unlimited enrollment.” Joint Academics’ Class 3 Comment at 4. They refuse to allow for any distinction or limitation along any of the lines suggested in the NPRM, such as whether the content is open or free or requires course materials to be licensed; whether the provider is a non-profit or for-profit entity; or whether the courses require registration and/or identity verification.¹¹

However, without a clear and limited definition of a MOOC, this proposed exemption could potentially encompass the Internet at large, which falls far from the “narrow and focused” class that the rulemaking procedure is intended to achieve.¹² Apparently, there is no licensing body or organization that certifies or accredits MOOCs as a whole. Anyone can potentially create and offer a MOOC, even without any advanced degree,¹³ and there are several platforms used to build MOOCs which do not require any particular coding skills.¹⁴ Status as a “student” of a MOOC is even more nebulous. Anyone can “enroll” in a MOOC (they are, by definition, “open” to participation by anyone), Joint Academics’ Class 3 Comment at 6, and more than 90%

2013, <http://www.thenation.com/article/176036/inside-coursera-hype-machine?page=0,1>, Exhibit 6 attached hereto (describing Coursera’s money-making possibilities, including that it charges for certificates).

⁹ For example, Coursera MOOC courses or lectures are being offered as part of the onboard entertainment available on JetBlue flights. *See Learn from Coursera on Your Next JetBlue Flight*, COURSERABLOG (NOV. 24, 2014), <http://blog.coursera.org/post/103477375027/learn-from-coursera-on-your-next-jetblue-flight>, Exhibit 7 attached hereto.

¹⁰ *See generally* 17 U.S.C. § 107; *Campbell v. Acuff-Rose Music*, 510 U.S. 569 (1994).

¹¹ *See* NPRM at 73,861 (listing possible distinctions among MOOCs); Joint Academics’ Class 3 Comment at 5-7 (arguing that it would “artificially constrain the growth and evolution of MOOCs to limit the definition in any of the ways mentioned above”).

¹² *See* Recommendation of the Register of Copyrights, Section 1201 Rulemaking: Fifth Triennial Proceeding, at 9 (Oct. 12, 2012) (“2012 Recommendation”) (quoting Report of House Commerce Committee on H.R. 2281, the Digital Millennium Copyright Act, H.R. Rep. No. 105-551, pt. 2 at 36 (1998) (“Commerce Rep.”)). All cited materials from previous rulemaking cycles can be accessed via the Copyright Office website at <http://www.copyright.gov/1201/> under “Past Proceedings.”

¹³ *See* Pappano, *The Year Of The MOOC*, *supra* note 3 (highlighting a MOOC taught by “Andy Brown, a 2009 M.I.T. graduate with a B.S. in Physics,” offered on Udacity).

¹⁴ *See* John Swope, *Building Your Own Online Class? – How To Choose the MOOC Platform*, MOOC NEWS & REVIEWS, February 24, 2014, <http://moocnewsandreviews.com/building-your-own-online-class-how-to-choose-the-mooc-platform/>, Exhibit 8 attached hereto (reviewing five MOOC-building platforms available to individuals).

of students who enroll in a given MOOC do not complete the course.¹⁵ Thus, becoming a “student” in a MOOC, and potentially eligible for the exemption, is as easy as directing one’s Internet browser to any given MOOC.¹⁶ Moreover, there is reportedly a “trend towards ‘always on’ availability” of MOOCs, with more and more MOOCs offered as “on-demand” courses rather than with fixed starting and end dates, and courses being shared as individual lecture videos—just as if they were a YouTube video.¹⁷ Given the lack of such distinctions and emphasis on “openness,” it is hard to see what distinguishes a MOOC from any online video that purports to be educational, and what characteristics distinguish a MOOC student from any interested party with an Internet connection. The proposed exemption would thus expand the educational exemption for motion pictures such that any Internet user who seeks to use portions of motion pictures is entitled to engage in circumvention. The rulemaking commands a much more substantially tailored approach to crafting the scope of the exemptions.

The Joint Academics assert that the exception in 17 U.S.C. § 110(2) for distance learning is not relevant to their proposed exception because “it is limited to systematic instruction as part of a curriculum of an accredited, non-profit institution,” while MOOCs are open to anyone. Joint Academics’ Class 3 Comment at 16. Thus, section 110 is of no use to them in meeting their burden of demonstrating that the uses at issue are lawful.

Item 6. Asserted Adverse Effects

Proponents claim that MOOCs require an exemption even more so than traditional university courses, because they are offered online, where there are more distractions to lure “students” away from the courses, and because students will be more aware of a low quality video clip if it is integrated into a lecture video created in high definition. Joint Academics’ Class 3 Comment at 11. Further, MOOC lectures are generally broken into short videos, typically seven to ten minutes in length, so proponents claim professors must “make the most out of this compressed lecture by incorporating the most effective audiovisual works,” and purportedly this is only possible through circumvention. *Id.* at 18.

However, proponents of any exemption are required to “demonstrate that the technological protection measure is the cause of the claimed adverse impact.” 2014 NOI at 55,690.¹⁸ That online students are more easily distracted than students in the classroom, and

¹⁵ Jon Marcus, The Hetchinger Report, *All Hail MOOCs! Just Don’t Ask if They Actually Work*, TIME, Sept. 12, 2013, <http://nation.time.com/2013/09/12/all-hail-moocs-just-dont-ask-if-they-actually-work/>, Exhibit 9 attached hereto.

¹⁶ See Pappano, *The Year Of The MOOC*, *supra* note 3 (noting that signing up for a course “might take just five minutes, assuming you spend two devising a stylish user name” and quoting Dr. Andrew Ng that doing so is “a lightweight process”).

¹⁷ See Shal, *Online Courses Raise Their Game*, *supra* note 2.

¹⁸ As noted in the NOI, “Adverse impacts that flow from other sources, or that are not clearly attributable to implementation of a technological protection measure, are outside the scope of the rulemaking.” Commerce Rep. at 37. “For instance, adverse effects stemming from ‘marketplace trends, other technological developments, or changes in the roles of libraries, distributors or other intermediaries’ are not cognizable harms under the statute.” 2014 NOI at 55,690 (*quoting* Staff

have much lower course completion rates, is not an adverse effect that is created by access controls, but rather is endemic to the nature of MOOCs, which have notoriously low student retention rates, regardless of the subject matter.¹⁹

Proponents barely address alternatives for circumvention for creating short clips to include in potential lectures, but the online nature of MOOCs and their limited time frame in fact would seem to minimize the need for circumvention of access controls. Adequate alternatives exist, such as directing students to authorized online copies of motion pictures at natural break points in the lectures, which could be achieved using hyperlinks or embedded authorized videos.²⁰ Film courses offered as MOOCs might, for example, direct students to view entire films or portions of films on their own time, between or before viewing lecture segments regarding the films.²¹ Licensing of content is also an option that has already been used by some MOOC providers—for example, UC Irvine worked with the cable channel AMC to create an incredibly popular MOOC based around the series “The Walking Dead” as a “joint production.”²²

Regarding uses by students that are limited by access controls, the only example given is a video essay assignment that Professor Peter Decherney plans to offer in a MOOC on the

of House Committee on the Judiciary, 105th Cong., Section-By-Section Analysis of H.R. 2281 as Passed by the United States House of Representatives on August 4, 1998, at 6 (Comm. Print 1998), *reprinted in* 46 J. COPYRIGHT SOC’Y U.S.A. 635 (1999) (“Manager’s Rep.”).

¹⁹ See Max Chafkin, *Udacity’s Sebastian Thrun*, *supra* note 8 (noting that even the creator of one of the largest MOOC platforms, which specializes in technology and science related courses, has realized that the “shockingly low number of students who actually finish the classes” is a significant problem for MOOCs).

²⁰ The Movieclips YouTube channel makes available 53,582 licensed clips from feature films that can be embedded in this manner. See About, Movieclips YouTube Channel, <https://www.youtube.com/user/movieclips/about>, Exhibit 10 attached hereto. YouTube also allows a user to create a custom embed code that will open to a specific time code within a given video, which could be saved for use in a MOOC setting. See Embed Videos and Playlists, YouTube Help, <https://support.google.com/youtube/answer/171780?hl=en>, Exhibit 11 attached hereto. This would help a MOOC professor or student discuss film clips without a need for circumvention.

²¹ For example, the Coursera “Language of Hollywood: Storytelling, Sound, and Color” course instructs students to view the relevant films “on their own, outside of class,” and mentions the various options for doing so, such as purchasing on DVD, renting at a local library or through Netflix, or streaming on the Internet. See Course Format, The Language of Hollywood: Storytelling, Sound, and Color, COURSERA, <https://www.coursera.org/course/hollywood>, Exhibit 12 attached hereto.

²² The Walking Dead MOOC Feedback, CANVAS BY INSTRUCTURE, http://www.canvaslms.com/downloads/twd-mooc-feedback.pdf?__hstc=229253315.d133072815463ced769f4ce3e712efad.1426547526032.1426547526032.1426547526032.1&__hssc=229253315.1.1426547526032&__hsfp=3382822346, Exhibit 13 attached hereto.

Hollywood film industry, which will require students to create videos in which they analyze short film and video clips using their own voiceover commentary.²³ Joint Academics' Class 3 Comment at 8. This is merely a possible use, and proponents have not identified any adverse effect that would result if these students used non-circumventing techniques to make their videos, such as by filming themselves watching and analyzing a decrypted version of the film using a webcam or smartphone camera. An exemption based on an anticipated adverse impact may be granted "only in extraordinary circumstances in which the evidence of likelihood of future adverse impact during that time period is highly specific, strong and persuasive." Manager's Rep. at 6. With so little evidence of a likely future adverse impact, there are simply no grounds for granting a new exemption for MOOCs, and particularly not for MOOC "students," who, as noted above, are a nebulous group of tens of millions of Internet users.

In addition to their failure to demonstrate a need for an exemption for MOOCs, proponents have not addressed whether there is a substantial adverse impact due to the inability to circumvent AACCS on protected Blu-ray Discs.²⁴ Nor have they identified significant uses of audiovisual materials other than motion pictures, as defined in 17 U.S.C. § 101. Finally, there is no evidence in the record whatsoever of a need for circumvention in any MOOC other than film studies or other courses requiring close analysis of film and media excerpts. Simply "using audiovisual works to highlight the beauty of [a] country and providing enrolled students with a sense of its culture," Joint Academics' Class 3 Comment at 13, could be achieved without circumvention, as noted in the prior rulemaking: "where a clip is presented simply to illustrate a historical event – lower-quality screen capture images may be fully adequate to fulfill the noninfringing use." 2012 Recommendation at 134.²⁵

²³ Given that the Register and the Librarian did not, in the 2012 proceeding, separate the various exemptions related to uses of short portions of motion pictures such that each category of users covered by the exemptions is defined in a clear and distinct manner, videos of the sort described by Professor Decherney and created by students in non-commercial MOOCs might already fall under the existing exemption for "noncommercial videos." See 37 C.F.R. § 201.40(b)(4) and (5).

²⁴ Nearly all film and television content released on Blu-ray is also available on DVD and/or through online services. As reported by "DVD and Blu-ray Release Report" with respect to physical media, DVDs remain the industry standard, with far more titles being released each year on DVD than on Blu-ray. For example, in 2014, nearly 5,000 feature film and television titles were released on DVD, while fewer than 1,500 titles were released on Blu-ray. Moreover, in that same year, 439 million DVDs were purchased, versus only 127 million Blu-ray Discs. MPAA member studios report that they are not aware of any of their films that have been released exclusively on Blu-ray Disc. As reported by *Home Media Magazine*, Blu-ray Discs have accounted for only 22% of all discs sold in 2015, while DVDs constitute 78% of all disc sales. MPAA member studios report that they are not aware of any of their films that have been released exclusively on Blu-ray Disc. A handful of titles may have been released on Blu-ray Discs as "special editions" or with "bonus footage" without a DVD counterpart; however, the main film would have been released on DVD and/or as a digital download.

²⁵ The Joint Creators and Copyright Owners take no position generally on whether any specific screen capture technologies, or any particular uses of those technologies, are lawful.

Item 7. Statutory Factors

When considering the availability for use of copyrighted works, § 1201(a)(1)(C)(i), it is important to recognize that more works than ever are more readily available than ever, in particular through streaming and downloadable online content. This growth in content availability has been underwritten by the legislative promise of secure and robust protection for such content.²⁶ The Digital Millennium Copyright Act (“DMCA”) was intended to encourage digital business models – “new ways of disseminating copyrighted materials to users”²⁷ – that depend upon strong access control measures in order to increase consumer options and promote the flow of copyrighted materials to the public. Thus, the Joint Creators and Copyright Owners urge the Register to consider how the DMCA and TPMs have supported a vast increase in the public’s access to works when considering the propriety of any MOOC-related exemption.

MOOCs are still at a very early phase of development, and are still finding their way in terms of providing high quality educational experiences for students. It is still unclear how this new form of education and the technology surrounding it will develop.²⁸ For now, the open and unregulated nature of the MOOC industry makes it difficult to define a properly tailored exemption, as is required by the rulemaking procedure, that does not run the risk of opening up motion pictures to widespread hacking by anyone claiming to participate in a MOOC, which could negatively impact “the market for or value of” motion pictures. *See* 17 U.S.C. § 1201(a)(1)(C)(iv).

Item 8. Documentary Evidence

Please see the attached Exhibits.

²⁶ The legislative history is clear that this rulemaking was not intended to ensure that every new service enables copying, manipulation, and other uses of every existing work in every new format. To the contrary, the legislative history instructs the Register to take into account increases in the availability of works that are due to access controls, and to grant exemptions only where the existence of access controls and the prohibitions of § 1201(a)(1)(A) have “diminished” the availability of works for lawful uses. *See* Commerce Rep. at 36 (1998).

²⁷ Manager’s Rep. at 6.

²⁸ Geoffrey A. Fowler, *An Early Report Card on Massive Open Online Courses*, WALL ST. J., Oct. 8, 2013, <http://www.wsj.com/articles/SB10001424052702303759604579093400834738972>, Exhibit 14 attached hereto.

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Exhibit 1

Jonathan Haber
Chief Learner, Degree of Freedom

Define 'MOOC'

Posted: 12/05/2013 3:18 pm EST | Updated: 02/04/2014 5:59 am EST

The author of this book on crowdsourcing took a bold move in trying to define the term in a way that would make it clear when one entity (like the t-shirt company Threadless) should be considered an example of the phenomenon while another (like Wikipedia) should not. And since I'm writing a title for the same book series on massive open online courses, I've been trying to similarly define MOOC in a way that would clarify what should be covered by that term and what shouldn't.

While it's tempting to just fall back on the acronym and say that if a course is massive, open and delivered online then it must be a MOOC, once you dig into the details, it turns out that each one of these words is either ambiguous or open to challenge.

For example, at what point do you move from being really big to "massive?" 1,000 students? 10,000? 100,000? And are we talking about enrollees, active students or course completers? And even if we ignore the debate over whether or not MOOCs represent a genuine Open Learning resource and just define "open" as free of costs and other barriers to entry, do we really want to set up a system whereby business decisions, like the ones made recently by Udacity, turn whatever we studied from a MOOC to a non-MOOC experience?

I suppose "online" is relatively unambiguous (although even there you can make the case that initiative like Coursera's Learning Hubs are creating a hybrid online/offline environment), but I would say that even the word "course" is up for grabs. For instance, if a million people download an iTunes lecture series there's no disputing that this is pretty massive, open (i.e., free) and online. In which case, it must be how we define the term "course" that would lead most people to say that listening to iTunes lectures represents something different than taking a MOOC on the same topic (or even the same course offered by the same professor) delivered via a Coursera or edX.

I've written before about the perils of making such a distinction, so I won't repeat those arguments here except to say that while MOOCs do tend to package together more of the material we associate with a course, it's not at all clear why we should reward one type of online learning with the title MOOC just because it includes a few crappy multiple-choice tests alongside recorded lectures.

In which case, perhaps we should just make things easy on ourselves and say that only courses from prestigious colleges and universities delivered via Udacity, Coursera and edX get to be called MOOCs. But like the term "massive," what threshold do we have for "prestigious?" And who gets to decide which colleges and universities should be considered in that club? Maybe we could let the MOOC providers make these choices, but even here the field is starting to crowd up with new entrants like FutureLearn and iversity (not to mention Canvas and even Udemy) forging their own partnerships and releasing their own products which they proudly call MOOCs.

While pondering these matters, it struck me that this challenge to define MOOC was comparable to defining other vague terms (such as "bald," "sharp" or "beautiful"), in other words it's a philosophical issue. For example, the struggle to determine the threshold for "massiveness" is the same as trying to figure out how many hairs separate a bald from a non-bald person (a challenge resulting from vague premises called the Sorites Paradox, if anyone's interested).

In fact, the struggle to define MOOC illustrated above derives from the fact that we're trying to come up with an empirical definition based on the observable and/or measurable characteristics of a course (components, requirements, enrollment numbers, etc.) to see if it deserves the MOOC label or not.

But what if we instead decided to separate MOOCs from non-MOOCs based on their purpose, rather than their observable elements (in other words, take a teleological vs. empirical approach to the problem)? In that case, the challenge would be to find that unique something that MOOCs have been created to do that separates them from all other forms of online learning.

Educating people won't cut it, given that this is the telos for all teaching (online or otherwise). And even educating lots of people for free doesn't provide enough distinction between a MOOC and every other form of free learning (including the aforementioned iTunes U example).

But if you listen to the people who brought us the MOOC movement; the pioneers in early MOOC-type projects or the leaders of today's MOOC organizations, each one of them stresses that MOOCs are really an experiment in which each new massive open online class serves as both an educational tool and research project designed to see what works and what doesn't as we try to push the envelope with technology-supported education.

So if all of our empirical attempts to define a MOOC are ending up in contradiction or absurdity, perhaps we should embrace a definition that puts purposeful educational research and experimentation at the heart of the MOOC project and then take a look at who gets to be (or stay) in the club and who has not yet paid the entrance fee.

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Exhibit 2

Online Courses Raise Their Game: A Review of MOOC Stats and Trends in 2014

MOOC Ecosystem Reaches Maturation Milestones

☰ 9 minute read written by Dhawal Shah (<https://www.class-central.com/report/author/dhawal/>)

◀ 912 ◀ 226 ◀ 89

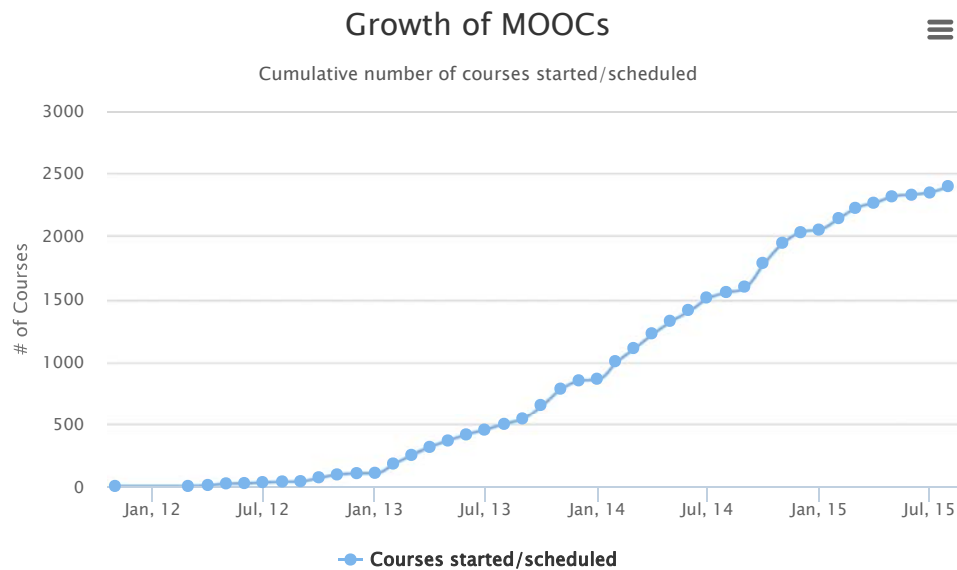
A shorter version of this article first appeared on [EdSurge](https://www.edsurge.com/n/2014-12-26-moocs-in-2014-breaking-down-the-numbers) (<https://www.edsurge.com/n/2014-12-26-moocs-in-2014-breaking-down-the-numbers>).

