

SUBSCRIBE

The Evolution of Blockchain Education

Colin Harper

10:01 AM
JUNE, 07 2018

With the creation of Bitcoin and its blockchain, Satoshi Nakamoto introduced an entirely new practical application for cryptography, unearthing an unexplored area for computer science and technological development. In the years following the technology's inception, community demand for instructional information and educational materials began to rise. Soon after Nakamoto bootstrapped the network, coders would look for guidance on developing the software, business heads would look for information on Bitcoin's financial ramifications, and enthusiasts would look for ways to support the network through mining and investing.

Early adopters flocked to various online platforms to answer each other's questions, share info and problem solve together. As the market began to mature, new coins were introduced and different forms of smart contracts entered the scene, demand for information continued to grow.

Over time, a growing user base stepped in to supply the educational fodder to satisfy this demand. Online resources expanded outside of the forums that formed the rockbed of the movement, as instructional videos, white papers and other articles, and even informal online accreditation courses were served up as part of many enthusiasts' pedagogical diet.

It wasn't until 2013 or so that universities began offering formal courses on blockchain technology, with the University of Nicosia in Cyprus leading the pack. Soon after, top universities in the U.S. and around the world formulated curricula on blockchain development/coding, Bitcoin's origins, and the emerging fields of cryptocurrency law and finance.

In the realm of education at least, these courses brought a certain institutional legitimacy to the formerly niche movement. But they established a dichotomy between crypto's anti-establishment roots and a sweeping mode of adoption that persists through mainstream culture; whereas in the beginning, the burden of education was supported by community-centric efforts, now, formal institutions are taking up the reins.

What we have going forward, then, is a clear divide between those early adopters who built a library of online knowledge on the foundations that Nakamoto left from 2008 to 2010 and their traditional, collegiate counterparts.

As the blockchain continues to write its way into university syllabi across the world, the divide begs the question, "What is accreditation for an industry that, until recently, has supported itself without outside authorities?"

The Era of Self-Education

“ *Many of these then-new resources were born from necessity as much as curiosity.* ”

Shortly after Bitcoin's debut, Nakamoto created bitcoin.org and bitcointalk.org, websites for information on the new digital currency and its intrinsic technology, the blockchain. The two would become invaluable educational resources for Bitcoin's earliest early adopters, and even today, they are go-to repositories for blockchain information.

Satoshi cemented these sites as the foundation of Bitcoin's pedagogical canon, creating them as the first educational tools for an entirely new financial system. In the beginning, they were among the few places early adopters could go to sharpen their knowledge on the subject.

Fledgling enthusiasts would flock to bitcoin.org to consult its resources. Per Bitcoin's decentralized, peer-driven modus operandi, the website is community supported and relies on donations to subsist. It features an extensive FAQ section, “Getting started with Bitcoin” and “How does Bitcoin work?” guides, information for developers and businesses, and even a vocabulary list for must-know terms.

For anything in between, community members could turn to bitcointalk.org to engage in open-forum discussions with other adopters. Like a virtual symposium, the website became the hub for blockchain discussion. Over the years, users have enriched each other's understanding

of cryptocurrency with millions of posts on thousands of topics. Discussions range from rudimentary questions regarding block sizes to complex topics on maintaining mining rigs.

Despite the popularity of these sites, as the crypto space grew, so too did its educational environs. Bitcoin.org began chronicling a handful of these in its resources section as members of the community laid the foundations for a second-generation of crypto-knowledge bases. Launched in April of 2010, one such resource, [Bitcoin Wiki](#), became the community's encyclopedic arm, consolidating much of the disparate information that had circulated to that point.

Meetups also began to spring up in cities around the world. Small gatherings of half a dozen Bitcoiners would gather in bars or common spaces where people could ask questions, share ideas and listen to guest speakers on various blockchain-related topics. Over a short period of time, those numbers grew as more people became curious about cryptocurrencies.

Early talk shows and podcasts like *The Bitcoin Show*, *Let's Talk Bitcoin!* and the *Bitcoin Knowledge Podcast* were among the space's earliest literal mouthpieces. The podcasts perked up the community's collective ear as its first founts of auditory education. [Khan Academy](#), a nonprofit educational website, played a role on this front, as well, releasing instructional videos alongside its own series of FAQs.

Many of these then-new resources were born from necessity as much as curiosity. Outgrowing its original digs, the infant movement needed to be outfitted with something that would help it with its growing pains. The

community had learned to walk; next, it needed to teach itself how to run. And it had to learn fast, because by 2011, altcoins had entered the race.

With Altcoins, the Search for More Knowledge

‘ *It would take more than just developers swapping tips. It would take educators, media personnel and the coders who had curated the movement to advance it further.*

Two years and some change after Bitcoin was founded, Namecoin, cryptocurrency’s first altcoin, was created. Toward the tail end of 2011, Namecoin would be joined by a few now-defunct alts and Litecoin, Bitcoin’s most well-known fork.

