

Connect the Dots: An Exploration of Connectivism in Theory and Practice

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The field of education, as is the case with most of society, has been significantly impacted by recent advances in digital technologies and unprecedented levels of global connectivity, with new theories of education being developed in an attempt to best suit the changing needs of a newly emergent global learning community. One of the more talked about emerging trends of recent years is the Massively Open Online Course (MOOC). In its simplest terms and as put by Wikipedia, “A Massive Open Online Course (MOOC) is an online course aimed at unlimited participation and open access via the web” (“Massive open online course,” n.d.). While somewhat controversial at first, the MOOC has more-or-less grown to be a widely accepted phenomenon; even many major universities such as Stanford, Princeton, and UC Berkeley have begun offering MOOCs through providers such as Coursera and Canvas.

Although it wasn’t known as such at the time, the first MOOC, again according to Wikipedia, was a course entitled *Connectivism and Connective Knowledge* that consisted of 25 tuition-paying students from the University of Manitoba along with 2,200 online students who were taking the class for free. This course was put together by Stephen Downes of the Canadian National Research Council and George Siemens of the online distance learning-oriented Athabasca University and explored how we learn through various “Web 2.0” interfaces and formats such as RSS feeds and blogs (“Massive open online course,” n.d.). Rather than working through conventional channels of online learning such as video lectures and quizzes, this course was based in connectivist theory and really laid the groundwork for an entirely different way of thinking about learning in a 21st century environment.

What is Connectivism?

So what is connectivism, exactly? And more importantly, what implications does it carry for education in a 21st century information ecosystem? Before answering these questions, let us look at the most prominent proponents of the theory. Stephen Downes, as mentioned earlier, is a Canadian theorist who runs a blog called OLDaily. According to OLDaily, Downes is a “leading voice in online and networked learning” and a “leading proponent of connectivism” (Downes, n.d.) His interests include “logic and reasoning, critical literacies, and free learning” (Downes, n.d.) As noted by Downes (n.d.), Downes is known for his, “deep, passionate and articulate exposition of a range of insights melding theories of education and philosophy, new media and computer technology.” He is also “one of the first adopters and developers of RSS content syndication in education” (Downes, n.d.).

George Siemens is another Canadian theorist who seems to write less about himself. In his blog he simply claimed that he is “with the Technology Enhanced Knowledge Research Institute at

Athabasca University” (Siemens, n.d.). On his bio from Athabasca University, it is stated that he is “a writer, theorist, speaker, and researcher on learning, networks, technology, analytics and visualization, openness, and organizational effectiveness in digital environments” (“George Siemens,” n.d.). It is also mentioned that he “has pioneered open connectivist courses that have included over 15,000 educators and students as participants,” that “he is a frequent keynote speaker at conferences detailing the influence of technology and media on education, organizations, and society,” and that he has “presented at conferences in more than 30 countries” (“George Siemens,” n.d.).

Siemens authored the seminal text of connectivism entitled *Connectivism: A Learning Theory for the Digital Age*, the main thesis of which is that traditional educational theories, i.e. behaviorism, cognitivism, and constructivism, are inadequate a 21st century information environment for a multitude of reasons. Namely, Siemens stated that learners need skills that transcend a multitude of possibly unrelated fields over the course of their lifetimes and allow for continual or lifelong learning, that technology changes the way we think and interact with the world and also supplements our ability to process information, that learning occurs in day-to-day interactions and in mundane environments, that learning is not limited to the individual, or in other words that collective learning is a thing, and that “know-how and know-what is being supplemented with know-where” (Siemens, 2005).

Connectivism, Siemens wrote, is “concerned with the actual process of learning, not with the value of what is actually being learned” (Siemens, 2005). So, for example, the success of a connectivist class focusing on, say, the history of banana cultivation in Central America would be measured not by what the students know about banana cultivation in Central America, but rather by the students’ abilities to navigate Web-based resources in order to find information about banana cultivation in Central America. The key idea is that, “we need to act by drawing information outside of our primary knowledge” (Siemens, 2005); that we need to build connections with those around us and develop the skills necessary to determine the value of the bits of information we are able to gather through these connections and understand the ways that they can be put into play with one another.

Similarly, Downes wrote in *Connectivism and Connective Knowledge* that “At its heart, connectivism is the thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks” (Downes, 2011). Knowledge, as such, does not exist within individuals, but across a community of practice. It cannot, therefore, emanate from a single point of authority, but rather only be accessed through networks. So education, as a result, consists of the process of learning how to be a node in a network through and by which knowledge is created. These ideas mean that a connectivist approach to education or “the idea of a connectivist course is that a learner is immersed within a community of practitioners and introduced to ways of doing the sorts of things practitioners do, and through that practice, becomes more similar in act, thought and values to members of that community” (Downes, 2011).