At TechCrunch Disrupt this year, Coursera Co-Founder Daphne Koller claimed that ([http://techcrunch.com/2014/09/10/coursera-president-daphne-koller-2014-is-the-year-](http://techcrunch.com/2014/09/10/coursera-president-daphne-koller-2014-is-the-year-moocs-will-come-of-age/)

400+ universities. 2400+ courses. 16-18 million students.

[moocs-will-come-of-age/](http://techcrunch.com/2014/09/10/coursera-president-daphne-koller-2014-is-the-year-moocs-will-come-of-age/)) 2014 is the year MOOCs will come of age. It is definitely the case that an ecosystem developed around MOOCs now: hundreds of people employed full-time, thousands of people involved in the creation of MOOCs, many millions in funding, and, importantly, millions in revenue (<https://www.edsurge.com/n/2014-10-15-how-does-coursera-make-money>). The big three (Coursera, Udacity, edX) employ more than a hundred people each,

while universities are employing teams of video assistants, instructional designers, TA's, and other staff to support the more than 3,000 instructors that have created these courses.

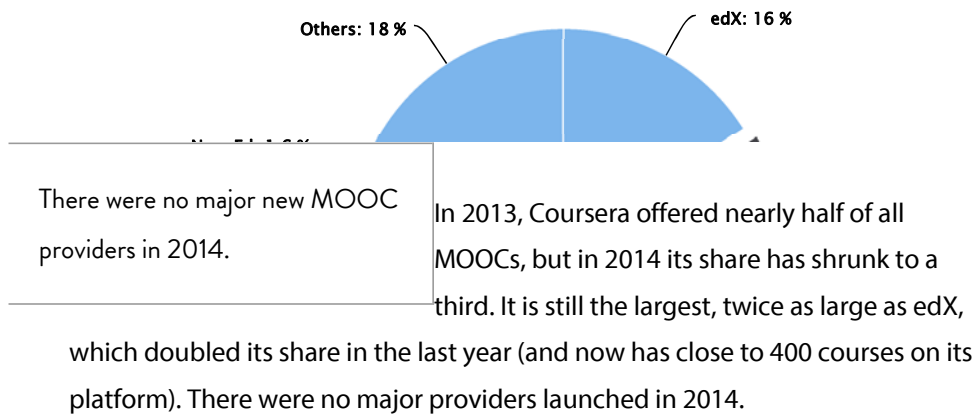


This year, the number of universities offering MOOCs has doubled to cross 400 universities (<https://www.class-central.com/universities>), and resulting in a doubling of the number of cumulative courses, to 2400. 22 of the top 25 US universities in US News World Report rankings are now offering courses online for free.

22 of the top 25 US universities in US News World Report rankings are now offering courses online for free.

Providers

Course distribution by provider



MiriadaX became the first non-U.S. MOOC provider to cross 1 million registered users, tapping into the large Spanish-speaking market worldwide. UK-based provider FutureLearn with 800K registered users should be the next provider to cross a million users.



Lorena Barba
 @LorenaABarba

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250k certificates issued, 6.4 million course enrollments, 3 million users, 300 new courses offered this semester
[@edXOnline](#) [#FutureEDU](#)

10:14 AM - 20 Nov 2014

18 RETWEETS 10 FAVORITES

Up-to date numbers can be found on our [provider listing page](https://www.class-central.com/providers) (<https://www.class-central.com/providers>).

Subjects

Course distribution by subject



The subject distribution of MOOCs in 2014 are consistent with last year, with the top three subjects remaining the same: Humanities, Computer Science & Programming, and Business & Management. There has been some debate (<http://www.stanforddaily.com/2013/06/04/moocs-face-challenges-in-teaching-humanities/>) whether MOOCs can be as useful for teaching humanities and non-technical subjects as it is for computer science and math. Clearly, if there is a difference, it is a matter of degree, as from the standpoint of course offerings, there is a healthy balance of technical and non-technical subjects.

Languages

Courses are currently being offered in 13 different languages (<https://www.class-central.com/languages>), although 80% of courses are taught in English. Spanish is the next biggest language with 8.5% of the courses, mostly do due to MiriadaX, a consortium of nearly 30 universities in Spain and Latin America, followed by French and Chinese.

Class Central Zeitgeist

Searches

When learners search for MOOCs, there is a great deal of diversity in what they are looking for. Among the 40,000 search terms used, the Top 20 (below) account for only 12.58% of them. A glance at the Top 20 do indicate that learners are searching both for topics that may help them in their education or careers as well as personal interests.

python, healthcare, java, finance, android, english, statistics, marketing, music, writing, psychology, accounting, design, spanish, programming, law, photography, big data, history

Courses

The ten most popular courses of 2014, as indicated by student interest are as follows:

1. [Developing Innovative Ideas for New Companies: The First Step in Entrepreneurship \(/mooc/840/coursera-developing-innovative-ideas-for-new-companies-the-first-step-in-entrepreneurship\)](#) via *University of Maryland, College Park* | Coursera
2. [Introduction to Statistics \(/mooc/361/udacity-introduction-to-statistics\)](#) via *Stanford University* | Udacity
3. [Learning How to Learn: Powerful mental tools to help you master tough subjects \(/mooc/2161/coursera-learning-how-to-learn-powerful-mental-tools-to-help-you-master-tough-subjects\)](#) via *University of California, San Diego* | Coursera
4. [Introduction to Computer Science \(/mooc/320/udacity-introduction-to-computer-science\)](#) via *University of Virginia* | Udacity
5. [Principles of Project Management \(/mooc/900/open2study-principles-of-project-management\)](#) via *Polytechnic West* | Open2Study
6. [CS50x: Introduction to Computer Science \(/mooc/442/edx-cs50x-introduction-to-computer-science\)](#) via *Harvard University* | edX
7. [Inspiring Leadership through Emotional Intelligence \(/mooc/710/coursera-inspiring-leadership-through-emotional-intelligence\)](#) via *Case Western Reserve University* | Coursera
8. [Introduction to Finance \(/mooc/345/coursera-introduction-to-finance\)](#) via *University of Michigan* | Coursera
9. [Strategic Management \(/mooc/902/open2study-strategic-management\)](#) Open2Study
10. [R Programming \(/mooc/1713/coursera-r-programming\)](#) via *Johns Hopkins University* | Coursera

This data is based on user intent collected by Class Central's [MOOC Tracker](https://www.class-central.com/report/mooc-tracker/) (<https://www.class-central.com/report/mooc-tracker/>)

Trends in 2014

MOOC providers roll their own credentials: Nanodegrees, Specializations, Xseries

Last year we predicted that credit-granting MOOCs would be a key trend in 2014—we were wrong

Last year we predicted that credit-granting MOOCs would be a key trend in 2014—we were wrong. There have been a few small experiments by universities to offer credit, such as a [criminal justice MOOC](https://www.class-central.com/report/study-crime-for-credit-penn-state-mooc/) ([https://www.class-](https://www.class-central.com/report/study-crime-for-credit-penn-state-mooc/)

[central.com/report/study-crime-for-credit-penn-state-mooc/](https://www.class-central.com/report/study-crime-for-credit-penn-state-mooc/)) at Penn State, and an [intro computer science MOOC](https://www.class-central.com/report/university-of-oklahoma-mooc-credit/) (<https://www.class-central.com/report/university-of-oklahoma-mooc-credit/>) at the University of Oklahoma, though European universities seem to be closer in making this jump, with the provider iversity planning to [work with European universities](https://www.class-central.com/report/iversity-european-moocs/) (<https://www.class-central.com/report/iversity-european-moocs/>) to offer credit. There are also MOOCs being offered in partnership with professional and continuing education programs (which confer professional education credits, certificates, or degrees): NovoEd is [helping Stanford's Graduate School of Business](https://www.class-central.com/report/iversity-european-moocs/) (<https://www.class-central.com/report/iversity-european-moocs/>) to bring their executive program online, and edX partnering with professional education programs to [bring some courses online](https://www.edx.org/professional-education) (<https://www.edx.org/professional-education>).

However, besides these experiments, the major development in 2014 has been the Big 3 MOOC providers, Coursera, Udacity, and edX, introducing their own credentials for paid courses. Udacity announced its [Nanodegree program](https://www.udacity.com/nanodegrees)

The major development in 2014 has been the Big 3 MOOC providers, Coursera, Udacity, and edX, introducing their own credentials

(<https://www.udacity.com/nanodegrees>) (and a [new round of funding](https://www.edsurge.com/n/2014-09-24-udacity-raises-fresh-35m-to-expand-the-university-of-silicon-valley) (<https://www.edsurge.com/n/2014-09-24-udacity-raises-fresh-35m-to-expand-the-university-of-silicon-valley>)), billed as “Industry credentials for today’s jobs in tech”. Coursera announced [Specializations](https://www.coursera.org/specializations) (<https://www.coursera.org/specializations>) in January and currently has developed 27 specializations, with more in the works. Specializations are already a strong revenue driver (<https://www.edsurge.com/n/2014-10-15-how-does-coursera-make-money>) for Coursera. edX also has its version, called [Xseries](https://www.edx.org/xseries) (<https://www.edx.org/xseries>), of which 11 have been announced.

Upping the Production Quality Ante

Harvard has in-house course production studio with over 50 staff, including specialists in instructional design, production, research, technical operations, and program support.

In an interview with nymag.com, [Marc Andreessen noted](http://nymag.com/daily/intelligencer/2014/10/marc-andreessen-in-conversation.html) (<http://nymag.com/daily/intelligencer/2014/10/marc-andreessen-in-conversation.html>) that MOOC production values are pretty low. However, this isn't necessarily true – some MOOCs have been very well-designed, and the bar has risen, with average course production quality improving considerably. Universities, seeing both large markets and big uncertainties in the online learning world, have organized and staffed centralized departments to support professors creating these courses, including MOOCs. For example, Harvard has in-house course production studio (<http://harvardx.harvard.edu/>) with over 50 staff, including specialists in instructional design, production, research, technical operations, and program support.



Professor Michael Goldberg of Case Western Reserve University worked with, former 60 Minutes Associate Producer and Peabody Award winner, Catherine Levy, to help produce his documentary-style video lectures for [Beyond Silicon Valley: Growing Entrepreneurship in Transitioning Economies](https://www.coursera.org/course/entpecon) (<https://www.coursera.org/course/entpecon>).

Some instructors have made efforts to create specific tools to help them teach MOOCs.

Some instructors have made efforts to create specific tools to help them teach MOOCs. Ohio State Assistant Math Professor Jim Fowler has spent more than 1000+ hours

(<http://www.forbes.com/sites/georgeanders/2014/09/10/forget-cat-photos-this-prof-is-making-calculus-go-viral/>) on his Calculus course on Coursera, including building mooculus (<https://mooculus.osu.edu/>), a tool to help students to practice math problems. Rice University's Scott Rixner built CodeSkulptor (<http://www.codeskulptor.org/>), an interactive browser-based python environment, used in courses in Coursera's Fundamentals of Computing (<https://www.coursera.org/specialization/fundamentalscomputing/9>) specialization program. These are just a couple of examples of how additional course subject-specific tools are extending the functionality of the base MOOC platforms.

Institutions Choose Open edX for DIY

Open edX (<http://code.edx.org/>) quickly seems to become de facto platform for organizations and groups who are looking to host their own MOOCs. It has been adopted by several organizations in diverse regions of the world

- Queen Raina foundation for the Edraak (<https://www.class-central.com/provider/edraak>) MOOC platform
- George Washington University (<https://www.class-central.com/report/george-washington-university-adopts-openedx-to-moocs/>)
- gacco (<https://www.class-central.com/report/japanese-moocs-from-gacco-and-jmooc/>) a Japanese MOOC provider
- French Universities (<http://www.france-universite-numerique.fr/>)
- XuetangX (<https://www.xuetangx.com/>) – a consortium of chinese universities
- SWAYAM (<https://www.class-central.com/report/swayam-india/>) – an India-based MOOC platform
- EdCast (<http://www.edcast.com/>) for its Open Knowledge Cloud

Open edX (<http://code.edx.org/>) quickly seems to become de facto platform for organizations and groups who are looking to host their own MOOCs

Currently there are 60+ instances of open edX (<https://github.com/edx/edx-platform/wiki/Sites-powered-by-Open-edX>), running over 400 courses. This has given rise to a large group of service providers (<https://github.com/edx/edx-platform/wiki/List-of-Open-edX-service-providers>) who help deploy and manage

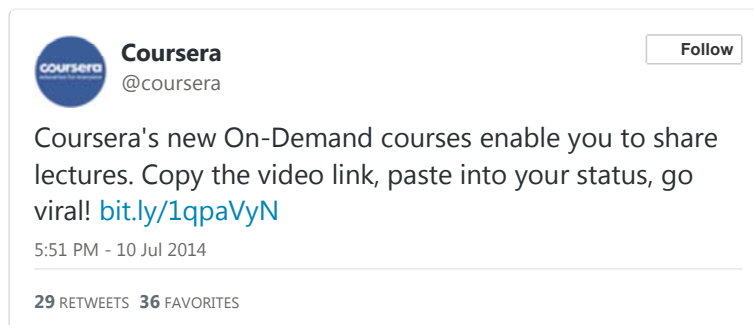
open edX instances. Recently they met at the [first open edX conference](http://con.openedx.org/) (<http://con.openedx.org/>), with slides and recordings [available here](https://openedx.atlassian.net/wiki/display/OPEN/Open+edX+Conference+Presentations) (<https://openedx.atlassian.net/wiki/display/OPEN/Open+edX+Conference+Presentations>).

A Trend towards 'Always On' Availability

MOOCs started out, and for the most part still parallel college classroom courses with a start date, end date, and specific deadlines for assignments/homework. Udacity was the first

Udacity was the first provider to adopt a self-paced model.

provider to abandon this paradigm (back in 2012) and adopted a self-paced model—users can sign up and complete the courses at their own pace (which allows both flexibility for students, and happens to fit well with Udacity's monthly subscription revenue model). This gets closer to the self-paced content available on Udemy or Lynda.com. However, to make a major jump towards this requires providing ways to supply the interaction and/or assistance that most MOOC-takers expect. Coursera had made a big push towards 'on-demand' courses. At the time of writing, there are [27 on-demand courses](https://www.coursera.org/courses?courseType=v2.ondemand) (<https://www.coursera.org/courses?courseType=v2.ondemand>) available. Currently none of these have discussion forums (yet) or verified certificates. This is a clear boon to those students who want scheduling flexibility, but it also removes key elements that have been part of the "MOOC" formula that has been so popular. It also allows for sharing of individual lecture videos:



FutureLearn also has plans to make all the [content of their courses open](https://about.futurelearn.com/blog/our-first-year/) (<https://about.futurelearn.com/blog/our-first-year/>).

This is one of the key tenets of the original MOOC acronym, 'Open', as in open content. FutureLearn also has plans to make all the [content of their courses open](https://about.futurelearn.com/blog/our-first-year/) (<https://about.futurelearn.com/blog/our-first-year/>). As more of the content from these

hundreds of professors and thousands of MOOCs and becomes sharable (at an

increasing level of production quality)), perhaps we will start to see new forms of content aggregation, a la YouTube playlists or curated libraries. Having to take (or at least sign up for and wade through) whole courses is a very large bite of content, and going down to the lecture level allows for much more interesting compilation, sharing, and re-mixing.

2014 a Year for MOOC Maturation

We have seen strong development of the MOOC ecosystem this year. MOOC providers are becoming more sure-footed in creating their business models. They will likely tune them and thus bring in even more revenues. Universities

Universities are jumping on the online bandwagon and investing in online course development.

are jumping on the online bandwagon and investing in online course development. They will be eager to leverage this content (perhaps via blended learning) in their on campus and continuing education curriculum. Instructors and students are continuing to offer and take MOOCs in growing numbers. As more new courses cover the same or overlapping content and production values rise, we may start to see more options and choices that student learners have, and more 'winners' and 'losers' in the course offerings. It will be interesting to see how all of this plays out in 2015.

Thanks to Charlie Chung for contributing to this story.

Free First Steps in Financial Engineering (<https://www.class-central.com/report/financial-engineering-first-steps-with-moocs/>)

Course Review: Learning How To Learn (<https://www.class-central.com/report/review-learning-how-to-learn/>)

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Rafael Espericueta · 3 months ago

I'm a bit surprised that the new OMSCS program, a joint venture of Udacity, AT&T, and Georgia Tech, wasn't even mentioned in the article. True, it doesn't technically qualify as a MOOC - it's not open, and it's not exactly massive. But the courses are very MOOC-like, and some of the courses later become full-fledged MOOCs. From the student's point of view, OMSCS courses definitely have the look and feel of MOOCs. The main difference is the extensive hand-grading of assignments, which provide much more feedback than is possible in a MOOC. This is a valiant attempt to try to move MOOCs into the mainstream, and to provide actual degrees rather than certificates. After one year in this program, I'm convinced that the OMSCS program provides a learning experience one would have a difficult time finding anywhere, and at any price. And the program offers a MS in CS for under \$7000, which brings tuition down to Earth. This is surely the future of education.

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classcentral Mod → **Rafael Espericueta** · 3 months ago

Rafael, the OMSCS was announced in 2013. We mentioned it in last years roundup: <https://www.edsurge.com/n/2013...>

It doesn't seem that any other universities are following Georgia Tech's footsteps. Udacity seems to be more focused on Nanodegrees. At this point the OMSCS does not look like a trend.

Because of the closed nature of the program not too many first hand stories have come out. Would love to connect and hear more about your experience. Can you drop us a mail at contact@class-central.com?

5 ^ | v · Reply · Share ›

Muvaffak GOZAYDIN → **Rafael Espericueta** · 2 months ago

Rafael

I am glad to hear your views about Georgia Tech OMSCS . That is a MOOC and it is not a MOOC too .

People call the latest trend as MOOC . The later trend is
ONLINE BY HIGH PERFORMING FIRST CLASS UNIVERSITIES .

It should be for providing degrees too . GeorgiaTech is the first to do it .

.....IT IS THE FUTURE OF EDUCATION for sure .

Important matter is the value of the university . ONLINE is justy a tool . We have to help degree seeking people access to first class universities at low cost .

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Exhibit 3

The New York Times<http://nyti.ms/TTn1E6>**EDUCATION LIFE**

The Year of the MOOC

By LAURA PAPPANO NOV. 2, 2012

IN late September, as workers applied joint compound to new office walls, hoodie-clad colleagues who had just met were working together on deadline. Film editors, code-writing interns and “edX fellows” — grad students and postdocs versed in online education — were translating videotaped lectures into MOOCs, or massive open online courses. As if anyone needed reminding, a row of aqua Post-its gave the dates the courses would “go live.”

The paint is barely dry, yet edX, the nonprofit start-up from Harvard and the Massachusetts Institute of Technology, has 370,000 students this fall in its first official courses. That’s nothing. Coursera, founded just last January, has reached more than 1.7 million — growing “faster than Facebook,” boasts Andrew Ng, on leave from Stanford to run his for-profit MOOC provider.