All of these early altcoins were source-code forks, offshoots of the Bitcoin network that tinkered with its code in their own ways to deliver variations of its consensus mechanism, inflation rate, circulating supply and other parameters. With them, the ecosystem not only expanded in volume of coins, it also expanded technically, introducing the forks and all the new hashing algorithms and technical developments that came with it. The ecosystem was evolving, and it was no longer just about Bitcoin.

Cryptocurrency was becoming an industry, with blockchain technology as its backbone.

A growing ecosystem meant growing interest. What previously was confined to the dark web's illicit marketplaces began attracting developers, entrepreneurs and enthusiasts who were serious about blockchain technology's widespread application. These visionaries began lifting the movement out of the obscurity of the internet's shadows and into the light of the mainstream.

Shedding this light would require more information than was readily available to keep it kindled. With the technical advancements that came from a budding industry, Bitcoin Wiki, Bitcointalk and bitcoin.org were no longer sufficient to supply the expanding demand for knowledge on blockchain technology and its newcomers. It would take more than just developers swapping tips. It would take educators, media personnel and the coders who had curated the movement to advance it further.

Mihai Alisie and Vitalik Buterin seemed to bind all these perspectives into one when they founded *Bitcoin Magazine* in 2011, launching the first editions in 2012. Now the longest-running publication devoted to Bitcoin, blockchain technology and the cryptocurrency space, *Bitcoin Magazine* set an industry precedent as its seminal editorial. The niche finally had its reader's digest, as the magazine's 22 prints dished out news, perspectives, guides and essays on Bitcoin and the emerging market at large.

What *Bitcoin Magazine* came to represent, then, was tangible growth and legitimacy. Whereas before, information came from volunteer-centric websites with loose organization, now there was clear literature on the subject. Serving a similar function yet obviously not nearly as popular, the

magazine became the industry's *Forbes* or *Wired* or a hybrid of both, a serious publication dedicated to legitimate discussion of blockchain technology and cryptocurrency.

Around this same time, the [Bitcoin Foundation](#) was gearing up its own operations. Founded in September of 2012, the nonprofit was created with the explicit purpose to “standardize, protect and promote the use of bitcoin cryptographic money for the benefit of users worldwide.” The operating body gave Bitcoin its first organizational face, a working group dedicated to educating not just individuals, but political leaders, institutional financiers, traditional media and all those who did not have a natural interest in the technology.

In general, 2012 became a critical juncture for cryptocurrency. The advent of new coins with their own blockchains, the founding of a cryptocurrency-specific publication and the establishment of a nonprofit that embodied all Bitcoin stood for all seemed to point toward a movement that was inching its way into the mainstream.

Coming out of the woodwork, Bitcoin and the industry it spawned drew new enthusiasts into their fold. They would proselytize soon-to-be-experts like Andreas Antonopoulos who, inspired by the promise of a decentralized and global financial system, would become Bitcoin evangelists with a knack for spreading the word. Antonopoulos [preached](#) the Bitcoin gospel at conferences and before governing bodies, and began writing extensively on the subject. By 2014, he had published *Mastering Bitcoin*, one of the first — if not *the* first — books to address Bitcoin and its blockchain in hard copy. By 2016, he would publish *The Internet of Money*, a collection of his talks on

Bitcoin and the thriving ecosystem that was developing around it. Antonopoulos would become the space's principal orator and author, an intellectual mouthpiece of sorts.

More than advocates, the likes of Antonopoulos became the informal intelligentsia of an evolving space. Lacking in what most would consider "accredited" informational sources, these advocates compensated for the lack of cogent, accessible resources on a technology that, for the technologically illiterate, is anything but. They garnered reputations as the industry's de facto experts, and along with a community of hardcore believers, they established a school of thought out of the nebulous knowledge of a nascent technology and the binaries and bits of cyberspace.

Fittingly — and for better or worse — these foundational members of the community decided to forgo traditional education to develop the decentralized space. Buterin received a two-year \$100,000 Thiel Fellowship for a white paper he wrote after dropping out of the University of Waterloo and traveling the world. The white paper is considered a genesis document for Ethereum, the first theoretical iteration of the platform that launched in 2015.

The decision to chase Ethereum's potential paid off. Ethereum's code, which was built to easily accommodate smart contracts and the decentralized applications (dApps) that come with them, opened a Pandora's box for blockchain utility. With Ethereum, developers could build on the blockchain in ways that few programmers had been able to do thus far.

