

Article

# Value and Pricing of MOOCs

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**Abstract:** Reviewed in this article is the potential for Massive Open Online Courses (MOOCs) to transform higher education delivery, accessibility, and costs. Next, five major value propositions for MOOCs are considered (headhunting, certification, face-to-face learning, personalized learning, integration with services external to the MOOC, marketing). Then, four pricing strategies for MOOCs are examined (cross-subsidy, third-party, “freemium”, nonmonetary). Although the MOOC movement has experienced growing pains similar to most innovations, we assert that the unyielding pace of improvements in network technologies combined with the need to tame the costs of higher education will create continuing demand for MOOC offerings.

**Keywords:** educational technology; policy in education; assessment; financing higher education; MOOCs; online learning

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## 1. Introduction

### 1.1. The MOOC Movement

A Massive Open Online Course (MOOC) is a type of online course characterized by large-scale student participation and open access via the Internet. The “Open” part of the MOOC acronym signifies “free” to many people—as in “free to students”. The growing college tuition bubble and the opportunities emerging from an ever strengthening, and expanding global reach, formed by the commodity Internet are among the factors that have led to the growth of MOOCs.

MOOCs often are sponsored and financed by major universities and corporations through partnerships leveraged by venture capital [1]. After the modern MOOC movement started with three courses at Stanford in 2011, over 500 universities were offering 4200 MOOC courses that served 35 million students by late 2015 [2]. Udacity, edX, and Coursera are among the most recognizable MOOCs providers due to their history of early delivery during the MOOC movement, their level of market penetration, and the large numbers of MOOC participants that they enroll. Yet, some MOOC providers, such as Udacity, also are for-profit education providers, which is a challenge to the simple “open” and “free” characterization of MOOC education providers. As we assert in the remainder of this article, “accessibility over global networks” and “scale due to the technology of delivery” perhaps are better ways to describe many MOOC offerings. Nothing is free.

### 1.2. Need for an Examination of Business Models for MOOCs

Unbounded enthusiasm almost always seems to precede evidence about the quality and performance of an innovation. And, so it seems with the nascent MOOC movement. Certainly,

many dreams are realized by passion alone. However, as renowned polymath U.S. statesman Benjamin Franklin wrote, “If passion drives you, let reason hold the reins” [3] (p. 30).

The expectation of zero costs to students for MOOC access and participation is an attractive feature to many students, educators, administrators, and policy-makers, most of whom are struggling with extreme financial strain. You must have been deep in an Amazon rainforest studying isolated indigenous tribes not to have felt the draw that expectations of zero costs that MOOCs have created in higher education. Yet, there is no denying the harsh reality that MOOC development and maintenance incur substantial costs [4]. MOOCs, commonly advertised as free to students, actually are subsidized heavily by universities and venture capitalists, and, as some analysts assert [5], some even lose money.

It seems as though higher education and the public at-large still are lounging through a honeymoon period with the MOOC movement. To avoid any irrational exuberance about MOOCs, the speculative fervor felt about MOOCs should be tempered with sober information about nature and performance of the business models that MOOCs follow.

According to Osterwalder and Pigneur [6], a business model is nothing else than a representation of how an organization makes, or intends to make, money. Components of a business model include infrastructure, customers, offerings of value, revenue streams, and finances. The commodity Internet and accumulated programming assets constitute the infrastructure for MOOCs. Revenue streams for MOOCs evolve as organizations offer information about how MOOCs add value to fulfill the students' educational needs as well as investors' requirements for financial returns. Central to a business plan are *value propositions*, *i.e.*, an offering about how a product or service creates value, and *pricing strategies*, *i.e.*, how revenue is generated in exchange for the value delivered. Value propositions and pricing strategies work hand-in-hand to sustain a business by clarifying how revenue is generated that covers its expenses to yield a profit or a return on investment.