“This has caught all of us by surprise,” says David Stavens, who formed a company called Udacity with Sebastian Thrun and Michael Sokolsky after more than 150,000 signed up for Dr. Thrun’s “Introduction to Artificial Intelligence” last fall, starting the revolution that has higher education gasping. A year ago, he marvels, “we were three guys in Sebastian’s living room and now we have 40 employees full time.”

“I like to call this the year of disruption,” says Anant Agarwal, president of edX, “and the year is not over yet.”

MOOCs have been around for a few years as collaborative techie learning events, but this is the year everyone wants in. Elite universities are partnering with Coursera at a furious pace. It now offers courses from 33 of the biggest names in postsecondary education, including Princeton, Brown, Columbia and Duke. In September, Google unleashed a MOOC-building online tool, and Stanford unveiled Class2Go with two courses.

Nick McKeown is teaching one of them, on computer networking, with Philip Levis (the one with a shock of magenta hair in the introductory video). Dr. McKeown

sums up the energy of this grand experiment when he gushes, “We’re both very excited.” Casually draped over auditorium seats, the professors also acknowledge that they are not exactly sure how this MOOC stuff works.

“We are just going to see how this goes over the next few weeks,” says Dr. McKeown.

WHAT IS A MOOC ANYWAY?

Traditional online courses charge tuition, carry credit and limit enrollment to a few dozen to ensure interaction with instructors. The MOOC, on the other hand, is usually free, credit-less and, well, massive.

Because anyone with an Internet connection can enroll, faculty can’t possibly respond to students individually. So the course design — how material is presented and the interactivity — counts for a lot. As do fellow students. Classmates may lean on one another in study groups organized in their towns, in online forums or, the prickly part, for grading work.

The evolving form knits together education, entertainment (think gaming) and social networking. Unlike its antecedent, open courseware — usually written materials or videotapes of lectures that make you feel as if you’re spying on a class from the back of the room — the MOOC is a full course made with you in mind.

The medium is still the lecture. Thanks to Khan Academy’s free archive of snappy instructional videos, MOOC makers have gotten the memo on the benefit of brevity: 8 to 12 minutes is typical. Then — this is key — videos pause perhaps twice for a quiz to make sure you understand the material or, in computer programming, to let you write code. Feedback is electronic. Teaching assistants may monitor discussion boards. There may be homework and a final exam.

The MOOC certainly presents challenges. Can learning be scaled up this much? Grading is imperfect, especially for nontechnical subjects. Cheating is a reality. “We found groups of 20 people in a course submitting identical homework,” says David Patterson, a professor at the University of California, Berkeley, who teaches software engineering, in a tone of disbelief at such blatant copying; Udacity and edX now offer proctored exams.

Some students are also ill prepared for the university-level work. And few stick with it. “Signing up for a class is a lightweight process,” says Dr. Ng. It might take just five minutes, assuming you spend two devising a stylish user name. Only 46,000 attempted the first assignment in Dr. Ng’s course on machine learning last fall. In the

end, he says, 13,000 completed the class and earned a certificate — from him, not Stanford.

That's still a lot of students. The shimmery hope is that free courses can bring the best education in the world to the most remote corners of the planet, help people in their careers, and expand intellectual and personal networks. Three-quarters of those who took Dr. Patterson's "Software as a Service" last winter on Coursera (it's now on edX) were from outside the United States, though the opposite was true of a course on circuits and electronics piloted last spring by Dr. Agarwal. But both attracted highly educated students and both reported that over 70 percent had degrees (more than a third had graduate degrees). And in a vote of confidence in the form, students in both overwhelmingly endorsed the quality of the course: 63 percent who completed Dr. Agarwal's course as well as a similar one on campus found the MOOC better; 36 percent found it comparable; 1 percent, worse.

Ray Schroeder, director of the Center for Online Learning, Research and Service at the University of Illinois, Springfield, says three things matter most in online learning: quality of material covered, engagement of the teacher and interaction among students. The first doesn't seem to be an issue — most professors come from elite campuses, and so far most MOOCs are in technical subjects like computer science and math, with straightforward content. But providing instructor connection and feedback, including student interactions, is trickier.

"What's frustrating in a MOOC is the instructor is not as available because there are tens of thousands of others in the class," Dr. Schroeder says. How do you make the massive feel intimate?

That's what everyone is trying to figure out.

Many places offer MOOCs, and more will. But Coursera, Udacity and edX are defining the form as they develop their brands.

THE FLAVOR OF THE MOOC

Coursera casts itself as a "hub" — Dr. Ng's word — for learning and networking. The learning comes gratis from an impressive roster of elites offering a wide range of courses, from computer science to philosophy to medicine. Not all are highbrow or technical; "Listening to World Music" from the University of Pennsylvania aims to broaden your iPod playlist.

While Coursera will make suggestions, Dr. Ng says, "ultimately all pedagogical decisions are made by the universities." Most offerings are adapted from existing

courses: a Princeton Coursera course is a Princeton course. But the vibe is decidedly Facebook — build a profile, upload your photo — with tools for students to plan “meet-ups” with Courserians in about 1,400 cities worldwide. These gatherings may be bona fide study groups or social sessions. Membership may be many or sparse.

No one showed at the meet-up that Stacey Brown, an information technology manager at a Hartford insurance company, scheduled for a 14th-floor conference room on a Thursday after work, despite R.S.V.P.’s from a few classmates in the area. He’s taking three Coursera MOOCs, including “Gamification” from the University of Pennsylvania Wharton School. In addition to the learning — and dropping to bosses that he’s taking a Wharton course — Mr. Brown says, “I hope to get a network.”

Others like the discipline a group offers. Kimberly Spillman, a software engineer, started taking seven MOOCs and completed three. “The ones I have study groups with people, those are the ones I finish,” Ms. Spillman says. She first joined a group for Dr. Thrun’s artificial intelligence course, and then ran one for a Udacity course on building a search engine, organizing Thursday-evening discussions of the week’s material followed by a social hour at a nearby pub. Fifteen people met each week at the Ansir Innovation Center, a community space with big tables and comfortable chairs, in the Kearny Mesa neighborhood of San Diego.

Udacity has stuck close to its math and computer science roots and emphasizes applied learning, like “How to Build a Blog” or “Building a Web Browser.” Job placement is part of the Udacity package. “The type of skills taught in computer science, even at elite universities, can be very theoretical,” Dr. Stavens explains.

Udacity courses are designed and produced in-house or with companies like Google and Microsoft. In a poke at its university-based competition, Dr. Stavens says they pick instructors not because of their academic research, as universities do, but because of how they teach. “We reject about 98 percent of faculty who want to teach with us,” he says. “Just because a person is the world’s most famous economist doesn’t mean they are the best person to teach the subject.” Dr. Stavens sees a day when MOOCs will disrupt how faculty are attracted, trained and paid, with the most popular “compensated like a TV actor or a movie actor.” He adds that “students will want to learn from whoever is the best teacher.”

That means you don’t need a Ph.D. While there are traditional academics like David Evans of the University of Virginia, “Landmarks in Physics,” a first-year college-level course, is taught by Andy Brown, a 2009 M.I.T. graduate with a B.S. in

physics. “We think the future of education is guys like Andy Brown who produce the most fun,” Dr. Stavens says. Mr. Brown’s course is an indie version of “Bill Nye the Science Guy” — filmed in Italy, the Netherlands and England, with opening credits for “director of photography” and “second camera and editor.”

Whether explaining what the ancients believed about the shape of the earth or, in Dr. Thrun’s statistics course, why you are unpopular, statistically speaking, voice-overs are as nonthreatening as a grade school teacher.

“You feel like you are sitting next to someone and they are tutoring you,” says Jacqueline Spiegel, a mother of three from New Rochelle, N.Y., with a master’s in computer science from Columbia who has enrolled in MOOCs from Udacity and Coursera. While taking “Artificial Intelligence,” she discovered she liked puzzling through assignments in online study groups.

The class was tough and took “an embarrassing amount of time,” says Ms. Spiegel, who found that consuming lectures by smartphone during her 14-year-old’s 6 a.m. ice skating sessions worked less well than being parked at a desktop. “I would listen to the lectures, then I would listen to them again.” Her effort was huge — some 22 hours a week — but rewarding. Ms. Spiegel befriended women in India and Pakistan through Facebook study groups and started an online group, CompScisters, for women taking science and technology MOOCs.

If Udacity favors stylish hands-on instruction, edX aims to be elite, smart and rigorous; don’t expect a gloss of calculus if you need it but never took it. Some 120 institutions have been in touch; only Berkeley and the University of Texas system have been admitted to the club.

EdX’s M.I.T. roots show in its staff’s geeky passion for building and testing online tools. They collect your clicks. Feedback from the MOOC taught last spring by Dr. Agarwal (who, students learn, is obsessed with chain saws) revealed that participants would rather watch a hand writing an equation or sentence on paper than stare at the same paper with writing already on it.

The focus is on making education logical. “Someone who is consuming the course should know it is not serendipity that the course is chunked in a certain way, but that there is intentionality to sequencing video,” says Howard A. Lurie, vice president for content development.

With mini-notebook in hand, he has been leading the “daily stand-up” meeting (so called because attendees lean against walls) to keep course development on

schedule. After one meeting, Lyla Fischer, a 2011 M.I.T. graduate and edX fellow, sat at her computer, a tag still dangling from the chair, and edited the answers for problem sets in Dr. Agarwal's course. Last spring, students could download PDFs with brief answers. Now, she says, "there is a full explanation of how to do it, here are the steps," right on the site.

"We are trying to use the magic of all the tool sets we have," Mr. Lurie says. Students control how fast they watch lectures. Some like to go at nearly double the speed; others want to slow down and replay. Coming: If you get a wrong answer, the software figures out where you went wrong and offers a correction.

WORKING OUT THE KINKS

Assignments that can't be scored by an automated grader are pushing MOOC providers to get creative, especially in courses that involve writing and analysis. Coursera uses peer grading: submit an assignment and five people grade it; in turn, you grade five assignments.

But what if someone is a horrible grader?

Coursera is developing software that will flag those who assign very inaccurate grades and give their assessment less weight. Mitchell Duneier, a Princeton professor, is conducting a study that compares peer grading of the final exam in his sociology MOOC on Coursera last summer with the grades he and his course assistants would have given the students.

Mr. Brown, the Hartford I.T. manager, does not have confidence in peer feedback. "This could be a 14-year-old kid in South Africa answering me," he says, thinking of his 14-year-old. The challenge is not just in grading. The diversity of MOOC takers — teenagers to retirees, and from across the globe — means classmates lack a common knowledge base and educational background. Out-of-their-league students, especially in highly technical courses, can drag down discussions.

Which course is right for you? What prerequisites are really needed to perform well? Princeton's "Networks: Friends, Money and Bytes" on Coursera recommends basic linear algebra and multivariable calculus but the "instructor will see if part of the course material can be presented without requiring this mathematical background." "Introduction to Computer Science" from Harvard lists prerequisites as "none" — as long as you're Harvard-ready. Where are the Yelp reviews?

“We desperately need crowdsourcing,” says Cathy N. Davidson, a Duke professor of English and interdisciplinary studies. “We need a MOOCE — massive open online course evaluation.”

Most important, what do you get for your effort? Do you earn a certificate? A job interview? Or just the happy feeling of learning something?

“If one is going for the knowledge, it’s a boon,” says Dr. Schroeder of the University of Illinois. “If one is looking for credit, that is one of the challenges. How do we fit this into the structure of higher education today?”

Dr. Agarwal predicts that “a year from now, campuses will give credit for people with edX certificates.” He expects students will one day arrive on campus with MOOC credits the way they do now with Advanced Placement.

The line between online and on campus is already blurring. This spring Dr. Davidson will teach a class called “Surprise Endings: Social Science and Literature” at Duke and as a MOOC, with her Duke students running the online discussions. This fall, San Jose State students are taking Dr. Agarwal’s course on circuits and electronics, with professors and teaching assistants on campus leading discussions. They add their own content, including exams. In the spring, Massachusetts Bay Community College in Wellesley will use an edX MOOC in introductory computer science.

Dr. Stavens promises more change, and more disruption: “We are only 5 to 10 percent of the way there.”

Correction: November 11, 2012

An article last Sunday about massive open online courses, using information from the MOOC provider Coursera, included several errors. The source of a study of peer grading in a Princeton sociology MOOC was Mitchell Duneier, the teacher, not Coursera. The student work was regraded by Professor Duneier and his teaching assistants, not by Princeton instructors. And it is not the case that the results have been released. The article also misspelled the surname of a co-founder of another MOOC provider, Udacity. He is Michael Sokolsky, not Sokolosky.

Laura Pappano is author of “Inside School Turnarounds” and writer in residence at the Wellesley Centers for Women.

A version of this article appears in print on November 4, 2012, on page ED26 of Education Life with the headline: The Year of the MOOC.

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Exhibit 4

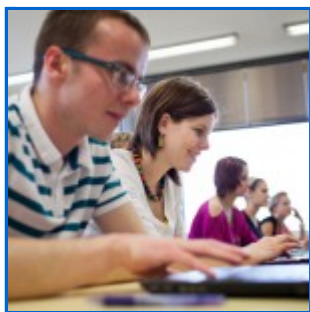
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MOOCs: Nothing but a marketing tool?

Posted By [Jake New](#) On January 20, 2014 @ 5:27 pm In [MOOCs, News, Top News](#) | [Comments Disabled](#)

The primary reasons many universities create massive open online courses (MOOCs), a new study suggests, are for marketing purposes.

The pedagogical benefits — or shortcomings — of MOOCs may often be the main talking point for the free online classes, but they aren't what are driving many schools to invest in them.



^[1][The survey](#) ^[2], which was conducted by Babson Survey Research Group, Pearson, and the Sloan Consortium, included nearly 3,000 institutions responding to questions about MOOCs and other forms of online learning.

When asked what the primary objective was for introducing a MOOC at their institutions, just under half of those surveyed said it was "marketing-related."

Nearly 30 percent of respondents said they used MOOCs to increase institution visibility, and 20 percent said they use the courses to drive student recruitment.

"That said, MOOCs are being used very differently by different institutions," the study's authors wrote. "Institutions with the most extensive traditional online offerings are most likely to say that they are embracing MOOCs to 'increase visibility of the institution,' while institutions with no current online offerings say their MOOCs will be used to 'drive student recruitment.'"

As more universities go online to reach prospective students, it's not surprising that they would use MOOCs as a sort-of sampler of their more costly course offerings.

Some institutions have turned to MOOCs [based on popular culture](#) ^[3], like super heroes and the AMC television series "The Walking Dead," to drive students to the online courses – and some of the university's instructors. In turn, the [courses help popularize](#) ^[4] MOOCs as a concept.

A study [released in June](#) ^[5] found that only 23 percent of people are aware that MOOCs even exist.

"Student's lives are permeated with so much pop culture that when you use it to teach, it makes the learning relevant, and it gets their attention," said Christina Blanch, an instructor at Ball State University who taught a MOOC about gender in comic books in April. "And I believe that MOOCs with a popular culture element are great for people understanding what a MOOC is."

That MOOCs still need some more name recognition themselves could give pause to some institutions looking to use the courses to boost their own. But some schools say that they have found that the gamble is paying off.

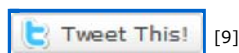
The University of London reported that recent MOOCs there "[generated 45 expressions of interest](#)" ^[6] in its degree courses. If those students were to enter into a full master's degree program, then the university could see as much as \$1.5 million in additional revenue, [estimated Leonard Waks](#) ^[7], a professors emeritus of educational leadership at Temple University.

If that's a sound marketing investment would depend on how much a MOOC cost to produce. Some estimates put the average cost of a MOOC between \$15,000 and \$50,000, while other more conservative guesses place the cost at just \$2,500.

In the first half of 2013, American colleges and universities spent \$570 million on paid advertising. About 30 percent – or nearly \$154 million – of that amount was spent on internet display ads.

When asked in the Babson survey if MOOCs were actually meeting an institutions' marketing objectives, two thirds of the respondents said it was still "too early to tell."

Follow Jake New on Twitter [@eCN_Jake](#).^[8]



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[1] Image: <http://www.ecampusnews.com/files/2012/11/students-with-laptops.jpg>

[2] The survey: <http://www.onlinelearningsurvey.com/reports/gradechange.pdf>

[3] based on popular culture: <http://www.ecampusnews.com/top-news/walking-dead-comics-moocs-007/>

[4] courses help popularize: <http://www.ecampusnews.com/top-news/zombie-mooc-628/>

[5] released in June: <http://www.ecampusnews.com/top-news/survey-alumni-parents-have-more-favorable-view-of-moocs-than-students/>

[6] generated 45 expressions of interest: <http://www.scmp.com/lifestyle/family-education/article/1350857/university-london-expand-its-selection-free-online>

[7] estimated Leonard Waks: <http://www.ecampusnews.com/top-news/student-recruitment-mooc-business-model/>

[8] @eCN_Jake.: http://www.twitter.com/eCN_Jake

[9] Image: <http://twitter.com/home/?status=MOOCs%3A+Nothing+but+a+marketing+tool%3F+http%3A%2F%2Fwww.ecampusnews.com%2F%3Fp%3D62127+via+%40ecampusnews>

[10] Image: <http://www.facebook.com/share.php?u=http%3A%2F%2Fwww.ecampusnews.com%2Ftop-news%2Fmoocs-marketing-015%2F&t=MOOCs%3A+Nothing+but+a+marketing+tool%3F>

[11] Image: <http://twitter.com/home?status=MOOCs%3A+Nothing+but+a+marketing+tool%3F%20-%20http%3A%2F%2Fwww.ecampusnews.com%2Ftop-news%2Fmoocs-marketing-015%2F%20@ecampusnews>

[12] Image: <http://delicious.com/post?url=http%3A%2F%2Fwww.ecampusnews.com%2Ftop-news%2Fmoocs-marketing-015%2F&title=MOOCs%3A+Nothing+but+a+marketing+tool%3F¬es=The+pedagogical+benefits+---+or+shortcomings+---+of+massive+open+onl>

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 20 <http://www.ecampusnews.com/top-news/moocs-marketing-015/>
 [17] Image: <http://www.ecampusnews.com/feed/rss/>

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Exhibit 5

TECH FORECAST

UDACITY'S SEBASTIAN THRUN, GODFATHER OF FREE ONLINE EDUCATION, CHANGES COURSE

HE CAPTIVATED THE WORLD WITH VISIONS OF SELF-DRIVING CARS AND GOOGLE GLASS AND HAS SIGNED UP 1.6 MILLION STUDENTS FOR ONLINE CLASSES. SO WHY IS HE PIVOTING AWAY FROM MOOCS? "WE DON'T EDUCATE PEOPLE AS OTHERS WISHED, OR AS I WISHED," THRUN SAYS.

BY MAX CHAFKIN

There's a story going around college campuses—whispered about over coffee in faculty lounges, held up with great fanfare in business-school sections, and debated nervously by chain-smoking teaching assistants.

It begins with a celebrated Stanford University academic who decides that he isn't doing enough to educate his students. The Professor is a star, regularly packing 200 students into lecture halls, and yet he begins to feel empty. What are 200 students in an age when billions of people around the world are connected to the Internet?

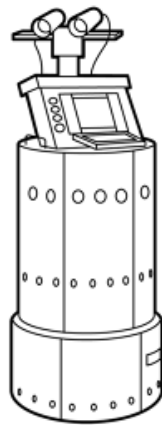
So one day in 2011, he sits down in his living room with an inexpensive digital camera and starts teaching, using a stack of napkins instead of a chalkboard. "Welcome to the first unit of Online Introduction to Artificial Intelligence," he begins, his face poorly lit and slightly out of focus. "I'll be teaching you the very basics today." Over the next three months, the Professor offers the same lectures, homework assignments, and exams to the masses as he does to the Stanford students who are paying \$52,000 a year for the privilege. A computer handles the grading, and students are steered to web discussion forums if they need extra help.