Up until this point, few if any classrooms were willing to broach the subject, so online blockchain certification courses began to fill this demand in an attempt to establish pedagogical standards for an area of study that was still looking for legitimacy under the public eye. Founded in 2014, one institution dedicated to these courses, the [CryptoCurrency Certification Consortium \(C4\)](#), even includes Antonopoulos and Buterin on its board of directors. The consortium offers three distinct certificates (Certified Bitcoin Professional, Certified Bitcoin Expert and Certified Ethereum Developer), with the programs spanning two to three years. Another course, the [Digital Currency Council's](#) Professional Certification Training Program, offers a pricier, less rigorous, seven-hour course.

Eventually, universities and colleges began offering courses dedicated to cryptocurrency finance, law and blockchain development, and they began to redefine what credibility meant for a space that a mainstream audience didn't care for until it became convenient.

The Rise of Blockchain Curricula

“ Conceptualizing a course five years ago carried a degree of risk, but like the crypto market writ large, there's a “positive relation between risk and expected return.” That risk has paid off.

By 2014, the movement had made enough noise to attract the attention of academic institutions. Over the coming years, some of America's leading universities would introduce blockchain- and crypto-concentrated curricula into their course offerings.

Before universities began these course offerings, the closest thing to a blockchain accredited education came in the form of online courses. The likes of IBM and the Linux Foundation established blockchain certification courses, a seemingly more legitimate extension of the video series that forerunners like Antonopoulos offered for free. It wasn't long until universities followed suit. Princeton and MIT, for instance, both offer online resources for blockchain education: Princeton with a course on Coursera, and MIT with essays and interactive videos on the subject.

Other universities have dug full-bore into the subject area. Vanderbilt, Cornell, Johns Hopkins, NYU, Duke and Stanford all offer classes dedicated to blockchain technology or the cryptocurrency field to some capacity.

In its third year, Stanford's Computer Science course on blockchain technology and cryptocurrencies (cs251) "is intended for Computer Science students and teaches how the different blockchains operate, how to build applications that interact with the blockchain, and how to write smart contracts," Professor Dan Boneh, the course's instructor, told *Bitcoin Magazine*.

"These courses can be taught from different perspectives," Boneh believes. "I focus our course on technology, but other professors may choose to focus on law or economics."

Indeed, other institutions, such as the NYU Stern School of Business, take an applied rather than technical approach. Since 2014, professors David Yermack and Geoffrey Miller have offered the “Digital Currency, Blockchains and the Future of Financial Services” course, which focuses on “the emerging role of digital currencies and blockchains in money, banking, and the real economy,” the course’s description [states](#).

Duke University’s offering straddles both the technical and applied aspects of the industry with its I&E 550: Innovation and Cryptoventures course. Taught by Fuqua School of Business professor Campbell Harvey, the course covers areas from cryptofinance to smart contract development, and its multilayered approach has brought “a mix of business, law, computer science and engineering students” to its lecture hall, Harvey conveyed to *Bitcoin Magazine*. In 2014, the course began with only 13 students. Now, Harvey claimed in our correspondence, more than half of the Fuqua School of Business’s 2018 graduating class had taken the course before walking this spring.

And he’s not alone in experiencing such a high turnout. In our interview with Yermack, the professor revealed that over the 2017–2018 academic year, “the course was so popular that [the instructors] had to relocate to the largest lecture hall on campus.”

Harvey candidly admitted that this was, in part, the result of the hype-induced enrollment of some students. Following the crypto market’s exponential rise, he went from 75 students in 2017 to 231 in 2018. Yermack

noted a similar trend, indicating that 2018's spring enrollment for his class hit 230 students, a sizable increase from its inaugural enrollment of 35 in the fall of 2014.

As with the industry at large, this hype could easily be seen as a blemish, the emotive trappings of an industry marred by volatility and get-rich-quick aspirations. Even so, even in a time when industry hype hadn't reached its peak, these courses weren't hard sells.

"It was easy to get the curriculum approved. The committee was very supportive. In fact, some of the faculty who approve new courses said that they want to take this course themselves," Boneh said.

Yermack had a similar experience, while Harvey told us that his original pitch was "naturally" met with some skepticism. "At that time," he said, "most thought that blockchain equaled Bitcoin. Many perceived the technology as enabling illegal transactions. In the end, Duke University embraced my course."

Harvey added that conceptualizing the course five years ago carried a degree of risk, but like the crypto market writ large, he believes that there's a "positive relation between risk and expected return." And to him, the risk has paid off.

It's hard to imagine the risk not having an upside given blockchain technology's increased exposure in financial markets, technological sectors and the purview of an increasingly interested global public. Be it for hype or genuine interest, the "subject is growing quickly," Yermack told us, "and there is a lot of demand from students for courses in the fintech area."

This coincides with a rise in demand from the industries — technical, financial and anything else — the blockchain could disrupt.