### 1.3. Focus of This Article

Can MOOCs become sustainable economically and financially? Can higher education monetize the costs of MOOCs so that they are justifiable, especially during a tight budget era? Strategies are outlined in the remainder of this article for establishing possible value propositions and pricing strategies for MOOCs, with the recognition that adoption of MOOCs could disrupt the business models that modern universities follow. Our aim is to promote deliberation about the promising MOOC movement, not wariness. As Dejong [7] cautioned:

Spending money on experiments isn't categorically bad. If not for fearless financial backers, we wouldn't have the personal computer, or the printing press, both of which have been great boons to the academic world. MOOCs are still developing, and since we don't know yet whether they'll succeed in facilitating learning, careful investment is healthy.

The subsequent sections of this article focus on four topics. First, the opportunities and challenges presented by the MOOC movement are characterized as part of the evolutionary turmoil that many disruptive innovations cause. The disruptive nature of MOOCs could threaten the very roots of the business model that guides most higher education institutions. Next, five categories of value propositions for MOOCs are delineated. Then, four pricing strategies are described that could generate revenue from value delivered to customers and investors. And, last, speculation is offered about the future of the MOOC movement. Undergirding this speculation is the optimistic assumption that the imperative to reduce costs and support the quality of higher education eventually will drive technological and financial progress to make MOOCs sustainable.

In a position paper motivated by an aim similar to our own paper, Liyanagunawardena, Lundqvist, and Williams [8] reviewed literature from SCOPUS, ISI Web of Knowledge, and Google Scholar, from MOOC workshops and conferences, and from various active MOOC development projects to delineate business models that could promote sustainability of MOOC courses. They consider sustainability by analyzing the strengths, weaknesses, opportunities, and threats of each business model. They

concluded that, despite widespread exploration and implementation of MOOC courses, a concrete economic viability model for MOOCs has not emerged. Perhaps MOOCs are so new and novel that the viability of models has not been tested systematically yet.

Liyanagunawardena, *et al.* provided a more in-depth review of MOOC sustainability literature than we plumb in our current paper; rather, we, first, consider MOOC value propositions separately from pricing strategies to examine MOOC business models. And, second, we provide hypothetical and actual to exemplify the value propositions and pricing strategies that we consider.

## 2. The Itch That MOOCs Scratch

### 2.1. Opportunities and Challenges the MOOC Movement Presents for Higher Education

Many people view MOOCs as a technology fix for some of the financial problems facing higher education institutions and students. The expectation of zero costs to students for MOOC access and participation is a compelling draw for many students, educators, administrators, and policy-makers. Yet, nothing really is free, is it? Everything of benefit costs someone something, even if these costs seem, at times, hidden to those consuming the benefits. It is true “There is no such thing as a free lunch”.

MOOCs are exciting the innovative spirit in higher education. At the same time, the MOOC movement is baring a latent sense of fear of change in the higher education community. Although MOOCs could increase access to learning opportunities, MOOCs also could become potentially disruptive technologies with the capacity to “creatively destruct” current, familiar and, common products and value networks in higher education. Nearly one-half of respondents to the 2013 *Inside Higher Ed Survey* of College and University Chief Academic Officers strongly or very strongly agreed that MOOCs could threaten “the business model of my institution” [9]. Although “disruption”, “destruction”, and “threaten” sound like hyperbole, the shift toward scaled, low-cost, online learning offered by MOOCs could mean that a reconfiguration is imminent in the conceptualization and delivery of online learning.

### 2.2. The Forces of Creative Destruction Affecting All Economic Institutions

In a now-famous, classic, *Capitalism, Socialism, and Democracy*, Austrian economist Joseph Schumpeter wrote over 70 years ago that there is a “process of industrial mutation . . . that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism” [10] (pp. 82–85).

Schumpeter viewed entrepreneurship and competition as the fuel for a ruthless, Darwinian struggle for economic survival. Costs—and that includes jobs and cherished, traditional ways of doing things—are eliminated without sentimentality, mercy, or pity if those costs do not lead to bottom-line profits and financial returns for investors.