Some 160,000 people sign up: young men dodging mortar attacks in Afghanistan, single mothers struggling to support their children in the United States, students in more than 190 countries. The youngest kid in the class is 10; the oldest is 70. Most struggle with the material, but a good number thrive. When the Professor ranks the scores from the final exam, he sees something shocking: None of the top 400 students goes to Stanford. They all took the class on the Internet. The experiment starts to look like something more.

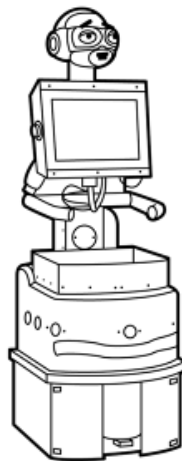
Higher education is an enormous business in the United States—we spend approximately \$400 billion annually on universities, a figure greater than the revenues of Amazon, Apple, Facebook, Google, Microsoft, and Twitter combined—and the Professor has no trouble rounding up a group of Silicon Valley's most prestigious investors to support his new project. The Professor's peers follow suit: Two fellow Stanford faculty members launch a competing service the following spring, with tens of millions of dollars from an equally impressive group of backers, and Harvard and MIT team up to offer their own platform for online courses. By early 2013, nearly every major institution of higher learning—from the University of Colorado to the University of Copenhagen, Wesleyan

THE EDUCATION OF SEBASTIAN THRUN

**PART 1: Artificial Intelligence Innovator
1994-2005**



RHINO
As part of his thesis project at the University of Bonn, he made a robot that gave guided tours.



to West Virginia University—will be offering a course through one of these platforms.

Suddenly, something that had been unthinkable—that the Internet might put a free, Ivy League-caliber education within reach of the world's poor—seems tantalizingly close.

"Imagine," an investor in the Professor's company says, "you can hand a kid in Africa a tablet and give him Harvard on a piece of glass!" The wonky term for the Professor's work, massive open online course, goes into such wide use that a *New York Times* headline declares 2012 the "Year of the MOOC." "Nothing has more potential to lift more people out of poverty," its star columnist Thomas Friedman enthuses, terming the new category "a budding revolution in global online higher education."

It is a good story, as well manicured as a college quad during homecoming weekend. But there's a problem: The man who started this revolution no longer believes the hype.

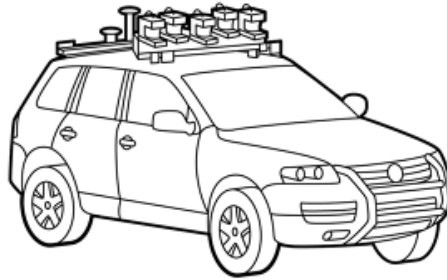


"I'd aspired to give people a profound education—to teach them something substantial," Professor Sebastian Thrun tells me when I visit his company, Udacity, in its Mountain View, California, headquarters this past October. "But the data was at odds with this idea."

As Thrun was being praised by Friedman, and pretty much everyone else, for having attracted a stunning number of students—1.6 million to date—he was obsessing over a data point that was rarely mentioned in the breathless accounts about the power of new forms of free online education: the shockingly low number of students who actually finish the classes, which is fewer than 10%. Not all of those people received a passing grade, either, meaning that for every 100 pupils who enrolled in a free course, something like five actually learned the topic. If this was an education revolution, it was a disturbingly uneven one.

PEARL

During a stint at Carnegie Mellon, Thrun developed a *Jetsons*-like "nursebot."



STANLEY

At Stanford, Thrun won the DARPA challenge to create a driverless vehicle.

"We were on the front pages of newspapers and magazines, and at the same time, I was realizing, we don't educate people as others wished, or as I wished. We have a lousy product," Thrun tells me. "It was a painful moment." Turns out he doesn't even like the term *MOOC*.

When Thrun says this, I nearly fall out of my chair. He is arguably the most famous scientist in the world—and perhaps only Elon Musk bests him in successfully persuading regular people to embrace wild ideas. Thrun has been a public figure since 2005, when a modified Volkswagen Touareg of his design won a Department of Defense –sponsored competition that pitted cars without drivers through a 128-mile, pedestrian-free course in the Mojave Desert. That such a competition almost seems ho-hum eight years later is itself a tribute to Thrun's genius. He joined Google in 2007, where he led the program to develop its self-driving car, and then founded Google X, the ultra-secretive research lab behind Google Glass and other research projects so far-out that Google calls them "moon shots."

But building a company is different from building a research lab. It requires compromises, humility, and, crucially, taking in more money than you spend. And it's why Thrun might be giving up the moon—free education for all! Harvard on a piece of glass!—in favor of something far more pedestrian. It will be, Thrun admits, "the biggest shift in the history of the company," a pivot that involves charging money for classes and abandoning academic disciplines in favor of more vocational-focused learning. In short, Thrun must prove that Udacity is something more than a good story.

Sebastian Thrun is in a hurry.

"Let's just get dressed here," he says, leading me into an empty suite two floors below the Udacity offices. He tosses a pair of bike cleats and a Lycra cycling kit onto the ground, kicks off his sneakers, starts taking off his pants, and then motions for me to do the same. "I don't mind," he says. There's no locker room at the Udacity office, so he's led me downstairs, into a part of the building that is still under construction—never mind the floor-to-ceiling windows. After a few awkward seconds, I move into an adjacent room, throw on my gear, and follow Thrun east toward the Los Altos Hills.

Thrun, who is 46 years old and originally from Germany, is a committed athlete who possesses that outdoorsy vigor (and lack of physical modesty) often found in middle-aged European men. He has run half a dozen marathons; he snowboards; he kite-surfs; and he is

an avid road cyclist. "I haven't been biking as much as I'd normally like to," Thrun confesses before we set out, explaining that he's done "only two" centuries, or 100-mile bike rides, this year.

I'd been warned that keeping up with Thrun tends to be a challenge in any setting, but I hadn't entirely appreciated it until Thrun clipped into his custom-made road bike and scooted up Arastradero Road, leaving me panting a few lengths behind. "Sebastian is like the smartest guy you've ever met, but on speed," says the entrepreneur Steve Blank, a friend of Thrun's and a Udacity investor. "And he hates to lose."

When I catch up to him, trying not to seem out of breath, he acknowledges that he normally doesn't ride with anyone, for this very reason. "I feel like everyone has this competitive instinct," he says. "And I want to be able to go at my own pace. I have trouble with all of these little decisions of running a company. Being alone—that helps."

The youngest of three children in a lower-middle-class family in Hildesheim, a town of 100,000 just outside Hannover, Thrun was a geeky kid, spending much of his free time in

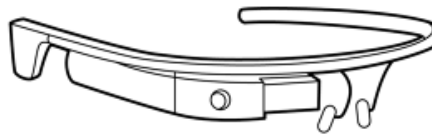
THE EDUCATION OF SEBASTIAN THRUN

PART 2: Google's Moon-Shot Man 2007-Present



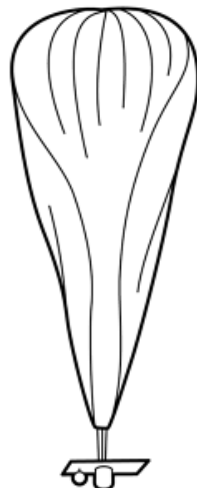
AUTONOMOUS CAR

Thrun's self-driving vehicles are now traversing California roads in an extended test.



GOOGLE GLASS

This augmented-reality eyewear has captivated the imagination for wearable tech.



libraries or in front of a NorthStar Horizon home computer, on which he tried to write software

PROJECT LOON

High-altitude balloons will deliver Internet access to the developing world.

programs to solve puzzles and play solitaire. As a lonely undergraduate at an obscure provincial college, Thrun thrust himself into trying to understand people better, dabbling in psychology, economics, and medicine. Eventually, he found his way to what was at the time a relatively obscure field: artificial intelligence, or the study of making machines that make their own decisions. "Nobody phrases it this way, but I think that artificial intelligence is almost a humanities discipline," Thrun says. "It's really an attempt to understand human intelligence and human cognition."

Thrun seems to owe much of his academic success to this early insight. As his peers wrestled with theoretical quandaries and high mathematics, Thrun's work had a romantic, populist flair. He designed and built robots around human problems, and gave them accessible names. Rhino, part of his thesis project at the University of Bonn, gave guided tours of the local museum. During a stint at Carnegie Mellon University, Thrun developed Pearl, a *Jetsons*-like "nursebot" with a human-looking face, to assist in elder-care facilities. His greatest achievement, though, was Stanley, the autonomous car that won Stanford a \$2 million Defense Department prize and won Thrun the notice of Google cofounder Larry Page.

Thrun and his team originally planned to spin their research out into their own company that would create detailed images of the world's roads, using car-mounted cameras like the ones used to steer Stanley. Page offered to hire them instead. The collaboration helped lay the groundwork for Google Street View, and eventually for the fleet of self-driving Google-branded Priuses that these days navigate rush-hour traffic on Bay Area freeways without incident. Page and cofounder Sergey Brin went on to ask Thrun to launch Google X.

His trip in March of 2011 to the TED Conference in Long Beach, California, where he delivered a talk about his work, led to an unexpected change in his plans. Thrun movingly recounted how a high school friend had been killed in a car accident, the result of the kind of human error that self-driving cars would eliminate. Although he was well received, Thrun was upstaged by a young former hedge-fund analyst named Sal Khan, who spoke of using cheaply produced, wildly popular web videos to tutor millions of high school students on the Internet. Thrun's competitive streak kicked in. "I was a fully tenured Stanford professor . . . and here's this guy who teaches millions," he would later recount. "It was embarrassing." Though

Thrun insists the timing was coincidental, just a few weeks later, he informed Stanford that he would be giving up tenure and joining Google full time as a VP. (He did continue teaching and is still a faculty member.)

Initially, Udacity was just another modest research project on Thrun's docket; he didn't even bother warning the higher-ups in the computer science department until after he had announced that first AI class. After two weeks, more than 56,000 students had signed up. "The conversation took a radically different turn," says Blank of his friend's interaction with Stanford after the response far outpaced anyone's expectations. The university was initially cool to the idea but ultimately embraced it, allowing two other computer science courses to be offered in the same manner. (Blank's popular entrepreneurship class at Stanford would eventually be offered on Udacity as well.) Thrun contributed \$300,000 of his own money in seed funding, installed one of his old Stanford graduate students, David Stavens, as CEO of the new company, and set about recording crude course videos about Markov models and the like.

"IT WAS THIS CATALYTIC MOMENT," THRUN SAYS. "I WAS EDUCATING MORE AI STUDENTS THAN THERE WERE AI STUDENTS IN ALL THE REST OF THE WORLD COMBINED."

"It was this catalytic moment," Thrun says. "I was educating more AI students than there were AI students in all the rest of the world combined." By the end of the semester, he'd raised another \$5 million and was standing in front of the Digital Life Design conference in Munich, promising a world in which education was nearly free, available to poor people in the developing world, and better than anything that had come before it. "I can't teach at Stanford again," he said definitively. "I feel like

there's a red pill and a blue pill. And you can take the blue pill and go back to your classroom and lecture your students. But I've taken the red pill. I've seen Wonderland."

It's hard to imagine a story that more thoroughly flatters the current sensibilities of Silicon Valley than the one into which Thrun stumbled. Not only is reinventing the university a worthy goal—tuition prices at both public and private colleges have soared in recent years, and the debt burden borne by American students is more than \$1 trillion—but it's hard to imagine an industry more ripe for disruption than one in which the professionals literally still don medieval robes. "Education hasn't changed for 1,000 years," says Peter Levine, a partner with Andreessen Horowitz and a Udacity board member, summing up the

Valley's conventional wisdom on the topic. "Udacity just seemed like a fundamentally new way to change how communities of people are educated."



The dream that new technologies might radically disrupt education is much older than Udacity, or even the Internet itself. As rail networks made the speedy delivery of letters a reality for many Americans in the late 19th century, correspondence classes started popping up in the United States. The widespread proliferation of home radio sets in the 1920s led such institutions as New York University and Harvard to launch so-called Colleges of the Air, which, according to an article in *The Chronicle of Higher Education*, prompted a 1924 journalist to contemplate a world in which the new medium would be "the chief arm of education" and suggest that "the child of the future [would be] stuffed with facts as he sits at home or even as he walks about the streets with his portable receiving-set in his pocket." Udacity wasn't even the first attempt to deliver an elite education via the Internet: In 2001, MIT launched the OpenCourseWare project to digitize notes, homework assignments, and, in some cases, full video lectures for all of the university's courses.

And yet, all of these efforts have been hampered by the same basic problem: Very few people seem to finish courses when they're not sitting in a lecture hall. Udacity employs state-of-the-art technology and sophisticated pedagogical strategies to keep their users engaged, peppering students with quizzes and gamifying their education with progress meters and badges. But a recent study found that only 7% of students in this type of class actually make it to the end. (This is even worse than for-profit colleges such as the University of Phoenix, which graduates 17% of its full-time online students, according to the Department of Education.) Although Thrun initially positioned his company as "free to the world and accessible everywhere," and aimed at "people in Africa, India, and China," the reality is that the vast majority of people who sign up for this type of class already have bachelor's degrees, according to Andrew Kelly, the director of the Center on Higher Education Reform at the American Enterprise Institute. "The sort of simplistic suggestion that MOOCs are going to disrupt the entire education system is very premature," he says.

Thrun had assumed that low completion rates in his early classes would be temporary, and during Udacity's early days he continued to spend most of his time at Google, recording his Udacity classes in the middle of the night. His investors had been urging him to expand his role for months, and in May 2012, Thrun informed Page and Brin that he'd have to step down from Google X to focus on Udacity. For the first time in his life, he was now CEO of a company. "There was no one who understood the nuances of what he was trying to accomplish as well as Sebastian did," says Levine, who led a \$15 million investment in Udacity, on behalf of Andreessen Horowitz, in October 2012. (Thrun still serves as a part-time consultant to Google X, spending one day a week working there.) "If it hadn't been for Sebastian," says Levine, "we wouldn't have done this investment."

Thrun initially approached the problem of low completion rates as one that he could solve single-handedly. "I was looking at the data, and I decided I would make a really good class," he recalls. Statistics 101, taught by the master himself and recorded that summer, is interactive and full of accessible analogies. Most important, it is designed so that students who are not particularly adept at math or programming can make it through. Thrun told me that he tried to smile whenever he was recording a voice-over, so that even though he couldn't be seen, his enthusiasm for the subject would be imputed to his online students. "From a pedagogical perspective, it was the best I could have done," he says. "It was a good class."

Only it wasn't: For all of his efforts, Statistics 101 students were not any more engaged than any of Udacity's other students. "Nothing we had done had changed the drop-off curve," Thrun acknowledges.

He then set about a number of other initiatives to address this thorny problem, including hiring "mentors," many of them former academics looking for a change, to moderate class forums and offer help via live chats. But he also pursued the more obvious way to incentivize students to finish their courses: He offered college credit. In late 2012, Thrun proposed a collaboration to California Governor Jerry Brown, who had been struggling to cope with rising tuition costs, poor student performance, and overcrowding in state universities. At a press conference the following January, Brown and Thrun announced that Udacity would open enrollment in three subjects—remedial math, college algebra, and elementary statistics—and they would count toward credit at San Jose State University, a 30,000-student public college. Courses were offered for just \$150 each, and students were drawn from a lower-income high school and the underperforming ranks of SJSU's student body. "A lot of these failures are avoidable," Thrun said at the press conference. "I would love to set these students up for success, not for failure."

MISSION IMPOSSIBLE

Why is Udacity now focusing on corporate training?

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Viewed within this frame, the results were disastrous. Among those pupils who took remedial math during the pilot program, just 25% passed. And when the online class was compared

with the in-person variety, the numbers were even more discouraging. A student taking college algebra in person was 52% more likely to pass than one taking a Udacity class, making the \$150 price tag—roughly one-third the normal in-state tuition—seem like something less than a bargain. The one bright spot: Completion rates shot through the roof; 86% of students made it all the way through the classes, better than eight times Udacity's old rate. (The program is supposed to resume this January; for more on the pilot, see "Mission Impossible.")

But for Thrun, who had been wrestling over who Udacity's ideal students should be, the results were not a failure; they were clarifying. "We were initially torn between collaborating with universities and working outside the world of college," Thrun tells me. The San Jose State pilot offered the answer. "These were students from difficult

neighborhoods, without good access to computers, and with all kinds of challenges in their lives," he says. "It's a group for which this medium is not a good fit."

BEEP-BEEP-BEEP.

A 43-year-old instructor named Chris Wilson sits hunched over a tablet computer in a soundproof recording studio—one of three in Udacity's offices—and hits a button that emits three quick tones that indicate the start of a new take.

The room is dark except for two bright drafting lamps pointed at the table. A digital camera mounted above his head records everything he writes, and a small headset microphone—the kind worn by megachurch pastors and TED talkers—records everything he says. Lounging on a beanbag chair just outside the studio is Udacity course developer Sean Bennett, who is staying close at hand in case Wilson needs help with a last-minute revision. All Udacity classes are scripted and storyboarded in advance by the same five-person in-house team, which means they generally look more uniform and polished than those offered by the competition. "A lot of the scripting process is thinking about what the

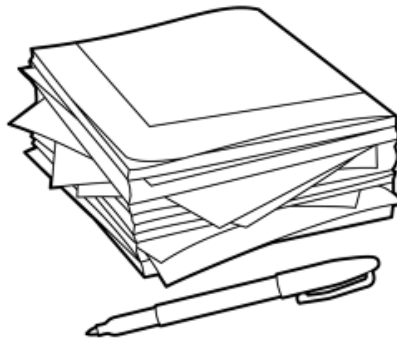
THE EDUCATION OF SEBASTIAN THRUN

PART 3: College Disrupter 2011-Present



THE EPIPHANY

Thrun was inspired to pursue online education after seeing Sal Khan's TED Talk.



THE HOOK

Thrun fully got the bug after 160,000 people signed up for his first Internet course.

students are going to be doing," Bennett says. "The words are mostly Chris's."

I watch as Wilson—a big man with wavy shoulder-length hair, wearing a baggy T-shirt and cargo shorts—struggles to communicate a web-development concept called fluid layout, which allows pages to render properly on differently sized screens. "Now, fluid layout means I should stop fixing all those width—eh. All right."



THE PIVOT

Thrun first embraced corporate training in late 2012—from Google, Autodesk, and Nvidia.

He tries again, and then stumbles a few words later. "The average for me is probably about three takes," he says.

If Wilson seems slightly unprofessional as an educator, that's because his only formal teaching credential is as an assistant scuba-diving instructor. Wilson works at Google as a developer advocate in the company's Chrome division. His class was conceived, and paid for, by Google as a way to attract developers to its platforms. Over the past year, Udacity has recruited a dozen or so companies, including Autodesk, Intuit, Cloudera, Nvidia, 23andMe, and Salesforce.com, which had sent a couple of reps to discuss a forthcoming course on how to best use its application programming interface, or API. The companies pay to produce the classes and pledge to accept the certificates awarded by Udacity for purposes of employment.

Udacity won't disclose how much it is making, but Levine of Andreessen Horowitz says he's pleased. "The attitude from the beginning, about how we'd make money, was, 'We'll figure it out,'" he says. "Well, we figured it out."

