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## "As human beings, we cannot not learn". An interview with Professor George Siemens on connectivism, MOOCs and learning analytics

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### Keywords

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### Abstract

George Siemens is a globally-known higher-education expert who created the first Massive Open Online Course (MOOC) ever, together with Stephen Downes. He is Professor and Executive Director of the Learning Innovation and Networked Knowledge Research Lab at University of Texas, Arlington. In addition, he co-leads the development of the Centre for Change and Complexity in Learning (C3L) at University of South Australia. He has served as Principal Investigator on grants funded by the Bill & Melinda Gates Foundation and the Soros Foundation (to name but a few) and is the founding President of the Society for Learning Analytics Research.

In this wide-ranging interview, George Siemens reconstructs his personal history as a lifelong learner and discusses his work, specifically on Connectivism, Massive Open Online Courses (MOOCs), and Learning Analytics. One of the leading thinkers in deepening our understanding on the impacts of technology on higher education and learning, George Siemens shares his personal experience of the utilitarian schooling system in his childhood which inspired him to have different perspectives on the interactions between education and technology, thus leading to his concept of Connectivism as well as his creation of MOOCs. He gives some insights on his seminal book, *Knowing Knowledge*, and elaborates on his perception of "knowledge" as well as the interactions of the four critical traits (diversity, autonomy, interactivity, and openness) in connective knowledge networks. Learning analytics is another focus for Siemens, and this relatively new, but quickly expanding, field can provide insights on the flow of information such as social activities, engagement patterns and a range of other factors that facilitate the quality of the learning experience for students. Siemens further emphasizes the cultural aspects of best practices of teaching and learning and also assessment in higher education. Siemens gives a preview of his future work which will focus on how human and artificial cognition may influence knowledge processes and their impacts on society.

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Figure 1: George Siemens (Nardelli, n.d.).

**Jürgen Rudolph (JR):** I just wanted to say you've been an absolute inspiration to me. Also, personally, because you may remember, it's perhaps seven years ago that I interviewed you for my M.Ed. thesis. You were also very kind in connecting me with Dave Cormier and Stephen Downes, and thanks to you, I interviewed both of them, and Stephen Downes even contributed an article to the *Journal of Applied Learning and Teaching* (Downes, 2018). So, I'm extremely thrilled to conduct this conversation with you today.

**George Siemens (GS):** Thank you! I'm glad to see there's some background data interactions that we've had in the past so I look forward to the chat.

**JR:** Could we please start off by asking you a kind of biographical question when it comes to your own personal learning journey? I read in this article by Kolowich (2014) that you grew up in Mexico and that you are from a Mennonite background. Would you mind telling me a little bit about your educational journey as a learner from Mexico to Canada and of course, eventually becoming extremely famous for being the first person to conduct a Massive Open Online Course (MOOC), and being highly influential when it comes to MOOCs.

**GS:** I was born in Mexico in a small community that was just outside of a city. And the city, or the environment itself at least, was very much a farming community. The focus of the region emphasized heavy reliance on community by virtue of being in a small group and a small cohort of people. There's a lot of interdependence that happens, and it's a kind of interdependence that is interesting, in our age of the current Covid pandemic. You begin to realise that you can act and do a number of things that focus on self-sufficiency. But at the end of the day, we live in systems, we exist in systems, and we are impacted by them. And when we have a breakdown in a system, it has a potentially significant impact, like many systems are experiencing right now.

I just say that by way of background. So, you're always acutely aware in these kinds of small agricultural communities of the nature of your relationships and reliance on one another. You can't make it long without that community and without that network. When I was reasonably young, still, my parents opted to emigrate to Canada. I was maybe five, six years old. And so, I still recall very much living in the farming community in Mexico, and I certainly recall the trip into Canada and getting started with the school system. What was unique about the Canadian school system

compared to what I had been used to in Mexico, was that the schooling in the community I was in in Mexico was very much a utilitarian relationship, which meant it wasn't about the pursuit of knowledge. It really focused on giving people the ability to read and the ability to do basic maths, and it was almost an extension of the church in regard that it was focused on helping. You just did learn enough so you could function, but there was no sort of existential reflection on man's relationship to the universe or the role of humanity in relation to other species. The education was utilitarian.

When you're doing a reflection in reverse, you add meaning to it that wasn't there when you went through it the first time. But certainly, coming to Canada and seeing a very different emphasis in the school system, and much more of a focus on how you think and critical thinking, and the list goes on – as well as at that stage, greater use of technology in the school system – had a pretty significant impact on how I started to see the affordances or the performance capability of those environments.

I started off early on in a range of different sectors, just working, and eventually got into the restaurant industry. And then, over time, I made the shift to a completely different environment out in Winnipeg when I started at a university or school system, a college called Red River College. And that's when I first started in late 1990s, exploring how technology impacts learning. And as a result of that cycle, I ended up working through a Master's degree, and a few years later began a PhD. At that point, I'd shifted to University of Manitoba, and the most of the time or effort in that regard was spent around just trying to understand how and why does technology produce these uneven impacts on the learning experience: the same group of students, the same group of individuals have access to a similar tool set and yet one group of teachers will create a very rich, robust learning environment, and another group will really just treat technology as an agent, if you will. That just replaces what was done in the classroom in the past.