Companies that fail to meet consumers’ demands at competitive prices lose customers and, eventually, wither and die. The economy’s “invisible hand” shifts resources from declining sectors to more valuable uses as workers, inputs, and financial capital seek their highest returns.

Schumpeter described capitalism as “the perennial gale of creative destruction” [9] (p. 85). This gale blows persistently. By our count, only five of today’s 100 largest public companies were among the top 100 in 1917. Of the 500 companies originally making up the Standard and Poor’s 500 Index in 1957, only 74 remained on the list through 1997. And of these 74, only 12 outperformed the Standard and Poor’s 500 Index itself.

Schumpeter’s “perennial gale” is an immutable, an evolutionary, and, at times, a revolutionary force in all markets. These forces seem likely to affect the higher education industry just as they affect other industries, even though higher education has resisted change obstinately to this point. However, the rate of closing or acquisition of private colleges in the United States doubled between 2008 and

2011, and, the rate of mergers among all colleges in the United States more than tripled between 2006 and 2009 [11]. The market moves on its own.

### *2.3. Conditions That Could Evoke Creative Destruction of Higher Education*

Confluences of technological and social trends that are coupled with financial pressures make this a critical moment in history for modern higher education. The potential for creative destruction in the higher education sector is increasing.

The costs of attending college have soared remarkably. Since 1985, the costs of all consumer goods in the U.S. doubled by 2012 [12]. Over the same period, the cost to students of a college education rose five times greater than the rate of cost increase for all consumer goods.

The incomes of many American households have lost ground. In 2013, real median household income actually was 8% lower than in 2007, the year prior to the latest recession in the U.S. According to the Board of Governors of the Federal Reserve System in the U.S. [13], the gap between household income and college expenses has been spanned by loans to students that in early 2016 totaled over \$1.3 trillion.

The size and ramifications of student loan debt are alarming. For instance, in Pennsylvania, one of the U.S. states in which both of us have worked in higher education, during 2014 70% of graduates of Pennsylvania's four-year public and private colleges and universities were student loan debtors (ranked third among U.S. states), with an average debt of \$33,264 (also ranked third) [14]. The National Association of Consumer Bankruptcy Attorneys has concluded that the student loan "debt bomb" could precipitate an economic crisis on a par with the recent home mortgage fiasco in the U.S. [15].

Some of this student loan debt certainly is driven by low degree completion rates and consequent inability to turn degree completion into labor market advantage. For example, the six-year degree completion rate for a 2009 national cohort was 53% by 2015 [16]. It should be no surprise that only one-half of nationally representative sample of approximately 30,000 higher education alumni in the U.S. "strongly agree" that college is worth what they spent for it [17].

Colleges and universities in the U.S. face slow growth of research funding. Risk and uncertainty plague public budget allocations for higher education. Traditional brick-and-mortar colleges and universities compete for student tuition dollars with trade and technical schools and with for-profit universities as more students consider alternatives to the rapidly increasing costs of attending mainstream four-year higher education institutions.

Access to global networks to deliver instruction reduces the advantage of location that allowed some colleges and universities to carry on the tradition to dominate their formerly geography-bound markets for students. Also, alternative certifications such as micro-credentialing through "digital badges", and academic credit for prior experience document and reward learning that occurs outside accredited higher education institutions. In a 2015 survey of 114 human resources managers serving various industries [18], only 5 percent said they were not interested in digital badges at all. However, 62 percent of these managers reported interest in badges, but, at the same time, believed that they needed to learn more about badges.

### **3. Value Propositions**

How can MOOC adopters generate revenue to cover costs or, if the adopter expects a profit or its investors require a financial return, yield revenue greater than its costs? What is a sustainable business model for MOOCs?

A business model starts with a value proposition—that is, an offer and often a presumption of benefits that will result from a good or service purchased. In this section of our article, we outline six possible value propositions for MOOCs, many of which often are outlined piecemeal by analysts. Then, we follow in Section 4 with pricing strategies associated with these value propositions.