Thrun, ever a master of academic branding, terms this sponsored-course model the Open Education Alliance and says it is both the future of Udacity and, more generally, college education. "At the end of the day, the true value proposition of education is employment," Thrun says, sounding more CEO than professor. "If you focus on the single question of who knows best what students need in the workforce, it's the people already in the workforce. Why not give industry a voice?"

"AT THE END OF THE DAY, THE TRUE VALUE PROPOSITION OF EDUCATION IS EMPLOYMENT," THRUN SAYS, SOUNDING MORE CEO THAN PROFESSOR. "WHY NOT GIVE INDUSTRY A VOICE?"

Thrun's friends and colleagues repeatedly told me that he has a great capacity for intellectual flexibility. "Most founder-CEOs have this belief that their vision of the universe will prevail and everyone else's vision will lose," says George Zachary, a partner with Charles River Ventures and Thrun's first investor. "Sebastian is the opposite. He's so far away from Steve Jobs on the CEO spectrum, it's amusing."

Still, I couldn't help but feel as if Thrun's revised vision for Udacity was quite a comedown from the educational Wonderland he had talked about when he launched the company. Learning, after all, is about more than some concrete set of vocational skills. It is about thinking critically and asking questions, about finding ways to see the world from different points of view rather than one's own. These, I point out, are not skills easily acquired by YouTube video.

Thrun seems to enjoy this objection. He tells me he wasn't arguing that Udacity's current courses would replace a traditional education—only that it would augment it. "We're not doing anything as rich and powerful as what a traditional liberal-arts education would offer you," he says. He adds that the university system will most likely evolve to shorter-form courses that focus more on professional development. "The medium will change," he says.

It might already be changing. This January, several hundred computer science students around the world will begin taking classes for an online master's degree program being jointly offered by Udacity and the Georgia Institute of Technology. Fees will be substantial—\$6,600 for the equivalent of a three-semester course of study—but still less than one-third of what an in-state student would pay at Georgia Tech, and one-seventh of the tuition charged to an out-of-state one.

It's a bold program, partly because it is the first accredited degree to be offered by a provider of massive open online courses, but also because of how it's structured. Georgia Tech professors will teach the courses and handle admissions and accreditation, and students will get a Georgia Tech diploma when they're done, but Udacity will host the course material. Thrun expects the partnership to generate \$1.3 million by the end of its first year. The sum will be divided 60-40 between the university and Udacity, respectively, giving the startup its single largest revenue source to date.

Crucially, the program won't ultimately cost either Udacity or Georgia Tech anything. Expenses are being covered by AT&T, which put up \$2 million in seed capital in the hope of getting access to a new pool of well-trained engineers. "There's a recruiting angle for us, but there's also a training angle," says Scott Smith, an SVP of human resources at the telco. Though Smith says the grant to Georgia Tech came with no strings attached, AT&T plans to send a large group of its employees through the program and is in talks with Udacity to sponsor additional courses as well. "That's the great thing about this model," Smith says. "Sebastian is reaching out to us and saying, 'Help us build this—and, oh, by the way, the payoff is you get instruction for your employees.'" Says Zachary, "The Georgia Tech deal isn't really a Georgia Tech deal. It's an AT&T deal."

I first became acquainted with Thrun's work nearly 10 years ago, in a very traditional university setting. I was getting my bachelor's degree in English—an experience that, I must say, taught me very little of obvious professional value but nonetheless seemed worth the outrageously high price—and had been required to take three science classes. In the final semester of my senior year, I took an introduction to mechanical engineering, where the professor showed us a video of the first DARPA Grand Challenge. I remember being moved by the quiet beauty of a driverless car winding up hills in an empty desert, and when I saw pictures of Stanley the following year, I felt a sense of awe, like a little boy getting a good look at a car for the first time.

I tell Thrun this, and he seems flattered. "They put it in the Smithsonian Air and Space Museum," he says proudly. "So now a lot of 8- and 9-year-olds know who I am."

"I HOPE [MY 5-YEAR-OLD SON] CAN HIT THE WORKFORCE RELATIVELY EARLY AND ENGAGE IN LIFELONG EDUCATION," THRUN SAYS. "I WISH TO DO AWAY WITH THE IDEA OF SPENDING ONE BIG CHUNK OF TIME LEARNING."

Thrun's 5-year-old son, Jasper, is not yet old enough to be impressed by his father's work, but he's already starting his education. "In my son's kindergarten, they're telling us how to get him into Stanford," he says. "By their advice, I'm doing everything wrong, because I'm trying to make him happy rather than putting him through as many piano lessons as possible." He dreams that his son will take a less conventional view of education. "I hope he can hit the workforce relatively early and engage in lifelong education," Thrun says. "I wish to do away with the idea of spending one big chunk of time learning."

I ask Thrun if it isn't odd that someone like him—someone for whom the traditional education system has done so much—would wind up railing against it. "Innovation means change," he says. "I could restrict myself to helping a class of 20 insanely smart Stanford students who ~~would~~ be fine without me. But how could that impact not be dwarfed by teaching 160,000 students?"

All visionary entrepreneurs must, at some point, find their own sense of romance in the compromises they make to build a profitable business, and the size of the crowd is where Thrun finds his. He's moved by the idea of many, many students from many, many places learning something because of him—even if it's something as mundane as a Salesforce.com API. I have a hard time believing that he really wants his son to get Salesforce certified rather than Stanford educated, but in this one thing Thrun seems entirely earnest.

Two days after our bike ride, I return to the Udacity offices, where Thrun is rerecording a segment for his statistics class. He'd mistakenly used an incorrect notation in writing out a math problem, and he's returned to the studio to get it right, spending an hour or so alone in the dark room, talking into the microphone and scribbling on a tablet. "It's kind of like being onstage, where you have all these lights in your face and can't see the audience, but you still have to be able to excite them," he says. "So I think of the football stadium full of people that I'm facing. I get a kick out of that." Thrun's taken the red pill. There's no going back.

[Photos by David Black / Illustrations by Brown Bird Design]

A version of this article appeared in the December 2013 / January 2014 issue of FAST COMPANY magazine.



MAX CHAFKIN

Max Chafkin is a contributing writer with Fast Company, and the author of *Design Crazy: Good Looks, Hot Tempers, and True Genius at Apple*.

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November 14, 2013 | 8:30 AM

Exhibit 6

Ali Gharib: Republicans Loved Netanyahu's Racist Election Tactics



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Inside the Coursera Hype Machine

The company has attracted tens of millions in venture capital—but if you're looking for the Amazon of online higher ed, try iTunes U.

Jon Wiener September 4, 2013 | This article appeared in the September 23, 2013 edition of *The Nation*.

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Coursera announced that things were looking better last winter when the American Council on Education, which represents college and university presidents, said it would recommend that colleges grant credit for the successful completion of five Coursera offerings. But as *The Wall Street Journal* pointed out, "Whether schools follow that suggestion remains unclear. Even the three institutions whose instructors teach those online courses [Duke, the University of Pennsylvania and the University of California, Irvine] don't plan to award credit" to their students who complete the MOOCs. A handful of other schools have agreed to award credit as recommended by ACE, but it's not for regular students enrolled in degree programs; it's for a pilot program "evaluating the applicability" of ACE's credit recommendations for "adult learners" taking MOOCs.

About the Author



Jon Wiener

Jon Wiener teaches US history at UC Irvine. His most recent book is *How We Forgot the Cold War: A Historical Journey...*

A Historical Journey...

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A guilty plea to a misdemeanor, and no jail time.

Jon Wiener

There's one other problem for Coursera and the other MOOCs trying to make money: 90 percent of the people who enroll in courses do not complete them. Watching video lectures on your laptop at home alone doesn't seem to work for the overwhelming majority of people who try.

To find out how Coursera works, I recently signed up for a course in my own field, history. The course was on the Holocaust and taught by UC Santa Cruz professors Peter Kenz and Murray Baumgarten. The lecture topics and reading assignments were outstanding, but it turns out that this course, like other Coursera offerings, is nothing like the "world-class education" promised in the company's mission statement. Coursera co-CEO Koller says they can do better than "the default form of college classes—a professor standing in front of her students, lecturing for an hour." But the lectures on the Holocaust were nothing more than video of the lecturers standing in front of a class and lecturing for an hour. There was no attempt to intercut the lecturing with visual material, film clips, illustrations, interviews or anything else, and the audio quality was often pretty bad. To young eyes familiar with action movies, fast-paced TV shows and video games, this looks practically Paleolithic. And although the UC Santa Cruz name and seal appeared on every page of the course website, there

was no way for Coursera students to ask questions of the two Santa Cruz professors. Instead, students were encouraged to ask each other, in the online "forums." Then the students voted on the best answer. If you don't think that's a good way to learn, you don't belong in a Coursera course.

At the end of the first week of class, the forum had 313 posts discussing the lectures—out of 11,000 students enrolled. The first lectures were on "Witnessing," and the 313 posts were responding to a query from the course coordinator, "What does witnessing mean?" In the most popular answer, a student said that when he read about the Holocaust, "I suffer, I cry, I become anguished"—and thus the writers are "making us also witnesses." The lecture in question, however, was about something quite different: "the problem of representation" for witnesses and "the limits of language and knowledge" in trying to explain their experience. Not a single one of the posts mentioned those issues.

The next three lectures had a total of only forty-two posts, all on the same issue: the poor audio quality. The next-biggest thread consisted of people complaining that the quizzes about the videos didn't recognize correct answers. The course coordinator replied, "The trick to getting the computer to recognize your answer as 'correct' is to recycle the same terminology you hear in the lecture video." Students then protested that they were not "parrots."

The course also had writing assignments. The topic of the first paper was uninspired: “write a brief (500–700 words) response about any of the video lectures you have encountered so far. Rather than just telling what your opinion is...make a critical statement that reflects on the themes, phrases and ideas presented in each video.” The students are supposed to read and grade one another’s papers, using criteria provided by Coursera. Peer grading provokes the most complaints from students in MOOCs.

I asked one of the two lecturers, Peter Kenez, about working with Coursera on this course. It turns out Coursera had nothing to do with the design, structure or look of it. The video was shot not by Coursera but by UC Santa Cruz, and not for Coursera but rather two years earlier, before Coursera was created, when the course was offered on campus. “The film already existed,” Kenez said, “so we didn’t have to do anything. They hired our TA to put together the material at their website; we had nothing to do with that.” He said he had never looked at the Coursera video. As for the forums, the writing assignments, the student questions and student problems, “I have nothing to do with any of the online activity,” Kenez told me. “I haven’t even checked in. I have nothing to do with the evaluations.”

And he didn’t get paid. He did it, he said, because “it cost me nothing. And whatever the students get out of it, I am all for it.” Finally I asked Kenez why UC Santa Cruz went with Coursera instead of one of the nonprofits or iTunes U. “Somebody on campus, the head of the computer science department, knew the Coursera people, and suggested that they approach us,” he said. “That’s how it happened.”

(Michael Roth, president of Wesleyan, offers a better Coursera course with “The Modern and the Postmodern”—intellectual history and theory from Kant and Rousseau to Judith Butler and Slavoj Žižek. The video alternated between two cameras on the lecturer and included some beautiful illustrations. Roth’s style is also more conversational and directed at the video audience. He sent his own weekly e-mail to enrolled students and initiated some forum threads himself. But the discussions in the forums for that course included fewer than 100 students, out of the 13,000 enrolled.)

Coursera knows its investors want to see progress toward making money. CEO Koller offered them some hope in May, telling *The Wall Street Journal* that “our verified certificate program, which we launched in January, is actually doing pretty well. We’ve had well over 10,000 people opting into this. We have made close to \$500,000 in a few months.” That program gives students a certificate stating that Coursera has verified the identity of the person completing the course work. But it’s highly unlikely that colleges and universities will give credit toward degrees for them. Indeed, the text of the certificate states explicitly that it’s a noncredit course.

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The basic problem with the verified certificates, indeed with all MOOCs, was acknowledged by “some college administrators” in the *Journal* in a surprisingly blunt statement: “it’s difficult to verify that students learned anything in MOOCs.” The best way for schools to do that is to employ their own assistants or adjuncts to grade papers and exams for online students. But then it’s not a MOOC anymore: it’s not open, and it’s not massive. If all that a school needs is online lectures, it doesn’t need Coursera, since iTunes U and YouTube already offer thousands of lectures.

Other moneymaking possibilities are described in Coursera’s contract with the University of Michigan, obtained by *The Chronicle of Higher Education* under a Public Records Act request. That contract includes a section titled “Possible Company Monetization Strategies”; one of them is to run banner ads on course webpages. The best bet for making a profit—outlined in a new Coursera contract with the University of Kentucky, also obtained by the *Chronicle*—would be for Coursera to get paid not by students seeking “certificates of completion” but rather by schools offering their courses: for a \$3,000 flat fee, plus \$25 per student for the first 500 students, \$15 for the next 500, and so on. Material that students could get for free on the Internet would be sold to them by their college, in exchange for credit toward a degree. You might call that a rip-off, but it could be the business model for higher education in the future.

Of course, there are plenty of forces beyond Coursera pressing colleges and universities to save money by replacing faculty members with video lectures. But the pressures become considerably more intense when powerful people look forward to making big profits. As it becomes clear that Coursera will not be the next Amazon, we will be closer to having a

rational discussion about the best ways to help students at nonelite schools fulfill requirements for graduation—and maybe even learn something along the way.

Editor's Note: This piece originally stated that neither iTunes U nor YouTube offer anything like the Coursera system, "in which a particular course starts on a specific date, with video lectures uploaded every week." This sentence has been corrected to reflect that the iTunes U iPad app offers some "in-session" classes with a specific start date.

Also in this week's issue, David L. Kirp asks if massive open online courses are the utopia of affordable higher ed—or just the latest fad, in ["Tech Mania Goes to College."](#)

Jon Wiener September 4, 2013 | This article appeared in the September 23, 2013 edition of *The Nation*.

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Exhibit 7

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Coursera Blog

Learn from Coursera on your next JetBlue flight



Learners can continue to acquire knowledge and build skills from thirty-thousand feet in the air. With the busiest travel season right around the corner, JetBlue announced a [new set of content providers](#) for their new onboard in-flight entertainment, Fly-Fi Hub. Among the options for travelers to select from is Coursera.

Coursera will host 10 e-learning videos that include courses such as [Introduction to Marketing](#) from The Wharton School, also giving learners the ability to browse from a list of respected institutions like University of Edinburgh and Berklee School of Music.

JetBlue's new Fly-Fi Hub will be accessible to customers on any personal device on all aircraft by the end of 2014. So sit back, grab a snack and get ready to learn on your next JetBlue flight with Coursera.

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Building Your Own Online Class? - How To Choose the MOOC Platform

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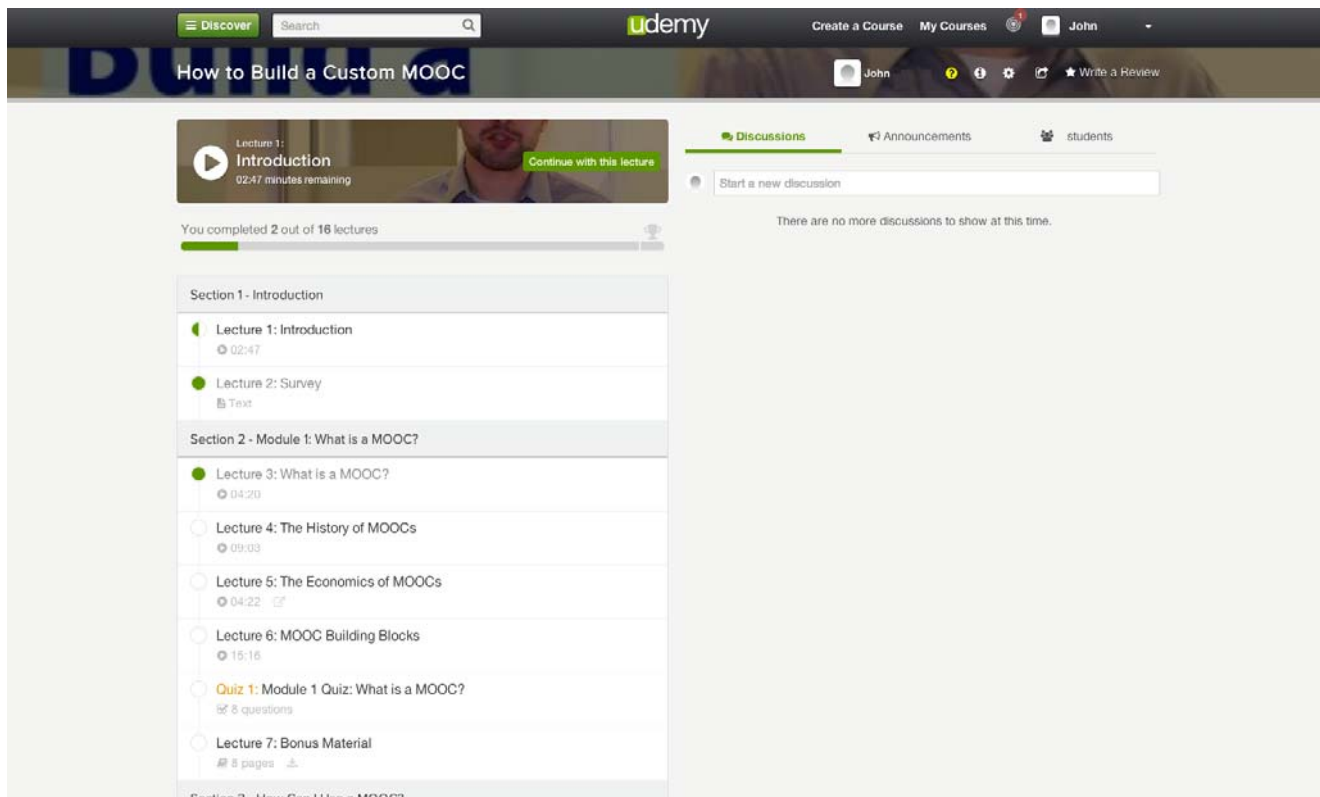
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In 2012 and 2013, MOOCs took root in the higher education landscape. Today, most top universities offer some sort of MOOC. In 2014, we are starting to see organizations and even individuals build MOOCs. If you've ever considered building your own open online class, one of the first steps is determining which MOOC platform will best suit your needs. Luckily, you can build MOOC and [MOOC-ish](#) courses using one of several tools that are free and open for anyone to use. The following is a review of some of those platforms, identifying their strengths and weaknesses and of the type of user each might be most appropriate for.

Udemy



Udemy is one of the simpler online education platforms that allows individual instructors to build courses that they can either charge for or offer for free. (Some classes have over 10,000 paying students.) Udemy hosts the courses in the cloud and building on the platform requires no coding knowledge. It can be thought of as a presentation platform like Slideshare, but enhanced with voice-over, quizzes and forum capabilities. Courses are very easy to set up. Most teachers upload a PowerPoint and record a voice-over, with multiple-choice questions at the end of each unit. You can also upload video, audio recording and documents.

A Udemy course must be accessed via the Udemy.com site, so branding options are limited. A MOOC cannot be white-labeled or use a custom domain. But Udemy does have 2,000,000 registered users on their site and they often do things to promote popular new courses.