**JR:** I am quite an admirer of your book *Knowing Knowledge* (Siemens, 2006). I teach Knowledge Management for an Australian university, Murdoch University. I browsed through your book a couple of years ago, but recently I revisited it, and I was really amazed by its depth. It's a very unusual book, I mean this in the best sense of the word. Perhaps we can discuss some of the things in the book. So of course, the book is obviously related to your philosophical approach, which is Connectivism. I think just now when you were sharing your own biographical journey through different institutions and different work experiences and so on, you already highlighted this also in regard to the current virus pandemic that is affecting everybody around the world now. So, you coined this term 'connectivism'. And I think you define it as the process of creating networks. I also watched one of your video lectures where you talk a lot about systems, and systems include machines and people and also hybrids of it. And these connective knowledge networks possess four traits which are diversity, autonomy, interactivity, and openness. I also very much like your Einstein quote, "whoever undertakes to set himself up as a judge of truth and knowledge is shipwrecked by the laughter of the gods" (cited in Siemens, 2006, p. ix). So, could you tell us more

about your concept of knowledge and what it means for your own continual and lifelong learning, and also for the continual learning of your students? And the world overall?



Figure 2: George Siemens in the noughties (Williams, 2008).

**GS:** A great set of interconnected questions. Initially, the focus of that book was an intent to try and communicate just the sloppiness whereby which we generally understand what knowledge is, and some of the ambiguity that's there. We often like to have very nicely structured, compact definitions. But the reality of it is that there can be a lot of factors that come into play whether or not we learned something. And it seemed that rather than a view that learning is this process where we know and understand something based on having undergone a reasonably rigid experience of instruction and learning and testing, it is the reality that as human beings, we cannot not learn. For literally, that's the point of our brain. And it's busy, aggressively, actively, continually forming connections.

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And so, as a result of that sort of experience and recognizing at that point, I was actively involved in a series of conversations with individuals globally. I was already doing quite a bit of traveling for conference presentations, and as a result of that experience, it became quite clear that the way that knowledge was understood seemed a bit of a fool's errand. To try and make sense of knowledge, especially if you look at the historical definitions that go back to Plato's view, it's 'justified true belief' and the thousands of philosophers that have tried to articulate what is knowledge.

I was trying to provide a series of ways of looking at what 'knowledge' might be in the kind of information climate that we exist in today. And by that, I mean, a global network, it's distributed, everybody has a voice, not even experts and non-experts, in some ways, we are given equal platform. So that's partially what we're seeing, say in the US environment now politically, where the vetting process has some value, to

have an idea before an idea is broadly made available, that it needs to have been confirmed or verified and so on. So, we were starting to see at these very early stages just the freedom of access, the freedom of sharing your ideas.

From the lens of today, we'd probably focus a little bit more not on that freedom per se, but we would focus more on what are the implications of that freedom that we didn't anticipate. I think there's a view that it's inherently good if everyone can communicate their experiences, their beliefs, their views. What we are finding, though, is while it may be inherently good, not all actors have inherently good motivations. And so suddenly, people who throw out perspectives and ideas that have sort of destabilizing interests, such as foreign actors, possibly being involved in an economy, could be quite significantly negative.

That's from the lens of today. But at the time, it was really just recognizing that all knowledge is essentially a type of recombination from knowledge that has been developed in the past in many cases. And even when someone discovers something new, even that discovery by and large shares the DNA of systems that have existed before. So really, the point being made was that we live in this deeply interconnected system. And when somebody like Steve Jobs, for example, makes an iPhone, he's given credit for making the iPhone. But the reality is, the innovation of the iPhone rested on thousands of individual innovations that had been created in telecommunications, in user design in a range of other topics. So, the broad perspective then is to just say, this is what we're talking about when we mean networked or connected learning or connective knowledge. It's that all these pieces develop, not necessarily simultaneously, but quite often what we're doing is going through a process of, for lack of a better word, combinatorial creativity, which I've heard being described as this process where we create by connecting things that already exist.

*All knowledge is essentially a type of recombination from knowledge that has been developed in the past... we live in this deeply interconnected system.*

That in some ways is a very good form of creativity to promote, say, to our students when they're involved in our courses, that they can begin advancing ideas and concepts really at the youngest ages. They don't need to be an expert until they begin to join the communication or the creation pipeline. The way that Maria Popova talks about combinatorial creativity, we can get started at really any point and begin to remake new worlds (see e.g. Brainpickings, n.d.).