“In my area, Operations Research should be teaching ‘Supply Chain with Blockchain Technology,’ [and] Accounting should be teaching ‘Financial Reporting with Blockchain Technology,’” said Harvey. “Marketing should be teaching ‘How Blockchain Technology Disrupts Marketing.’ Finance is low-hanging fruit, and they should be teaching a course called ‘The Tokenization of Everything.’ Law should have multiple courses on ‘Smart Contracting.’ They should also offer courses on the regulatory implications. There are a vast array of computer science courses dealing with key aspects of this technology (that are not on the books at most schools). There is much to be taught.”

Of course, the industry’s ever-changing landscape means professors must remain vigilant to keep syllabi up-to-date. With the market and industry constantly in flux, curricula could become markedly different from one year to the next.

To “keep up with the quickly evolving range of topics,” Yermack said that he has to essentially reinvent his syllabus every year, and Boneh revealed that for each new class, he has to “redo the bulk of the course from scratch.”

The industry’s dynamicism, it seems, is the primary pain point keeping it from earning a spot in additional course offerings. Some professors are wary of investing the time to learn and teach an unsolidified and unstable subject that, at worst, may be a passing fancy.

“Currently some faculty are unsure if this area is a fad or if it is here to stay. Clearly, I believe that this technology is here to stay and we need to educate our students how to build on it,” Boneh said.

With University Offerings, a Pathway to "Qualification"

‘ There are a vast array of computer science courses dealing with key aspects of this technology (that are not on the books at most schools). There is much to be taught.

What started off as a fringe anti-establishment movement for a cypherpunk niche has found a place in the classrooms of some of America’s leading universities.

Like the Andreas Antonopouloses in the earlier days of the emerging field, the professors teaching these courses are trailblazers for a new frontier. This new frontier, the dominion of formal education, is becoming the accredited complement to the old frontier, the virtual domain of unofficial expertise. As such, these professors hope to refine the existing information of the old mode to bring clarity and understanding to an esoteric topic.

“Blockchain technology is complicated,” Harvey said in regard to the difference between academic and nonacademic educational resources.

“There is a lot of misunderstanding. Even worse, there are people that

believe they know blockchain [technology] but are quite ignorant. Academic institutions have an important role in training the next generation of innovators.”

Boneh expanded on Harvey’s thoughts, saying that he sees his role less as opening up a new frontier and more as acting as an usher to lead others safely through the old one.

“All the information is out there on the internet. The problem is that there is too much information online. I view my role as a guide ... we teach the students what they need to know, what is important, and what is less so. The students can always read up online to learn more about the topics discussed in class and in the programming projects. I’d like to think that students who graduate from the class have a fairly complete understanding of the area. Purely self-study is great, and I highly encourage it, but it can sometimes lead to patchy knowledge.”

Yermack conveyed that while he believes online resources “have a role to play in the market,” ultimately “they deliver content to a different population and with considerably less depth and rigor than a graduate university course.”

Undoubtedly, each professor believes that his role and the classroom’s structure will herald in a new age of legitimacy for the space. Academic accreditation will no doubt supply a budding workforce with the tools it needs to work in a burgeoning industry, and having America’s top universities vet a formerly stigmatized field promises to be beneficial for adoption and awareness.

But the advent of official pedagogical standards for a space that has only ever relied on the sweat of its own brow raises the question: What constitutes “accredited instruction” in an industry that, until recently, has subsisted on informal educational resources? With makeshift dedication and decentralized organization, the iconoclasts who built this movement never asked for nor needed a degree to create its infrastructure; much like Buterin dropping out of university to realize Ethereum, academia and blockchain development seem to naturally repel each other.

‘ As we move into an era of formalized education for the cryptocurrency realm, then, the tensions between the official and unofficial will likely arise. Decentralized diehards will measure whether academia complements or contradicts the educational strides the space has made to this point.

Perhaps Boneh’s view of the instructor as a guide diffuses these tensions. Rather than invalidate the work that has been done, these professors are expanding on this work. From this perspective, the relationship between old and new, less than adversarial, is symbiotic.

Taking a look at the syllabus for Harvey’s class, for instance:

Antonopoulos’s *Mastering Bitcoin*, Nick Szabo’s work on smart contracts, and the Bitcoin white paper are all required readings. These classes may, in the eyes of many, play a more legitimate and licensed role in blockchain

education. But their makeup is still reliant on the work of the informal forebears that propelled the movement from its infancy out of the shadows of obscurity.

The new mode of education is finally an extension of the old. It carries on the work of the field's earliest experts for a different audience, one likely less inclined to fully grasp its knowledge without clear, concrete guidance. As Yermack indicates, each has its own role to play in the industry at large, and each will no doubt bear its own mark for a technological revolution that still has plenty of growing up to do.

[About](#)[Terms of use](#)[Advertise](#)[Store](#)[Contact](#)