Strengths

- Ease of Setup
- Udemy's audience of 2,000,000 users

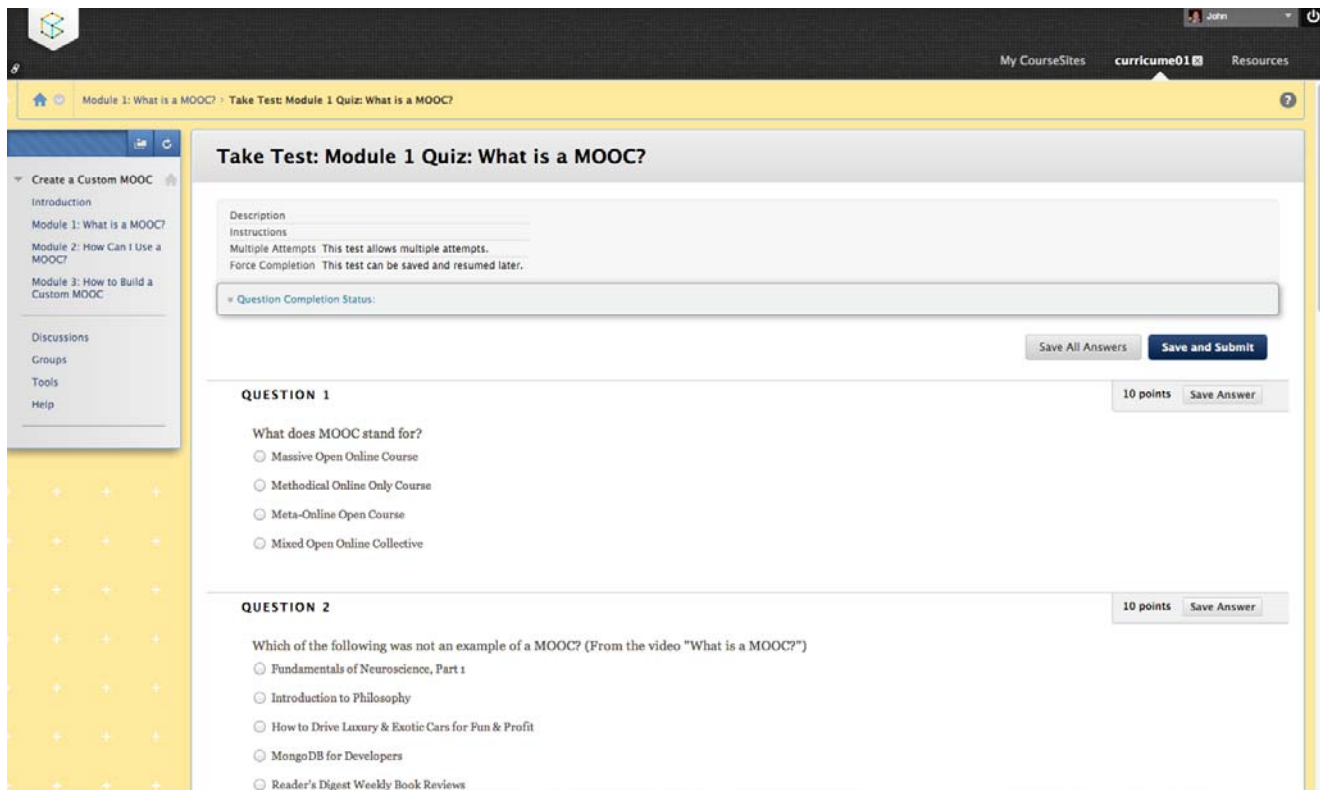
Weaknesses

- Free version is not brandable
- Limited student analytics

Most appropriate for

- Individual Instructors who want to monetize their courses

CourseSites by Blackboard



CourseSites is a more full-featured online course platform that is also cloud-based and requires no coding knowledge. CourseSites is more specifically geared toward instructors within educational institutions. In addition to basic MOOC functionality, it offers features like Course Announcements, Awards/Badges and a “Grading Center.” (See [this profile](#) of how one state university is converting their existing distance ed infrastructure into open courses using CourseSites.)

CourseSites feels, in every way, like a tool for use in the classroom. From the student’s perspective, a dashboard shows announcements, to-do’s and a calendar. These features seem ideal for a student trying to keep track of multiple assignments across several classes. But it feels overwhelming for a non-classroom audience who is likely only taking one MOOC and less interested in grading or deadlines. Nonetheless, CourseSites provides one of the best combinations of full functionality and ease of setup.

Strengths

- Full-featured
- Easy setup


Weaknesses

- Not brandable
- Limit of 5 courses

Most appropriate for

- Individual Teachers who want to build classes online

Versal

| How to Build a Custom MOOC | Lesson 3: The Economics of MOOCs |
|--|--|
| Introduction Introduction Video Introductory Survey |  |
| Module 1: What is a MOOC? Lesson 1: What is a MOOC? Lesson 2: The History of MOOCs Lesson 3: The Economics of M... Lesson 4: MOOC Building Blocks Quiz: What is a MOOC? Quiz | Article Assignments: How MOOCs Can be Free and Profitable - EdTech Magazine - December 2013: http://www.edtechmagazine.com/higher/article/2013/12/how-moocs-can-be-free-and-profitable-same-time What Do We Know About MOOC Students So Far? - MOOC News & Reviews - November 2013: http://moocnewsandreviews.com/what-do-we-know-about-mooc-students-so-far/ Will MOOCs Kill University Degrees? - The Economist - October 2013: http://www.economist.com/blogs/economist-explains/2013/10/economist-explains |
| Module 2: How Can I Use a ... Lesson 1: MOOC Use Cases Lesson 2: How MOOCs are diffe... Lesson 3: MOOC Types & Platfo... | Lesson 4: MOOC Building Blocks |
| Module 3: How to Build a M... Lesson 1: The ADDIE Model Lesson 2: Analyze Lesson 3: Design Lesson 4: Develop Lesson 5: Implement Lesson 6: Evaluate | Quiz: What is a MOOC? Quiz |
| Outro | Module 1 Quiz: What is a MOOC? Quiz subtitle (e.g. English time phraseology) What does MOOC stand for? <input type="radio"/> Massive Open Online Course <input type="radio"/> Methodical Online Only Course <input type="radio"/> Meta-Online Open Course <input type="radio"/> Mixed Open Online Collective |

Versal is still in beta, but it seems very promising. Users can build courses via drag-and-drop with no coding experience required. In addition to the basics, Versal also offers advanced widgets like dynamic graphs and interactive piano widgets. The platform lacks one major feature: discussion forums. Versal seems to be set up more as a tutorial tool than other MOOCs that invite discussion & debate.

Versal is one of the only platforms to allow users to easily embed courses in their personal website or blog. This serves as a quick and easy way to have your own branded course. The technology is just an iframe—similar to embedding a YouTube video—so embedded courses are most suitable for quick tutorials, not multi-lesson courses.

As mentioned, Versal is still in beta and they are adding new features frequently. They are also planning to open the platform up for third-party developers to build widgets. These are guys to keep an eye on.

Strengths

- Ease of Use
- Advanced drag-and-drop widgets (i.e. 3D modeling, virtual piano exercises)

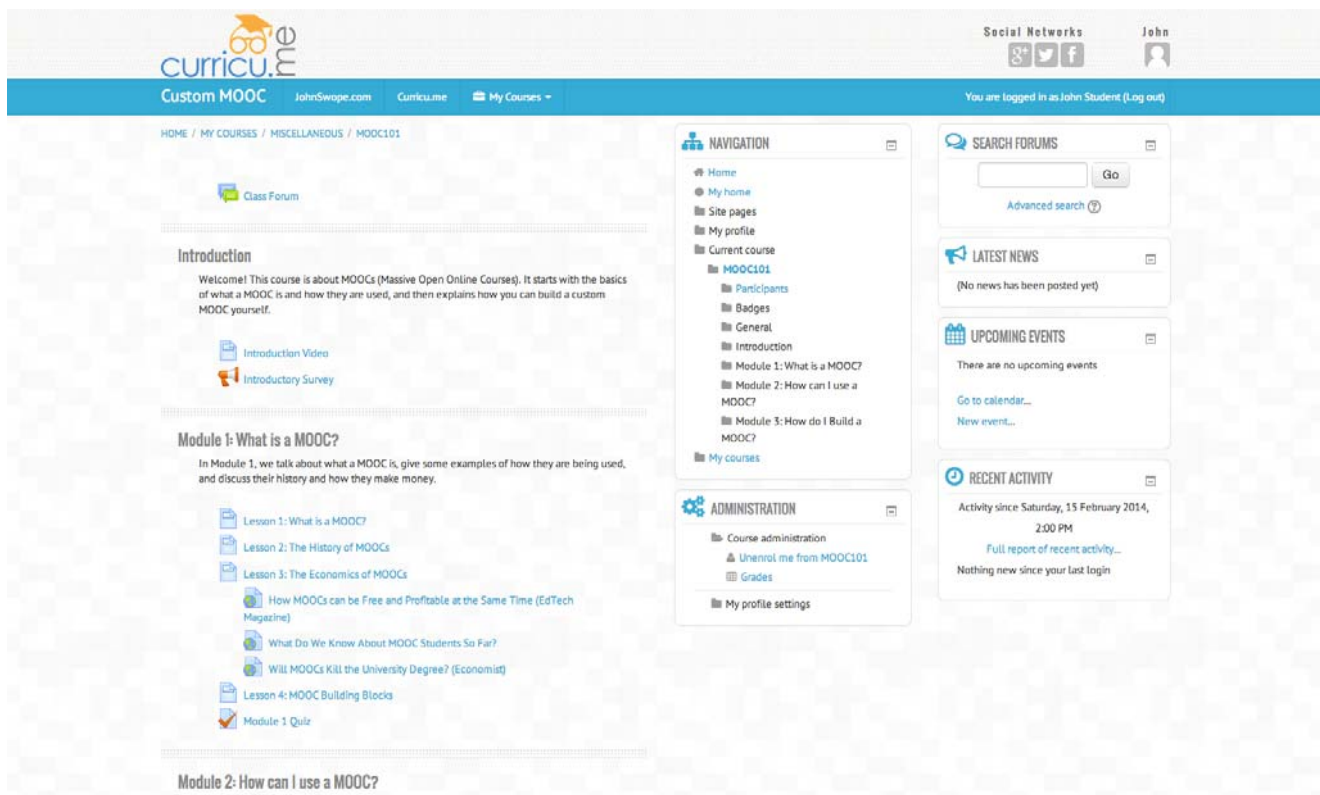
Weaknesses

- No forum capabilities

Most appropriate for

- Individual Instructors who want to deliver tutorials to existing audiences

Moodle



Moodle has been around for over ten years and is one of the most popular open-source Course Management Solutions available. As such, it is not specifically a MOOC platform but a competent online course platform which can handle large classrooms, and [a lot of the open online classes you may have seen that are not affiliated with the major platforms were built on Moodle.](#)

The great strength of Moodle is its combination of full functionality with extensive customization options. Moodle offers all the basic course elements plus fairly advanced elements like SCORM compliance and group permissions. Because Moodle is open source, users have the ability to customize nearly everything within their implementation if they know where to look.

Moodle requires a self-hosted installation, but building simple courses is fairly intuitive and requires no coding knowledge. Because of its robustness, the advanced options can be daunting at times. Luckily, the Moodle community is extremely active, and most questions can be solved via a quick search in the instructor forums.

Strengths

- Open source
- Highly expandable and customizable

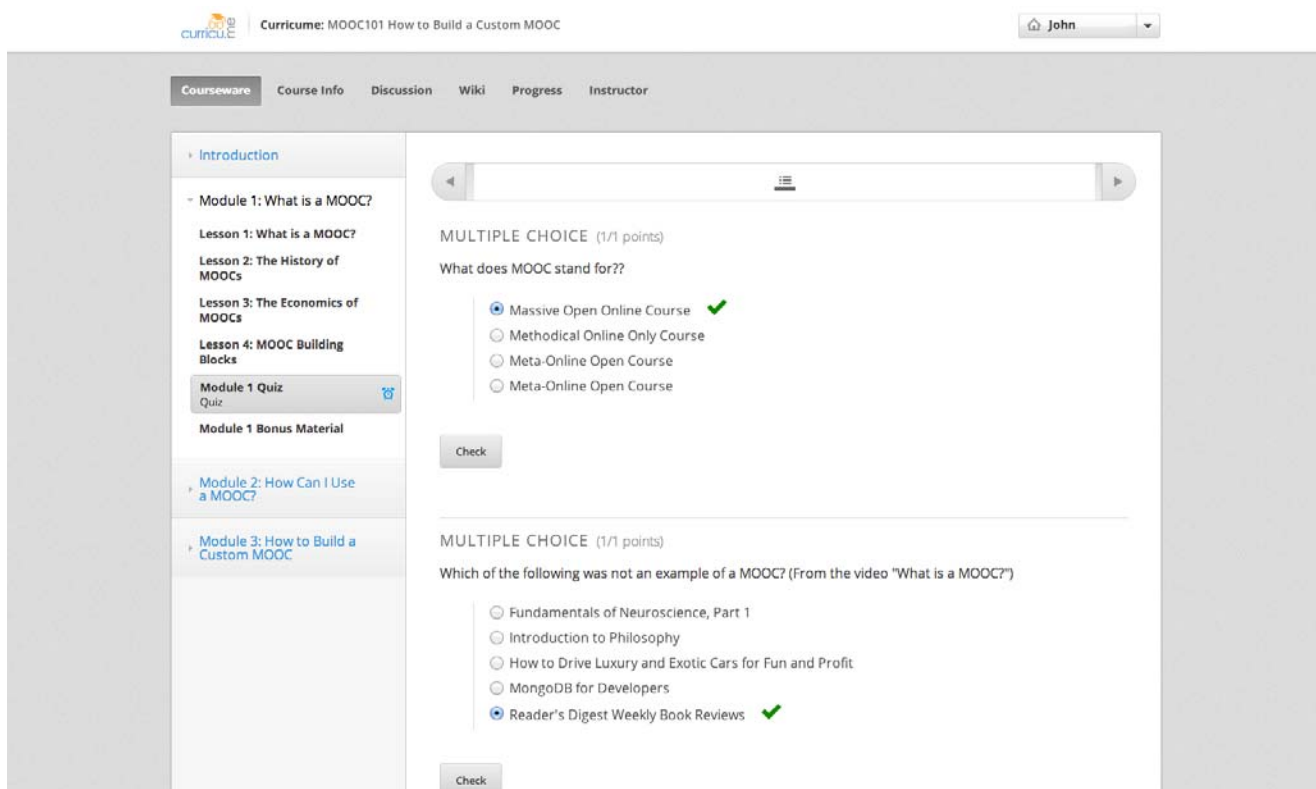
Weaknesses

- Performance intensive
- Requires setup and maintenance investment

Most appropriate for

- Schools or small/medium organizations that want a full-featured Learning Management System

EdX



You may know edX as the platform where MOOCs from faculty from very selective universities are hosted. But the software behind it, developed by Harvard and MIT, was released as open source in March 2013, enabling anyone to use the full-featured platform, which is dedicated specifically to building MOOCs. EdX's apparent goal is to become the WordPress of online course platforms, where users can start with a basic framework and then add functionality via third-party plug-ins.

The edX course-building platform is the same tool used by the universities who offer MOOCs on edX.org. If you've taken an edX.org MOOC, you have a basic idea of what this platform can offer. Students can watch lectures, take multiple different kinds of quizzes, participate in

forums and even work on labs or cooperative essays. Creating basic courses can all be done via edX Studio—a graphical user interface for course creators—and multiple instructors can work on a course together.

EdX does require a self-hosted installation, though they have recently developed a fairly easy to use [AWS install](#). In return for the time it takes to set up and maintain your edX instance, you get full access to your student data and unlimited customization options.

Strengths

- Open source
- Fully brandable and customizable
- Designed to handle large classrooms (100,000+)

Weaknesses

- Requires setup and maintenance investment

Most appropriate for

- Organizations that want a sleek, modern online course tool, potentially for very large student audiences

There are a few more MOOC-building tools to consider besides the ones I detail here. For example, Google has a free tool called [Course Builder](#), though since their partnership with edX to launch [mooc.org](#) (date TBA), its future is uncertain.

Choosing your MOOC platform is the first step. After that comes the task of actually putting together your course! Luckily, most platforms rely on content you are already familiar with such as YouTube videos and PDFs. With some effort and patience, you can put out a MOOC that is on par with some the university MOOCs that are available.

John Swope is the founder of [curricu.me](#) and he offers his own open course, [How to Build a Custom MOOC](#). His favorite MOOC is Dan Ariely's *A Beginner's Guide to Irrational Behavior*, and [his personal blog](#) takes much inspiration from Ariely's theories around irrational economics. You can follow him on Twitter [@j_swopeoo](#).



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Share 9

1 point

Exhibit 9



Subscribe



of all help desk calls are printer related.

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EDUCATION

All Hail MOOCs! Just Don't Ask if They Actually Work

Despite booming enrollment and enthusiastic administrators, scant research offers little evidence that online courses are effective

By Jon Marcus / The Hechinger Report | Sept. 12, 2013 | 17 Comments

Dozens of top universities and colleges are scrambling to get in on the latest trend in higher education, massive open online courses known as MOOCs. Enrollment is ballooning by the hundreds of thousands each semester. A [third of administrators](#) say they think residential campuses will eventually be obsolete. Google just [announced](#) it's teaming up with Harvard and MIT to create "a YouTube for MOOCs." And The Economist asked this summer if the courses portend "the fall of the ivory tower."

There's only one hitch: No one really knows if students learn anything in a MOOC. Scant existing research suggests that the success rate of online education, in general, is poor. And even the people behind MOOCs are becoming concerned about sky-high expectations, which they say represent a misunderstanding of their purpose.

"At this point, there's just no way to really know whether they're effective or not," said Shanna Jaggars, assistant director of the Community College Research Center at Columbia University's Teachers College, which has produced some of the most recent scholarship about online education.

(MORE: [The Hottest Seats in Class](#))

"Everyone in the research field agrees that, for the particular purpose of replacing on-campus education, the evidence [for MOOCs] is ambiguous at best," said Andrew Ho, a professor at the Harvard Graduate School of Education and research director for HarvardX. "Far more research is needed. And we're conducting some of it. But we're way out over our skis when it comes to that particular purpose of MOOCs."

Enrollment in online college courses of all kinds increased by 29 percent to more than 6.7 million between 2010 and last year, the latest period for which the fast-changing figures are available, [according to the Babson Survey Research Group](#). And this explosion is happening at a time when the number of students in conventional universities and colleges has started to decline.

MOOCs alone—as opposed to other kinds of online classes, including those with limited enrollment and for which tuition is charged—are growing so quickly, it's impossible to know how many people take them. Barely a year and a half after its debut, Coursera, a startup launched by Stanford faculty, reports that about 4.4 million students have signed up. The MIT-Harvard MOOC collaboration called edX, which premiered just four months later, boasts more than a million.

But those numbers probably don't augur a new wave of learning. About 90 percent of people who register for MOOCs fail to complete them, most providers acknowledge. Advocates say that's because there are no admissions requirements and the courses are free; they compare it to borrowing a book from the library and browsing it casually or returning it unread.

(MORE: [MOOC Brigade: What I Learned From Learning Online](#))

A [survey of students](#) by the market-research company Qualtrics and the education technology provider Instructure seems to confirm that trend. Seventy-five percent said the main reason they signed up for a MOOC was that it didn't cost them anything, while 29 percent of those who dropped out said they got too busy to continue, and 20 percent said they lost interest.

Two-thirds of those students said they would be more likely to complete a MOOC if they could get college credit or a certificate of completion for it, something that's [still not widely available](#). Until it is, said Jaggars, it will be hard to measure the effectiveness of MOOCs—a Catch-22, since without knowing their effectiveness, it's unlikely colleges will give academic credit for them.