One of the main arguments espoused by adherents of connectivism is that, “including technology and connection making as learning activities begins to move learning theories into a digital age” (Siemens, 2005). In fact, it seems as though connectivism is contingent upon and can only exist

within a digital environment; that connectivism is a reaction to the rise of ubiquitous computing and the movement towards “an environment where the connectivity of devices is embedded in such a way that the connectivity is unobtrusive and always available” (Beal, n.d.). Whether or not this is an appropriate response will be addressed later, but the fact of the matter is that most individuals with Internet access embed ourselves, intentionally or not, into certain communities of practice on the world-wide web, which is a driving force behind connectivism.

That being said, the information environments in which we operate are often complex and chaotic. Connectivist theory strives to empower individuals to successfully navigate and operate within this reality in order to create stronger and more powerful networks. As stated by Siemens (2005), “Self-organization on a personal level is a micro-process of the larger self-organizing knowledge constructs created within corporate or institutional environments. The capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in our knowledge economy.”

Rather than shy away from the chaos brought about by the ontological instability of information in the digital information age, then, connectivism strives to take it head on and instill resilience in users that allow them to use the perpetual state of flux of Web 2.0 environments as a tool to be utilized in the long-term knowledge-creation process. In Siemens’s (2005) words, it “is driven by the understanding that decisions are based on rapidly altering foundations.”

These ideas mean that on one end, and as stated by Downes (2011), the purpose of connectivism is to immerse a learner “within a community of practitioners and [introduce them] to ways of doing the sorts of things practitioners do, and through that practice, becomes more similar in act, thought and values to members of that community.” On the other end, as mentioned by Siemens (2005), the individual “in turn feed[s] back into the network,” which then “continue[s] to provide learning to individual.” There is, then, a dynamic back-and-forth relationship between individual and network; between student and community. The two continually shape and inform one another, perpetually generating new knowledge. As said by Siemens (2005), “This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed,” but he fails to mention that this process also keeps a field current and relevant to learners.

Connectivism and MOOCs

Given this background on connectivism, it seems as though the MOOC is the ideal representation of connectivist learning. Not all MOOCs, though, are connectivist. As MOOCs began to gain a name for themselves throughout academia, they began to be modeled on traditional university classes and sought to emulate the lecture-based classroom. This approach was directed towards a more passive audience; students would watch a video lecture and answer some quiz questions afterward, for example. A notable and widely talked-about example of this is Stanford University’s 2012 MOOC on Artificial Intelligence. While it is generally accepted that such MOOCs, known now as xMOOCs, “significantly broaden the number of students who can be exposed to university-level courses,” they are often criticized as being “inferior to the university courses they mimic because they eliminate teacher-student interactions and involve limited student-student interactions” (“xMOOC vs cMOOC? A glossary of common MOOC

terms part 2”, n.d.). Just as in the standard university classroom, a participant of an xMOOC either takes the role of teacher or student, never both. While there may be a time and a place for such divisions of power in the traditional classroom, the xMOOC model tends to only use the Internet as a transmitter, neglecting the many opportunities its dynamic and collaborative nature could provide.

Conversely, connectivist MOOCs, or cMOOCs, “involve groups of people learning together” and “often include blogs, learning communities, and social media platforms that contain content and promote interaction” (“xMOOC vs cMOOC? A glossary of common MOOC terms part 2,” n.d.). Most significantly, “participants are all considered teachers and learners” (“xMOOC vs cMOOC? A glossary of common MOOC terms part 2,” n.d.). The cMOOC is the MOOC that was originally intended by Siemens and Downes, it is the MOOC in which “we are all educators, or at least, learning to be educators, creating and promoting the (connective) practice of education by actually practicing it” (Downes, 2011). Rather than solely being the receptors of information, student-teachers in a cMOOC actively engage with and share information with one another to collaboratively create something new. Yet, it is the xMOOC that is generally thought of when “MOOC” is used in popular discourse, and as a result the cMOOC is often overlooked. While recognizing the widespread popularity of and easy accessibility offered by xMOOCs, the behaviorist theories that underlie their practice limits the scope of possibilities they offer in the digital, interactive, and collaborative environment of the Internet. For this reason, cMOOCs will be the focus of the rest of this paper.