### 3.1. *Headhunting*

MOOCs could offer services to employers that provide information about skills of MOOC students. This “headhunting” service would make labor markets, which notoriously hold incomplete and lagged information, work more efficiently. MOOCs could make student performance and portfolios available. Also, MOOCs could screen the best performers for referral to potential employers. Both students and employers might have an incentive to pay for this service.

Coursera announced in 2012 an employee-matching service, called Coursera Career Services [19]. Coursera MOOC participants, and the universities with which Coursera partners, could opt-in to allow Coursera to provide hiring companies lists of students who live in particular geographies who performed well in specific courses. For example, a company could request a contact list populated with students in the Miami area who earned certificates through the Coursera/Penn State course, “Maps and the Geospatial Revolution”. Companies pay a flat fee for each student on the list provided, with typically 6% to 15% of revenues from these fees returned to the universities offering the course from which student performance information was gleaned [20].

### 3.2. *Certification*

MOOCs could certify student course completion or performance through academic credit or by examination. Interestingly, MOOCs also could offer this service independent of MOOC participation. Mastery learning could occur in many ways. Through formal education. Through work experience. Through self-organized learning. MOOCs might be indifferent about where the learning occurred, but could compete to receive fees making valid and reliable assessments of competencies held by students. A number of MOOC providers offer certificates of completion for MOOC courses.

In 2014, Penn State became one of a handful of universities offering academic credit for MOOC completion. Tuition for access to a MOOC, “The Social Science of Wrongful Convictions”, was set at approximately 50% of the tuition for a course offered through Penn State’s regular curriculum for resident instruction. According to Chris Long, at that time an associate dean of Penn State’s College of the Liberal Arts,

While learners will access lectures and videos in the Coursera MOOC, students in the credit portion of the course will complete more rigorous readings and assignments, and have their work evaluated by the instructor and teaching assistants . . . The reduced tuition is designed to make the course more accessible to MOOC participants and a wider public . . . But making the course less expensive won’t cheapen the educational experience. We’ve committed significant resources to ensure that the credit course is staffed with an excellent corps of teaching assistants committed to working directly with registered students [21].

### 3.3. *Premium Learning Services*

Another approach is for MOOCs to charge for premium learning services. Some students prefer to complete all or some of a MOOC. Yet, some MOOC participants could pay for more personalized resources than a massively enrolled course might offer.

A number of schemes for premium learning services are possible, but these schemes have not been assessed formally yet. Face-to-face courses might attract MOOC participants who desire opportunities to supplement their MOOC experience with interaction and direct contact with an instructor. Also, MOOC participants might want to receive matchmaking services that would create networks among like-minded or geographically co-located MOOC participants. These more personalized services might be sold by a MOOC itself, but entrepreneurs might offer these support services independent of a MOOC. This sort of spin-off would be similar to the creation of a large number of vendors who have developed courses and other services around, say, Microsoft products (e.g., firms offering courses to train people in the use of Microsoft Excel). We reveal more about premium services when pricing strategies are discussed in the next major section of this article.

### 3.4. External Services

Services external to MOOC delivery also could generate revenue for MOOC developers. MOOC developers could license entire MOOCs or proprietary back-end MOOC technology to alter and brand MOOCs for their own specific uses. Another possibility is the mining of information from MOOC operations for use in other markets. Registration elements provided by the MOOC registrant, course performance, various preferences revealed, and social networks created by MOOC participants could be linked to other public or purchased records. Consider the vast data already mined about individuals and market segments that could be linked to MOOC data. In this way, the MOOC makes money not by promoting learning, but by mining information from learners. Welcome to the world of big data.