To study what happens when students get credit for online courses, Teachers College [looked at online courses](#) at community colleges in [Virginia](#) and Washington State that were not MOOCs—since tuition was charged and credit given—but were like them in other ways. The results were not encouraging. Thirty-two percent of the students in online courses in Virginia quit before finishing, compared with 19 percent of classmates in conventional classrooms. The equivalent numbers in Washington State were 18 percent versus 10 percent. Online students were also less likely to get at least a C, less likely to return for the subsequent semester, and ultimately less likely to graduate.

In July, San Jose State University suspended its experiment with offering MOOCs for credit after only half of credit-seeking students who took the online courses passed, compared to three-quarters of those who took the traditional versions. In one of the three pilot classes, which were offered during the spring, fewer than 30 percent of the online students passed. And while the university and its partners hailed an apparently dramatic [improvement in results](#) in the summer semester, a [closer look](#) showed that more than half of the summer students already had at least a bachelor's degree, compared to none of the students who took online courses in the spring—and even then, more of the summer registrants dropped out.

[Follow](#)



Matt Rourke / AP

University of Pennsylvania professor Peter Struck, accompanied by teaching assistant Cat Gillespie, teaches a mythology class during a live recording of a massive, open, online classes (MOOC), in Philadelphia, May 30, 2013.

(MORE: [MOOC Brigade: Can Online Courses Keep Students from Cheating?](#))

While their scale is unprecedented, the underlying way that MOOCs are taught isn't really new, Jaggars and others said. It's very, very old—a system in which professors lecture to huge numbers of students with whom they seldom, if ever, interact. “In general, students don't do as well in online courses as they do in conventional courses,” said Jaggars. “A lot of that has to do with the engagement. There's just less of it in online courses.”

None of the evidence has slowed the MOOC craze. Seventy-seven percent of academic leaders already think that online education is as good or better than face-to-face classes, and 69 percent say that it's essential to their long-term strategy, the Babson group found (though the administrators also conceded that only 30 percent of their faculty agreed). Four in 10 said their [schools](#) plan to offer MOOCs within three years, according to [a survey released in the spring](#) by the IT company Enterasys. And legislators in several states are pushing to speed up the shift to MOOCs for college credit, which they see as a way to expand access to higher education while reducing costs.

John McCardell, vice chancellor of [Sewanee: The University of the South](#), is one of the skeptics. He points out that the American Council on Education has recommended only 10 MOOCs for credit, and even those recommendations are merely advisory. Quoting poetry he said he studied in an old-fashioned brick-and-mortar classroom years ago, McCardell invoked Alexander Pope's advice: “Be not the first by whom the new are tried, nor yet the last to lay the old aside.”

“That might be a useful thought to keep in mind,” McCardell said, “as the world seems to be rushing headlong to embrace this latest pedagogical fad.”

This story was produced by [The Hechinger Report](#), a nonprofit, nonpartisan education-news outlet based at Teachers College, Columbia University.


SEE ALSO: [The Big Surprise of Martin Luther King's Speech](#)


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Exhibit 10


What to Watch


BEST OF YOUTUBE


 Popular on YouTube


 Music


 Sports


 Gaming


 Education

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 News


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53,582 videos

10,435,461 subscribers

Language: **English** ▾

Country: **Worldwide** ▾

Safety: **Off** ▾

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https://www.youtube.com/user/movieclips/about

3/25/2015

Exhibit 11



Help

Embed videos and playlists

Add YouTube videos and playlists to a website or blog by embedding it.

Here's how to embed a video:

1. Click the **Share** link under the video.
2. Click the **Embed** link.
3. Copy the code provided in the expanded box.
4. Paste the code into your blog or website.

Here's how to embed a playlist:

1. Click **Playlists** on the left side of your YouTube page
2. Click the **playlist title** you'd like to embed.
3. Click the **Share** link.
4. Click the **Embed** link.
5. Copy the embed code that appears in the menu below.
6. Paste the code into your website or blog.

Embedding options

Enable Privacy-enhanced mode

Make an embedded video automatically play

Start an embedded video at a certain time

Add **#t=** to a video's embed code, followed by the time at which you'd like the video to begin playing.

For example, if you want a video to start at 2 minutes and 30 seconds into the video, your embed code would look something like the following:

```
<iframe allowfullscreen="" frameborder="0" height="315"
src="http://www.youtube.com/embed/UkWd0azv3fQ#t=2m30s"
width="420"></iframe>
```

Add captions to an embedded video

Disable embedding

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[Can't see private videos](#)

[Wrong video description or thumbnail on Facebook](#)

How helpful is this article:

Not at all helpful

Not very helpful

Somewhat helpful

Very helpful

Extremely helpful

Exhibit 12

Watch Intro Video 



The Language of Hollywood: Storytelling, Sound, and Color

This Film History course explores how fundamental changes in film technology affected popular Hollywood storytelling. We will consider the transition to sound, and the introduction of color. This online educational experience is not equivalent to a college course.





Sessions

Feb 2, 2015 - Mar 15th 2015



Join for Free!

Course at a Glance

-  5 weeks of study
-  4-6 hours/week
-  English
-  Русский язык subtitles

Instructors



(/instructor/~236)

Scott Higgins (/instructor/~236)

Wesleyan University (/wesleyan)

Categories

Humanities (/courses?categories=humanities)

Music, Film, and Audio (/courses?categories=music)

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About the Course

This history course explores how fundamental changes in film technology affected popular Hollywood storytelling. We will consider the transition to sound, and the introduction of color. Each change in technology brought new opportunities and challenges, but the filmmaker's basic task remained the emotional engagement of the viewer through visual means. We will survey major directors and genres from the studio era and point forward to contemporary American cinema. Our aim is to illuminate popular cinema as the intersection of business, technology, and art. Through film history, we will learn about the craft of filmmaking and how tools shape art. This online educational experience is not equivalent to a college course.

Subtitles for all video lectures available: Turkish (provided by Koc University

(<http://www.ku.edu.tr/en>)), English

Course Syllabus

Here is a week-by-week description of the course and the films discussed. Each lecture is followed by an ungraded multiple choice quiz. At the end of the course, students can complete a longer, 20 question multiple-choice quiz for a grade. This is an online educational experience, not intended to be equivalent to a college course.

Week One:

INTRODUCTION

Lecture One: Form, Technology, and the Art of Cinema

Lecture Two: The Power of Silence: Cinema as a Visual Art.

Watch *Street Angel* (Fox, 1928)

NOTE: *Street Angel* is Optional because the purchase price of the DVD can be prohibitive.

Lecture Three: *Street Angel*: Borzage's Visual Opera

Lecture Four: von Sternberg's World

Watch *Docks of New York* (Paramount, 1928)

Lecture Five: *Docks of New York: The Seedy Side of Silence*

SOUND

Week Two:

Lecture One: Sound Comes to Cinema

Watch *Applause* (Paramount, 1929)

Lecture Two: *Applause*, Mamoulian's Struggle for Style

Lecture Three: The Marx Brothers: Unbridled Talk

Watch *Monkey Business* (Paramount, 1931)

Lecture Four: *Monkey Business*: Vaudeville Anarchy in the Sound Film

Week Three:

Lecture One: Gunfire and the City: Introduction to the Gangster Film

Watch *Scarface* (United Artists, 1932)

Lecture Two: *Scarface*: Sound and the Gangster's World

Lecture Three: Building an Atmosphere: Val Lewton's Horror Films

Watch *The Ghost Ship* (RKO 1943)

Lecture Four: *Ghost Ship*: Horror through Sound and Light

COLOR

Week Four:

Lecture One: Harnessing the Rainbow: Introducing Technicolor

Watch *Trail of the Lonesome Pine* (Paramount, 1936)

Lecture Two: *Trail of the Lonesome Pine: Dramatic Restraint*

Lecture Three: The Color of Adventure

Watch *Adventures of Robin Hood* (Warner Bros. 1938)

Lecture Four: *Robin Hood*: Technicolor's New Palette.

Week Five:

Lecture One: Color and Melodrama

Watch *All that Heaven Allows* (Universal, 1958)

Lecture Two: *All that Heaven Allows*: Orange, Blue, Loss and Longing

Lecture Three: Continuing the Technicolor Tradition

Watch *Punch Drunk Love* (New Line: 2002)

Lecture Four: *Punch Drunk Love*: P.T. Anderson's Palette Games

Lecture Five: Conclusions

Recommended Background

No background required. All are welcome.

Suggested Readings

The lectures are designed to be self contained. However, the following books offer helpful background in Film History and Analysis.

Bordwell and Thompson, FILM ART: AN INTRODUCTION any edition.

(<http://chggtrx.com/click.track?>

[CID=267582&AFID=301076&ADID=1088031&SID=hollywood&isbn_ean=9780073386164](http://chggtrx.com/click.track?CID=267582&AFID=301076&ADID=1088031&SID=hollywood&isbn_ean=9780073386164))

Higgins, HARNESSING THE TECHNICOLOR RAINBOW (http://www.amazon.com/Harnessing-Technicolor-Rainbow-Color-Design/dp/0292716281/ref=sr_1_1?

[s=books&ie=UTF8&qid=1347564028&sr=1-1&keywords=Scott+Higgins](http://www.amazon.com/Harnessing-Technicolor-Rainbow-Color-Design/dp/0292716281/ref=sr_1_1?s=books&ie=UTF8&qid=1347564028&sr=1-1&keywords=Scott+Higgins))

Neale, THE CLASSICAL HOLLYWOOD READER (<http://chggtrx.com/click.track?>

[CID=267582&AFID=301076&ADID=1088031&SID=hollywood&isbn_ean=9780415576741](http://chggtrx.com/click.track?CID=267582&AFID=301076&ADID=1088031&SID=hollywood&isbn_ean=9780415576741))

Course Format

This class will consist of video lectures of around 15 - 30 minutes in length. There are four such lectures each week. Students are required to see the films on their own, outside of class. They are readily available on DVD and available at your local library or for RENTAL via NETFLIX or a similar service. Some of them are available streaming on the internet. All are available for purchase from AMAZON or another vendor. Students are responsible for locating/obtaining the films and viewing them each week.

Short Quizzes of 3 multiple-choice questions follow each lecture. These are ungraded.

Students can take a longer, cumulative quiz to obtain a grade at the end of the course.

FAQ

- **Will I get a certificate after completing this class?**

Yes.

- **What resources will I need for this class?**

For this course, you will need copies of the films discussed and the time to give them a proper, undistracted, viewing before each lecture. All are available on DVD, some may also be available as downloads or streaming from sites like Amazon and Netflix.

Genomic and Precision Medicine

(/course/genomicmedicine)



Analytic Combinatorics

(/course/ac)

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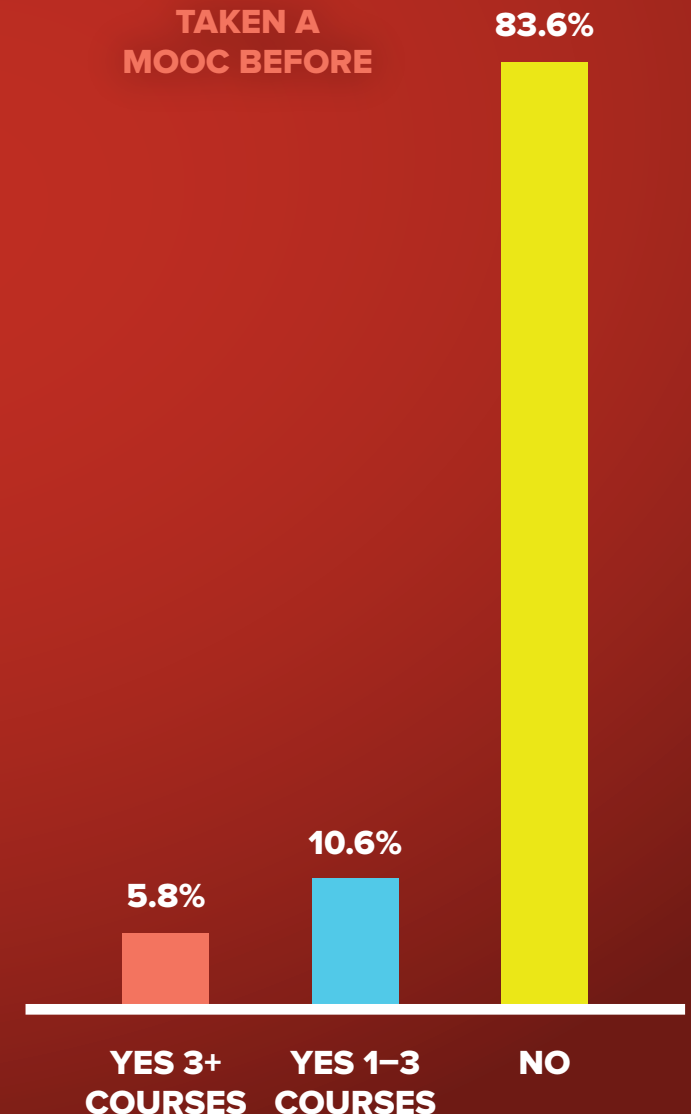
Exhibit 13

THE WALKING DEAD MOOC FEEDBACK

Instructure today announced key findings from its massive open online course (MOOC) based on the hit TV show “The Walking Dead,” a joint production with AMC and the University of California, Irvine that attracted more than 65,000 users around the world over its eight-week run.

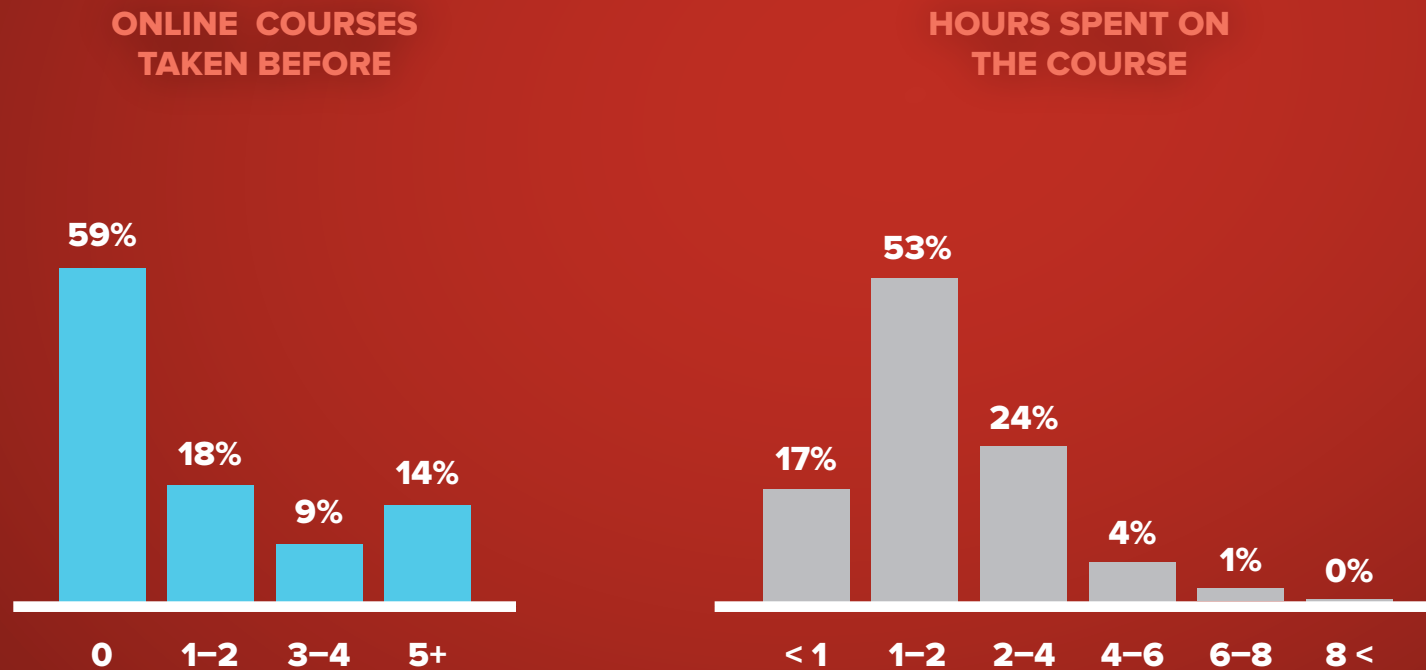
Titled “Society, Science, Survival: Lessons from AMC’s ‘The Walking Dead,’” the MOOC was offered for free on Instructure’s Canvas Network, and explored a wide range of scholarly topics through the lens of a hypothetical zombie apocalypse. A survey of the online course’s participants received more than 12,000 responses and delivered several new insights for the MOOC community.

Instructure’s survey found that nearly 9 out of 10 of the course’s participants had never taken a MOOC before.



“I graduated from high school 20+ years ago, with the promise that I would go to college "someday." I am viewing this MOOC as an opportunity to gauge my own ability to assimilate myself into a routine of learning and keeping up with a schedule designed by someone other than myself. I have a disabled child and parent that I care for full-time, so I take this very seriously as I will be sacrificing my "sleep time" in order to participate. Thank you for the opportunity to learn if I am able to continue my education with my current circumstances.

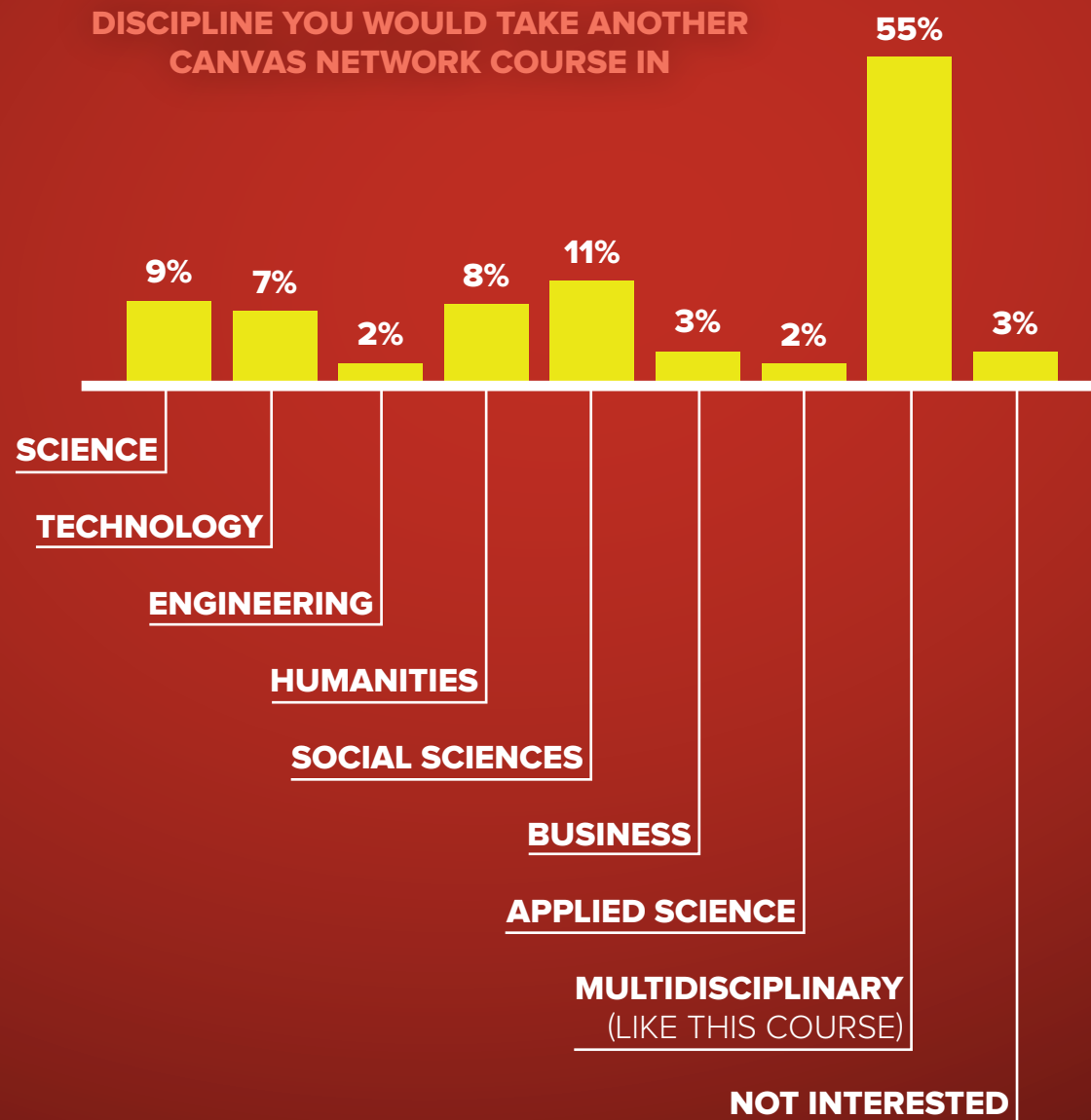
59% said they had never taken an online course before and **4 in 5** participants spent more than 1 hour per week on the course. This statistic reveals that participants actually spent more time in the course than they did watching the show.