Putting the Theory into Practice

In an article entitled *A MOOC By Any Other Name* (2012), the unnamed author wrote that, “Ideally, MOOCs should facilitate active, meaningful, and productive learning relationships,” very much evoking connectivist theory. She followed that, “Learning in MOOCs is not about remembering facts, but creating innovative, fresh knowledge through communication with peers, while giving new shape to shared meanings and concepts” (“A MOOC By Any Other Name, 2012), further enforcing the idea of knowledge taking place through communication and creating connections between peers, opening up the possibility of discourse and collaboration towards a shared goal. This reiterates that knowledge is should not imparted on students in a MOOC, but is rather created through nodes of connection, much like synapses between neurons in the brain.

In such an environment, though, there is no readily evident structure or discernable boundaries in which learning can occur, and given the breadth of students that may participate in a MOOC, a lack of structure could be exclusionary. Downes himself pointed out in *From MOOC To Personal Learning* (2015) that “Students have to manage their own time, find their own resources, and structure their own learning,” for which reason “it is argued students must already have a high degree of skill and internet savvy in order to be successful,” while in *A MOOC By Any Other Name* (2012) it is stated that, “One of the challenges for MOOCs is how to reconcile [...] being massive and serving diverse populations with the need to adapt to the learning preferences, levels of prior learning, and tastes of individual students.” In response to these concerns, Downes claimed that, given that learning in the “real world” is not directed, “navigating the chaos and making learning decisions is the lesson in a cMOOC” (Downes, 2015).

This is where information literacy comes into play. It seems that in Downes's opinion, cMOOCs are the framework through and in which information literacy is developed, and much like conventional literacy, which is "rooted in our comprehension of, and ability to work within, abstract symbol systems (and in particular, language and mathematics)" (Downes, 2015), information literacy can only be understood in the context(s) in which it is situated. In his words, "the modern understanding is about more than communication and meaning in a language or symbol system. It is about operating and interacting in a complex and multi-dimensional environment" (Downes, 2015). These ideas mean that one acquires the skills necessary to operate and learn within a MOOC by participating in MOOCs, or, as Downes (2015) says, "Learning in a MOOC and literacy in a MOOC become synonymous. We are not acquiring content or using language and literacy, we are becoming literate, becoming MOOC." As cMOOCs are more or less learner-built and learner-directed, problems surrounding inclusion of a diversity of students ought to take care of themselves. Right?

Keith Brennan, for one, does not think this is necessarily the case. He believes that connectivists are blinded of the shortcomings of their theory by subscribing to what he calls "ideological monogamy" (Brennan, 2013). His criticism started by pointing out that "One of the most important aspects of the learning experience is motivation" (Brennan, 2013). He also mentioned self-efficacy, or "our belief that a task is achievable by us, and that the environment in which we are working will allow us to achieve that task" (Brennan, 2013). Self-efficacy is a fundamental force in motivation; low-self efficacy students are easily discouraged, give up early, and generally blame themselves for failing at tasks, while high self-efficacy students are highly motivated and work quickly and confidently to complete tasks. Typically, notions of self-efficacy originate from past learning experiences, but in a MOOC there could be a wide variety of past learning experience among the participants and therefore differing conceptions of self-efficacy.

Brennan also mentioned the concepts of cognitive load, which is "the amount of information we can take in, process and retain... Complex, new, or difficult tasks have a high load. Simple, known or easy tasks have a low load," and prior knowledge, which positively correlates with both cognitive load and self-efficacy (Brennan, 2013). Simply put, cognitive load is the reason novice drivers, for example, learn to drive in a parking lot and not on the interstate (Brennan, 2013). Connectivism, according to Brennan (2013), overlooks the fact that some people are novices and some people are experts in certain fields or within certain communities of practice, and that when people of varying degrees of prior experience and skill are put in the same learning arena it can result in a fairly chaotic learning environment, thus favoring experts and burdening novices. Further, Brennan (2013) pointed out that "In Connectivism, the distributed platforms, the networked nature of learning, the requirements for metacognition, digital literacy, the new tools and techniques add significantly to the novice's cognitive load." While Downes (2015) made the point that 21st information literacy in this sense can only be learned through collaborative online environments, such literacy is a requisite skill for participation in such environments and those who lack it will not be able to succeed as well as experts. It's a catch 22. As Brennan (2013) put it, "Design for experts, and invite novices, and watch novices get shot out of the sky." Everyone in a cMOOC is equal in theory, but some end up being more equal than others.

This, though, is not the only criticism of cMOOCs. At its core, it could be argued that connectivism overlooks fundamental aspects of how we learn. This sentiment was evoked while reading Laura Gibbs's 2012 blog post *Teacher Authority and Student Initiative in a MOOC*. This post, which gives an account of participation in a cMOOC, begins with the observation that "there are many students who prize very highly the rules of a class and teacher authority, even in a massive course like this where the teacher is more absent than present;" that there are a number of students in the class "who are very much expecting the teacher to function as the voice of absolute authority in the class" (Gibbs, 2012).