Acceptance of sponsorships from organizations external to MOOC providers in higher education is another way to offer value. Such a value proposition is not far from current practices in the U.S. for accepting sponsorships tied to university athletic teams. For instance, many university athletic departments in the U.S. have contracts with Nike, a global firm that is well-known for its athletic wear. Nike gives products (e.g., athletic shoes) to sports teams in exchange for placement of a Nike logo on university athletic uniforms as a means for maintaining Nike brand recognition. Such a sponsorship usually does not include a direct university endorsement of a product, but brand recognition is promoted by co-location of brand images with university team jerseys, shoes, or visible stadium signage. Branding rights could be a strong value proposition that MOOCs could offer. In a similar way, organizations external to university MOOC providers could receive MOOC naming rights just as often happens when universities name academic buildings according to donors' wishes.

### 3.5. Use of MOOC Data for Marketing

A common theme among many university MOOC handlers and designers is the application of MOOCs to market higher education institutions. One hope often expressed is that, although a university's MOOC might be free to students, a MOOC can be a loss leader (*i.e.*, a product sold below cost to stimulate sales of other goods or services). Participation in a MOOC exposes participants to other attributes of a university, which they might, in turn, purchase. For example, MOOC participants might discover degree programs, merchandise, or other course offerings. Yet, use of this assertion as a justification for MOOCs bears careful assessment in practice, as certainly do other assertions about the benefits of MOOC development and delivery. We have yet to observe any systematic MOOC evaluation strategy or practice that has emerged that can guide MOOC practitioners.

Penn State University, for instance, delivered nine MOOCs in 2016 through Coursera (see the following list of Penn State courses at <https://www.coursera.org/psu>), an educational technology company offering MOOCs founded by computer science professors Andrew Ng and Daphne Koller from Stanford University. Developers of the Penn State MOOCs informed us that informal tracking of participants has revealed a surge of click-throughs from MOOC pages to academic program pages and to pages related to offerings by Penn State's World Campus (an online campus of Penn State that has operated since 1998 and that offers more than 90 online undergraduate and graduate degree and certificate programs in partnership with Penn State academic units).

## 4. Pricing Strategies

Embedded in the analysis of six possible value propositions for MOOCs that we reviewed in the previous section of this paper are various pricing strategies for MOOCs. In *Free: The Future of a Radical Price*, Anderson [22] describes pricing strategies that are capturing attention in the digital economy and offers some possibilities that could be adopted for MOOC pricing: cross-subsidy; third-party; "freemium"; and nonmonetary. In a sense, the digital economy can be viewed as a "gift" economy because network technologies have reduced the marginal cost for delivery of digital information to virtually zero. This technological change in the marginal costs of information delivery has created both opportunities as well as challenges for higher education institutions as MOOCs are adopted.

#### 4.1. Cross-Subsidy

In this pricing strategy, MOOCs administrators follow the common dictum, “Borrow from Peter to Pay Paul”. MOOCs have design, development, implementation costs, which they must cover in some manner. Under the cross-subsidy pricing model, MOOC costs are paid by using revenue earned from some other product or service or from revenue that is reallocated from some other operation in the MOOCs’ organization.

For instance, funds earned through a university’s revenue generating academic program is used to develop and operate a university’s money-losing MOOC. Or, funds earned by a university press are devoted to MOOC operation. In this way, “cash cows” can support MOOCs. Using this approach, some funds originally allocated to, say, a university’s police services and to grounds keeping and beautification of a campus might be reallocated to MOOC operation, reducing funds then available to policing and landscaping. In this way, a fixed and constrained budget is leveled maintained by reallocations based on priorities. The pain of budget loss is delivered to some so that a MOOC can operate.

Some variations in this pricing alternative are available. One possibility is to require payment by some MOOC participants, and use their payments to subsidize participants who are not charged. This is a model that often is used in some international conferences in which participants from developed countries pay a conference fee, while participants from developing countries attend without a conference fee.

#### 4.2. Third-Party

Under this pricing strategy, neither MOOC operators nor MOOC participants have any or all costs. A third party covers some or all costs. This strategy is applied in, for example, commercial radio. Advertisers pay a fee to radio station operators, who sell advertising to many advertisers to cover costs and, if ad revenues are large enough, to extract a margin of profit. Radio listeners listen to radio freely over airwaves. They “pay” by listening to ads periodically sprinkled through radio broadcasts and targeted to the segments of markets they occupy.