A lot of fun and informative too. I would have been very happy if it had been even more comprehensive and longer, i.e. more stuff to learn and discuss each week. I certainly hope that they have something in store for the second half of the season — there are so many other topics that they could cover within the ambit of this show.

55% reported interest in possibly taking other multidisciplinary courses on Canvas Network in the future as opposed to standard single topic courses.

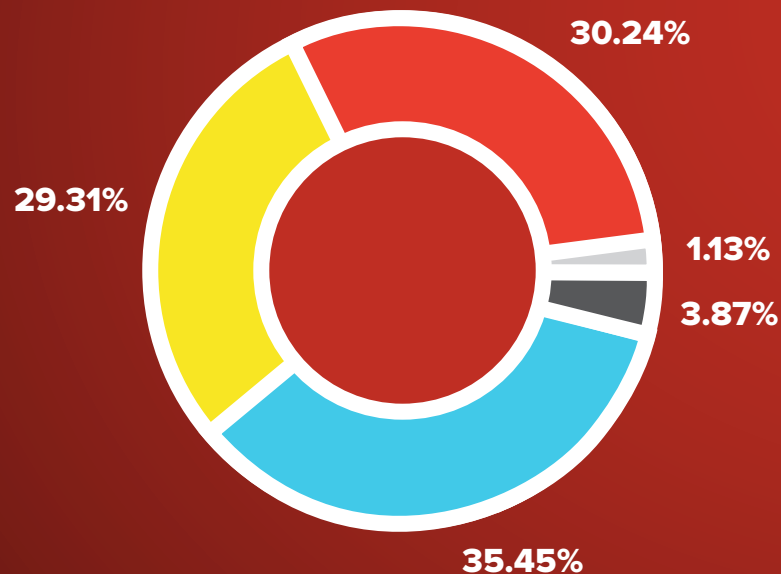




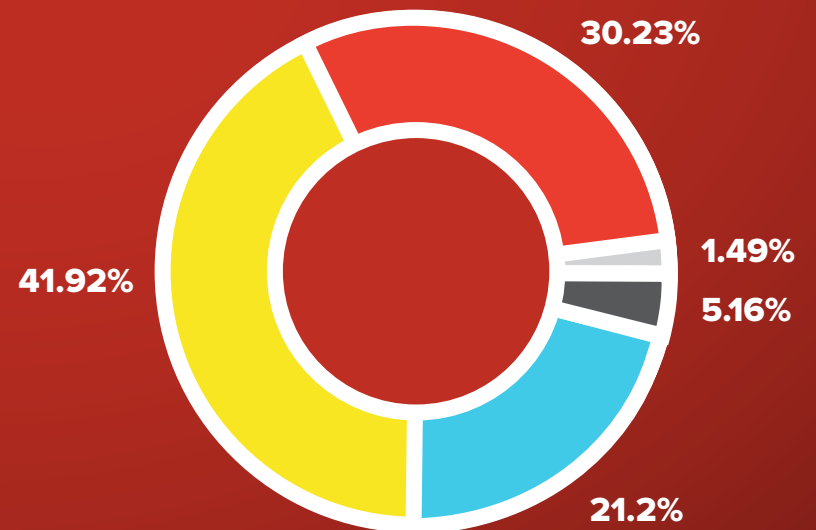
Just a quick "Thank You" to the staff for doing this course. What a great way to get/be involved in the application of sciences applied to world scenarios. I am 51 and can't say I would have done a course like this if it wasn't for the great show. Having others to help dissect and discuss the nuts and bolts of it is terrific. Thanks again.

After taking the course, **60%** of survey respondents said they became a bigger fan of “The Walking Dead,” **73%** said they had more fun watching the show, indicating a strong endorsement for blending education and entertainment.

AFTER TAKING THE COURSE I'M AN EVEN BIGGER FAN OF AMC'S "THE WALKING DEAD"



I HAD MORE FUN WATCHING THIS SEASON BECAUSE OF MY PARTICIPATION IN THE COURSE



STRONGLY DISAGREE



DISAGREE



NEITHER AGREE NOT DISAGREE



AGREE



STRONGLY AGREE

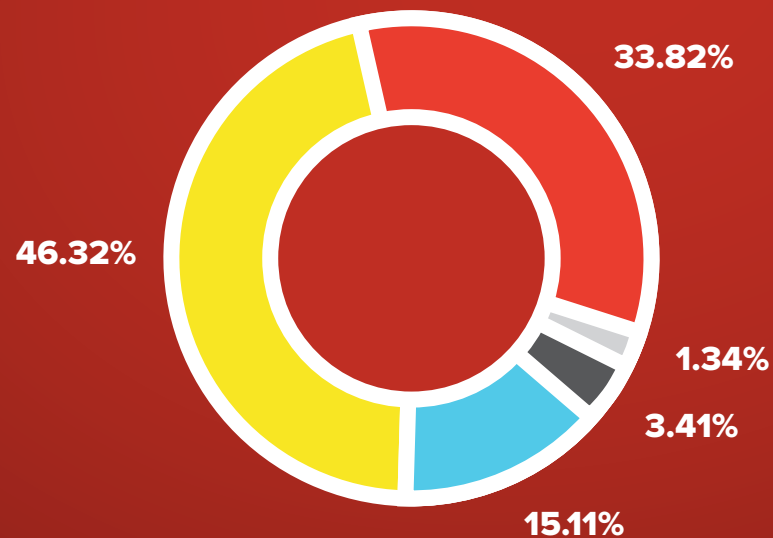


“

BTW, I can't tell y'all how much I'm enjoying the MOOC "Science, Society, and Survival: Lessons Learned from AMC's The Walking Dead." I took the class to see what professionals can do with the Canvas platform, even though I had never watched the show. Now I'm a die-hard fan who owns all four seasons and have learned a ton. I can even do differential equations now. It's a Canvas miracle!

80% **AGREE** THIS COURSE INCREASED THEIR CHANCES OF SURVIVING A ZOMBIE APOCALYPSE.

THIS COURSE INCREASED MY CHANCES ON SURVIVING A ZOMBIE APOCALYPSE



STRONGLY DISAGREE



DISAGREE



NEITHER AGREE NOT DISAGREE



AGREE



STRONGLY AGREE





Who thought that academics could be this sport? On top of it all, of the valuable information, practical know how, and refreshing in the basics of several subject matters such as math, it was fantastic to see serious academics engaging with popular culture in this way. Thank you very much!

Exhibit 14



THE WALL STREET JOURNAL.

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JR: BEST ON THE STREET

An Early Report Card on Massive Open Online Courses

MOOCs promise to change the face of higher education, one giant classroom at a time. Here's what they're doing well—and how they can do better.



LINDSAY HOLMES/THE WALL STREET JOURNAL

By GEOFFREY A. FOWLER

October 8, 2013

If the MOOC movement were in college, it would be time for a freshman report card. The assessment: great potential, but still in need of remedial work.

MOOCs, or massive open online courses, went mainstream last year, heralded as the next great technological disruption in education. The big idea is that putting lecture videos and interactive course work on the Web will make it possible for top-notch university education to reach more students and allow for different styles of learning.

Already, MOOCs have shown they can attract students in huge numbers. The largest provider, Coursera, has drawn five million, and nonprofit provider edX more than 1.3 million. And while the majority are still based in the U.S., their learners come from all over the globe: Among edX's students, 9% came from Africa and 12% from India.

VIDEO CHAT

Ask the president of the University of Phoenix, the instructor of a popular Coursera MOOC and a Columbia University education researcher about how to get ahead using an online course in an interactive video interview on Wednesday, Oct. 9, at 8 p.m. ET.

- RSVP: How to Succeed in an Online Class (<http://www.spreecast.com/events/how-to-succeed-in-an-online-class>)

Big-name schools have also signed on to the idea. Top institutions—from Harvard University to the Massachusetts Institute of Technology to Stanford University—and some companies have joined with MOOC providers to put courses online, free to anyone who wants to access them. Now more schools, to expand their student base and potentially reduce the cost of an education, are building online courses that cost money but offer actual college credit.

For all that great potential, though, MOOCs still have a lot of room for improvement. Early studies highlight a number of problems with the learning experience in online courses that educators are scrambling to solve. Perhaps most important: Staring at a screen makes some students feel isolated and disengaged, which can lead to poor performance or dropping out altogether. Often, more than 90% of people who sign up for a MOOC don't finish, though many come to online learning with a different intent than would students at a traditional university.

"In large part, the experience is very good, but we see that there are problems, and there are a number of things that can be done that have promise," says Anant Agarwal, president of edX. "We are not even close to the kinds of conclusions we want."

As educators sift through the research to see what works best and what needs to be shored up—or scrapped—here are some of the most important lessons they've learned.

VIDEOS: INNOVATION IN EDUCATION



- Teacher's Top Five Tech Tips (<http://online.wsj.com/video/teachers-top-five-tech-tips/B1645AB6-8604-4604-9C3F-818E158E3A47.html>)
- A High School Without Textbooks (<http://online.wsj.com/video/a-high-school-without-textbooks/AED6577F-5846-4214-A00E-B2FF469DC809.html>)
- Can Games Help Improve Education? (<http://online.wsj.com/video/can-games-help-improve-education/5B39DC78-5DC5-448D-9DEB-DEDD8F1A67BC.html>)

People Need People: Interaction Matters

For all but the most self-reliant, online learning can be isolating. Perhaps the largest challenge MOOCs face is that students lose interest when they don't feel engaged.

"The most important thing that helps students succeed in an online course is interpersonal interaction and support," says Shanna Smith Jaggers, the assistant director of Columbia University's Community College Research Center. She has compared online-only and face-to-face learning in studies of community-college students and faculty in Virginia and Washington state. Among her findings: In Virginia, 32% of students failed or withdrew from for-credit online courses, compared with 19% for equivalent in-person courses.

Some instructors help students feel connected by recording audio comments on assignments instead of writing them. Others record a fresh update video about what's going on in the course each week. Then there are motivational messages. At Coursera, when students have work that needs to be done, the company sends them emails congratulating them on what they've already completed as a gentle nudge to keep going, says co-founder Andrew Ng. The company tried notes that simply reminded the students about what was due, but they weren't as well received.

JOURNAL REPORT

- Insights from The Experts
(<http://blogs.wsj.com/experts/category/leadership/>)
- Read more at WSJ.com/LeadershipReport
(<http://online.wsj.com/public/page/journal-report-leadership.html?mg=inert-wsj>)

UNLEASHING INNOVATION: EDUCATION

- What 'Angry Birds' Can Teach Students
([/articles/SB100014241278873246656045790810309163126394](http://articles.SB100014241278873246656045790810309163126394))
- A Look at College of the Future
([/articles/SB10001424127887323527004579079673280705960](http://articles.SB10001424127887323527004579079673280705960))
- Surprise! You Earned a Degree
([/articles/SB10001424127887324123004579057080163126394](http://articles.SB10001424127887324123004579057080163126394))
- Read More from the Education Report
(<http://online.wsj.com/public/page/journal-report-leadership.html?mg=inert-wsj>)

Adding manpower is another potential solution. In trial courses with San Jose State University that offer students college credit, MOOC provider Udacity hired mentors who stayed on top of students. "They are sort of your online mother," says Ellen Junn, the provost of San Jose State.

Many experiments being developed at traditional schools involve blending online and offline learning, sometimes called flipped classrooms. Students watch lectures online at home, and then come to class to work on projects and interact with faculty. There's some evidence that such hybrids can even improve student performance in traditional in-person

classes. One fall 2012 test by San Jose State and edX found that incorporating content from an online course, Circuits and Electronics, into a for-credit campus-based course increased pass rates to 91% from as low as 55% without the online component.

Blended classes may well be the future of MOOCs. "We do not recommend selecting an online-only experience over a blended learning experience," says Coursera's Mr. Ng.

Even something as simple as having skin in the game can make students feel more engaged. Most MOOCs are free, so students don't feel a financial bite if they drop a course or perform poorly. Coursera found that students who pay \$30 to \$90 for the company's Signature Track identity-verification program, which confirms that they took a course and passed, are substantially more likely to finish the course.

Don't Just Sit There: The More You Talk, the Better You Do

One way to provide personal interaction at mass scale is to get students talking to each other. Several studies suggest that many students who spend more time contributing to course discussion forums end up performing better. More than answering specific questions, the boards send a message, says Mr. Ng: "You are not alone."

A study of the online-only version of edX's course Circuits and Electronics offered in the spring and summer of 2012 found a mild correlation between the number of posts people made in the discussion forum and their final grades. Some 52% of the students who earned a certificate for the course were active in discussion forums, according to the study by the Teaching and Learning Laboratory at MIT and Andrew Ho, an associate professor at Harvard.

The question, says Lori Breslow, director of the MIT laboratory, is why some students are active on forums but most aren't. "We don't know the answer to that question," she says.

Boring, Boring, Boring: Long Lectures Don't Cut It

Successful MOOCs have figured out that students can't simply sit and listen to a long lecture. They break up lessons with quizzes and problem sets that must be completed before students can progress. In the study of the online version of Circuits and Electronics, researchers found that time spent on homework was the largest predictor of positive grades—more than time spent watching videos or reading. Among comparable students, one additional hour spent on homework across the whole course, with all other factors equal, meant a 2.2-point increase in total score on a 100-point scale (with a 60 required to pass).

MOOCs also have to figure out how to compete with the distractions of home life. The most students watch edX videos between midnight and 2 a.m., the organization says. Educators have to be sure that their lecture is compelling enough to keep students awake (and away from the refrigerator).

Along those lines, a study of edX student habits by Philip Guo, assistant professor of computer science at the University of Rochester, found that certificate-earning students generally stop watching videos longer than 6 to 9 minutes. The median time they spent watching a 12- to 15-minute video: about 4.4 minutes.

All of which means MOOCs challenge professors to rethink how they teach. "Organizing the course around exercises and mental challenges is much more effective than around lectures," says Udacity CEO Sebastian Thrun.

One Size Doesn't Fit All: MOOCs Don't Work For Everyone

It runs counter to the access-for-all mission of MOOCs, but evidence is mounting that online learning doesn't work for all students. The Columbia study of Washington community-college students found that all students performed less well in online courses than in face-to-face ones, but the gap was even wider among those with lower GPAs, men and African-Americans.

Some MOOC tests that target troubled students haven't turned out well. This spring, San Jose State paired with Udacity to offer several for-credit courses online to high-risk students. Among students in those courses, pass rates were between 24% and 51%—much lower than the typical in-person pass rates of between 46% and 76% for a normal student population.

"It is not just the professor who sets up the learning environment," says Ms. Junn, the provost. "It is also characteristics of the students that determine the amount of learning that occurs."

One reason some of the high-risk students, including some in high school, might have underperformed is that those from disadvantaged backgrounds didn't have access to broadband Internet access and personal computers at home. "They are not as familiar with using the technology," says Elaine Collins, associate dean of San Jose State's College of Science, who conducted a study of the university's experience.

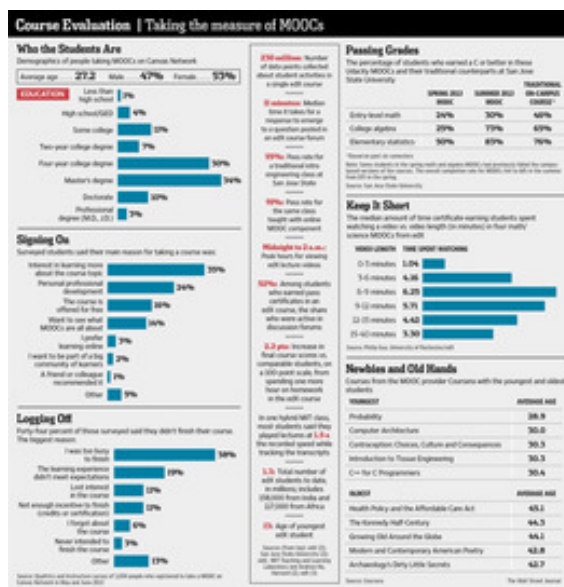
From the spring experiment, San Jose State says it learned it needed to better prepare students for MOOC learning. Some instructors have made students begin with self-assessment surveys and videos. They asked, " 'What do you think it takes to be successful in online education, and do you feel that you are ready for it?' " says Sandra DeSousa, a math lecturer who taught one of the San Jose State MOOCs. Asking those kinds of questions "improved the engagement right off the bat."

The school's MOOCs did much better on a second attempt, in the summer semester, though they were open to a wide range of students—not just high-risk ones. Some researchers have suggested colleges might screen participants for signs they can do well in for-credit online courses, perhaps even barring students from enrolling until they earn a certain grade-point average or take an online-learning workshop.

What the Numbers Show: MOOCs Can Teach Humanities, Too

Many popular MOOC sites were created by scientists. To the surprise of many, the sites are also useful for teaching poetry. "There was a real question of whether this would work for humanities and social science," says Coursera's Mr. Ng, who is also a Stanford computer-science professor.

Now courses in psychology and philosophy are among Coursera's most popular, and student feedback and completion rates suggest that they work as well as ones in math and science. "Whenever someone says you can't teach X online, half the time someone is already doing it," says Mr. Ng.



There is at least one major holdout:

Udacity, which has drawn more than 1.6 million students, doesn't have humanities offerings, focusing instead on technical courses. And there are indications that online students struggle a bit more in English and social-sciences courses than in math and science ones. In the Columbia study of community-college students, Ms. Jaggars found online grades were lower in English than in natural-science classes when compared with grades in in-person classes. (The score differences may reflect the fact that many students with anxiety

about math and science avoid online classes in those subjects.)

What remains a challenge are capstone projects like a senior thesis and very subjective exams, which are impossible for a professor or even a team to grade on a mass scale. Some MOOCs are experimenting with peer grading and self-assessment, but results have been mixed, and plagiarism is an issue.

Nonetheless, you can learn almost anything online—if you put your mind to it. Software entrepreneur Jonathan Haber has an undergraduate degree, but decided to dedicate a year to determining if MOOCs can provide the equivalent of a traditional liberal-arts degree. So far, the 51-year-old has taken 24 MOOCs, from statistics to philosophy. "Each course has its own strengths and weaknesses, and I haven't seen any one discipline that's stronger than any other," he says. "I haven't had any courses that are clunkers."

Mr. Fowler is a deputy technology editor for The Wall Street Journal in San Francisco. He can be reached at geoffrey.fowler@wsj.com and on Twitter @geoffreyfowler.

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