This is best illustrated through an anecdote about an assignment the class had to do, and how they reacted when Gibbs got creative with the parameters of the assignment. The class was told to write an essay on Edgar Allen Poe's short story "The Oval Portrait." Instead of writing an essay, Gibbs wrote a reworking of the story for a 21st century audience. The instructor of the MOOC lauded Gibbs's creativity and gave her a good grade for the assignment, but she received highly negative criticism from peers, who essentially told her via forums that she should have failed for not following the rules.

Gibbs (2012) attributes this steadfastness to rules and authority, in part, to "the *international audience* [emphasis added] and different cultures of schooling in different countries... yet another factor in the globalization of MOOCs," and there is certainly something to be said for that. Taking this concept a step further, though, it really should be noted that connectivism and cMOOCs operate under the assumptions that everyone has equal access to information, or at least to the resources necessary to obtain information when this simply is not the case. The literacies and framework fervently promoted by Downes, specifically, are very much rooted in affluent, Global North, neoliberal technical utopianism, in an idea that the Internet is the great democratizer that brings freedom and education to all. According to "Internet Live Stats," (2016) only 40% of the global population has access to the Internet, the majority of which is composed of the globally affluent. Further, in an article published by the International Monetary Fund's *Finance and Development*, it is stated that "The Internet threatens to magnify the existing socioeconomic disparities, between those with access and those without, to levels unseen and untenable" (Ishaq, 2001), which sheds light on the severity of the situation at hand. Even if access were assured for the entire global population, which is a highly pressing issue in and of itself, would it be right to impose culture-specific notions of information literacy on the rest of the world, or would that further exasperate the radical inequality experienced by the global population? Would it not be the same as subjecting developing nations to the global economic framework and depriving them of their own autonomy and self-determination? It is for these reasons that it could be said that connectivism is inherently exclusionary of most of the world's population and could even verge on colonialism.

Further, as expressed by Gibbs in her blog post (2012), many students cannot cope with the idea that rules are arbitrary in cMOOCs. This is no fault of connectivism itself, but it is an underlying assumption of connectivist theory. She writes, "For some students, though, the absence of the teacher as a determining factor in the day to day activities of the class, as someone who gives the grades, as someone who enforces the 'rules,' is clearly going to be a shock," and even more poignantly that, "In the absence of the teacher-as-rule-enforcer, some students seem ready and willing, even eager, to leap into that role themselves" (Gibbs, 2012). This illustrates that

education and learning are in one way or another a function of power, that power will inherently pervade even the virtual classroom, and that many North American and European librarians, the products of a late-capitalist consumer-directed society, are simply not equipped with the tools necessary to be able to constructively deal with the radical freedom offered by cMOOCs.

Conclusion

It may be a bleak outlook, but I'm of the opinion that connectivism operates under false pretenses that students will want to empower themselves to learn, when that simply may not be the case. cMOOCs were formulated in order to subvert, question, challenge, complement, and supplement the channels of conventional academia, but when students are more motivated to learn through the traditional channels than the subversive ones, even if it would be better for them pedagogically in the long run, it means cMOOCs are failing in some way. Connectivism, it seems, overlooks the way things are in favor of viewing the way things ought to be; we cannot just one day decide that power ought to be distributed horizontally across a network and expect that to be the case the next day, and for this reason I believe that connectivism is far too optimistic to be practical, at least for now. On the other hand, though, it should be mentioned that connectivist theory encourages awareness of learning and education being embedded within a greater social context. Although they have been overshadowed by xMOOCs for the time being, cMOOCs offer greater potential to continue the trend of questioning and supplementing traditional pedagogy, and it is for this reason that I believe that cMOOCs will maintain some relevance into the near future.

Subscribing exclusively to pure connectivism, like subscribing exclusively to pure ideology of any kind, is unproductive at best and dangerous at worst. It is best to be, as Brennan (2013) puts it, "ideologically promiscuous." He wrote, "There is no 'one size fits all' theory. Because there is no 'one size fits all' student. And because students, participants, and learners are the final metric that measures any theory, and experience is the proving ground for theory" (Brennan 2013). So while connectivism may be seen as ineffective, have a tendency to be a bit presumptuous, and can arguably verge on colonialism, it should also be noted that connectivism has some very practical applications, it can enrich the learning experience, and can aid in bolstering information literacy. While it may not be best utilized in a vacuum, connectivism can be used in junction with other theories of education on an as-needed basis and, similarly, cMOOCs can be best used as a supplement to enhance students' learning.

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