A third-party pricing strategy for MOOCs probably requires scale, which MOOCs with six-figure participant counts (which describes relatively few MOOCs), can deliver because low revenue ad views and potentially high revenue ad follow-ups by MOOC participants typically would snag a low incidence of viewers.

Another third-party strategy involves direct subsidies of MOOC implementation. For example, the Georgia Institute of Technology teamed with Udacity in 2013 to deliver an online master’s degree in computer science [23]. AT&T, the third party in this effort, earmarked \$2 million to subsidize the degree program’s first year. The subsidy was meant to ease MOOC start-up costs for Georgia Tech and Udacity and, at the same time, to increase the supply of students for science, technology, engineering and mathematics jobs. Third-party investment allowed the students’ cost for the program to total approximately \$7000, which is quite a bargain considering that non-Georgia residents pay about \$40,000 for completion of Georgia Tech’s existing master’s degree in computer science. According to Rivard [24], “Since Georgia Tech created its traditional on-campus master’s degree program in 1991, fewer than 2000 degrees have been awarded, according to the Board of Regents of the University System of Georgia. Under the new effort, that many could be awarded in a single year”.

#### 4.3. Freemium

The Freemium pricing strategy involves linking a sequence of related products, one free and the other premium . . . or Freemium, a word that seems to have been coined by a venture capitalist, Fred Wilson [25]. In the Freemium approach, one product is provided at no charge to the buyer. Another product, one that complements or extends the free product, is sold at a positive price to the buyer.

The Freemium price strategy is related closely to what economists call “tying”—that is, when a buyer is forced to purchase a slow-selling product along with a fast-selling product. The coercion involved in tying usually is illegal in most economies. However, the Freemium pricing strategy is structured more as a soft bundling of products that are linked only by marketing, not by requirement.

Under the Freemium pricing strategy, MOOC enrollment is free. However, to receive premium services (e.g., face-to-face classes, contact with an instructor, brokering of MOOC participants with potential employers), the MOOC participant must pay. According to Porter [26], the Freemium approach is the most common pricing strategy used among MOOCs.

#### 4.3.1. Payment for Premium Service

Udacity, a for-profit online education provider using MOOCs, and Google offer a Senior Web Developer Nanodegree in both paid and free versions [27] which are identical. However, only the paid version yields a certificate of completion. Coursera’s Signature Track program [28] also yields a verified certificate of completion for between \$30 and \$100. By 2013, Coursera had earned \$1 million in revenue from Signature Track sales to approximately 25,000 students, which rose to \$4 million within five months [29].

A rule of thumb often applied to digital products is that 5% of the users of a product subsidize the remaining 95%. However, the 5% who pay must see sufficient value in the premium services offered to justify a purchase. A MOOC that wishes to adopt payment for premium services probably should market test thoroughly the premium services offered to ensure that MOOC customers view these services as valuable.

Not all customers might view the same premium value to services described by the MOOC as premium. For instance, a MOOC could offer for extra payment the right of a student to contact or have a discussion with the instructor or a team of student/helpers. The authority to contact an instructor or a team of students/helpers might not yield the same value for all MOOC participants.

#### 4.3.2. Deferred Conditional Payment

One variation on the Freemium pricing model could allow enrollment in a MOOC initially for no charge, but, if the participants persist in the MOOC after a particular number of days, the participants are billed. This approach is similar to “Crippleware”, the term used often in software sales to indicate a product that is free initially, but that is disabled after the customer has used the product through the end of a trial period.

This deferred conditional payment approach is used in many online learning ventures. For example, DataCamp, a provider of online learning of programming skills, offers free access to the first chapter of its premium courses. A monthly fee is required for full access to DataCamp’s premium courses [30]. We are not aware of MOOCs that implement a deferred conditional payment plan.

#### 4.3.3. Refund for Timely Completion

Udacity offers a refund of 50% of tuition to students who complete nanodegrees within 12 months [31]. To contain costs for nanodegree delivery, Udacity outsources grading of student work to independent contractors who are paid \$50 per hour to assess approximately 15,000 student submissions per month. Reviewers with poor ratings from students are culled. Reviewers who remain are incentivized. Udacity reports that thousands of potential reviewers are wait-listed. Udacity reports that “The \$200 [per month] that we charge and the tuition reimbursement of \$100 [per month] when they finish is enough to pay for all of this and more” [28]. This variation on the Freemium pricing strategy specifically addresses the criticism that MOOC completion rates are low, sometimes 10% or lower [32], by using a financial incentive.

#### 4.3.4. Insurance for a Money-Back Guarantee

For certain programs of study (machine-learning engineer, Android developer, Apple iOS developer, and senior web developer) Udacity offers to return tuition if students fail to secure a job in their field of training within six months [33]. Students qualifying for this guarantee actually must complete their programs of study. In addition, students must pay \$100 more per month above base tuition as something of an insurance premium to hedge against failure to secure a training-related job.

#### 4.4. Nonmonetary

Implementing this pricing (or, perhaps, non-pricing) strategy, MOOC participation is free, without any monetary return expected. A MOOC under this strategy is a gift, freely given. Such a gift economy, such an act of altruism is difficult to imagine in a climate of cost-consciousness.

Perhaps, though, a nonmonetary outcome might be expected. For instance, the Red Cross might offer for free a MOOC that teaches principles of first aid. The Red Cross would not benefit directly from this MOOC in terms of new revenue. Although the Red Cross would pay the costs of MOOC operation, other parties who are recipients of competent first aid treatment derive benefits, not the Red Cross. The Red Cross conducts the MOOC for the public good without receiving private gain. This outcome seems like altruism, but this outcome matches the Red Cross's mission.

A variation on this nonmonetary pricing strategy is to require voluntary labor in exchange for access to a MOOC. For example, in exchange for access to a MOOC about principles of computer programming in the python language, the MOOC participant might agree to teach 10 other people about how to program in python or to answer a quota of technical questions about python programming in a user support forum.

### 5. Future of the MOOC Movement

Gartner, an information technology consulting firm, has coined the term, "hype cycle", to represent the maturity, adoption, and social application of networked technologies and innovations [34]. First in the cycle, a potential technology breakthrough occurs. Often, commercial viability is unproven at this stage, yet significant publicity is triggered. This publicity leads to early adoption by some users and curiosity from others. Disillusionment follows and interest wanes as practical problems with implementation become evident, spurring product improvements by entrepreneurs as well as pruning of the number of products in the market and elimination of some producers in something of a survival-of-the-fittest competition. Next, as knowledge and experience improve, actual benefits and best processes become clearer. A plateau of productivity, then, is reached as mainstream adoption occurs.

Our assessment is that the MOOC movement currently is moving toward a "plateau of productivity" in the Gartner hype cycle. After a period of great enthusiasm for the potential for MOOCs, a more realistic appraisal is emerging that MOOCs are not a panacea for access, cost, and delivery problems that ail higher education. For instance, a lower percentage of respondents in 2013 compared with 2012 believed that MOOCs presented a sustainable method of offering online courses in an annual survey of more than 4700 colleges and universities performed by the Babson Survey Research Group [35]. Yet, with waning exuberance, also we are observing the emergence of consistent, regular MOOC applications with high enrollments over a wide diversity of topics.

We believe that the inexorable march of networked technologies that promote learning, facilitate innovation that eliminates geography (particularly distance as an impediment to acquiring learning), and reduce unrelenting cost pressures that favor movement to scale in learning delivery will lead to adoption and acceptance of MOOC or solutions for higher education. A major tension surrounding the adoption of MOOCs is how to reconcile academic critiques of MOOC concepts, technologies, designs, and instructional quality with the market forces that, for the most part, focus on accessibility, scale of delivery, and market rationalization.

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