**JR:** You were already talking about the notorious difficulty of defining knowledge and I sympathize with the difficulty, or even impossibility, of capturing knowledge just in a couple of words. In your book, *Knowing Knowledge*, you differentiate five types of knowledge, which are, knowing about, knowing to do, knowing to be, knowing where, and knowing to transform (Siemens, 2006). In the knowledge management literature, because of Gilbert Ryle (Ryle, 2009), and Polanyi (1996) and so on, we often talk about tacit and explicit knowledge. So, I am under the impression

that 'explicit knowledge' should be roughly equivalent to 'knowing about' in your sense, and 'knowing to do' is 'tacit knowledge', and we could also talk about 'know who', and 'know why and care why' which is part of a so-called professional knowledge hierarchy. In your book – and this would, of course, relate to your approach of connectivism – you say that in the current 21st century environment, some very important forms of knowledge actually are 'know where' and also 'know who' (Siemens, 2006, p. 32). So, perhaps you can just comment on how your scheme fits into the more traditional, conventional picture of how knowledge management approaches this.

**GS:** It's a great question because at the core, it relates to: what do the technologies that we have access to, enable us to do that differentiates what was possible in the past? And what I mean by that is when you're dealing with a process of managing knowledge, where publication costs are very high, and you need to have a degree of wealth or access to be brilliant with your ideas in order to get some recognition – that kind of an environment produces the types of traditional publishing experiences that we've seen.

So, you'll see that with Encyclopaedia Britannica at the time, which was the definitive source for this kind of aggregated information about topics. In an era of Encyclopaedia Britannica, the kinds of knowledge that you really need is to take the knowledge that's in the Encyclopaedia and understand it, make sense of it and come to know it in some meaningful way. But if you're in an environment where everyone has the ability to contribute, you produce a different set of affordances, to use Gibson's (1979) language, but you produce a different set of opportunities for individuals. So, it's no longer: if we know the knowledge that I need is in an Encyclopaedia Britannica, or if it's in an academic article, then we just need to find that academic article.

I'll go back to Covid just because it's topical, but in the past, I've used SARS as an example. When the example of SARS first came out, it was a novel kind of an output, meaning people were unsure of what it was, networks of academics didn't know how to understand it yet. And so, as a group of people you had to go through, for lack of a better word, a sustained period of negotiation to understand what is it? How do we treat it? What are the implications? So that's the kind of knowledge actions that are different from if you just have the answer already, and you just need to find the answer because you know, it exists. And I would argue, more and more of the challenges that we face as a society fit into that environment, they fit into this space of 'the answer doesn't exist', and we need to collaboratively discover it.

When you need to collaboratively discover something that's uncertain or unknown, then you have to spend a lot more effort on the architecting of the network in such a way that the network can connect with each other, meaning people need to be able to discover each other. More recently, we found a key knowledge activity and today's age is also about being able to ensure that this information doesn't come in navigating disinformation, navigating abundance, and the list goes on. So, to get to your question, really, in a broad way, it's to say that the kinds of knowledge that exist in a society are going to be heavily related to the kind of

opportunities that exist for members of society to engage in knowledge-related work. And as a result of that kind of an output, we need different skills today, because we don't have the same guidelines or approaches that we might have had 10, 15, well, maybe 30, 40 years ago, where we just needed to find the person who knew the answer to the problem that we're asking. So, I think, today, it's about: are you able to not just access a distributed network of expertise, but do you have the skills to navigate contradictory opinions, false information? Do you have the ability to exhibit like I said earlier, combinatorial creativity when you're taking multiple sources and to be able to create something different? As we get more and more into the space of AI in the learning process, then we also need to look more at what is the essence of being human in that kind of setting and what are the implications of that, and the list goes on. So, it's really the knowledge practices that changed the most when you get into a world of global connectivity and global access to all kinds of information.

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**JR:** That's a great comment. So, we were talking about the definition of knowledge earlier. When I discuss the concept with my students, I always tell them if you just want to have a very catchy and an easy to remember definition, it's 'actionable information', because it's just two words and everybody gets the idea. So, we are surrounded by that unbelievable amount of data and then we try to create some structure which perhaps we can call information. But then there's the question what's the difference between information and knowledge? And perhaps it's the usefulness that we can do something meaningful with this.

Now for my last question that very directly refers to your book (Siemens, 2006). You basically say 'doing is more important than knowing', that knowing is kind of incomplete if there's no action item. This is in the final part of the book, you talk about the Connectivism Development Cycle that includes five domains. Part of this is the personal knowledge plan. This is part of the third domain on page 134, which is the adaptive knowledge and learning cycle. Could you elaborate because it sounds really great? At the same time, organizations are quite adverse to change. I'm curious what are your experiences with this? And, of course I'd be very curious to find out more about personal knowledge plans because it sounds extremely useful and important, because earlier you were saying – at least that's how I interpreted it – we are surrounded by a lot of nonsense. When we go on the internet, there's an unbelievable amount of half-truths and 'fake news', to use the term. And President Donald J. Trump has been saying that the mainstream media are fake news and the enemy of the people (Smith, 2019). So, it's quite interesting. And I think managing our knowledge has probably never been this important as it is now. So how do your models help with that on an individual basis and also on an organizational basis?



Figure 53. Adaptive Learning and Knowledge Cycle

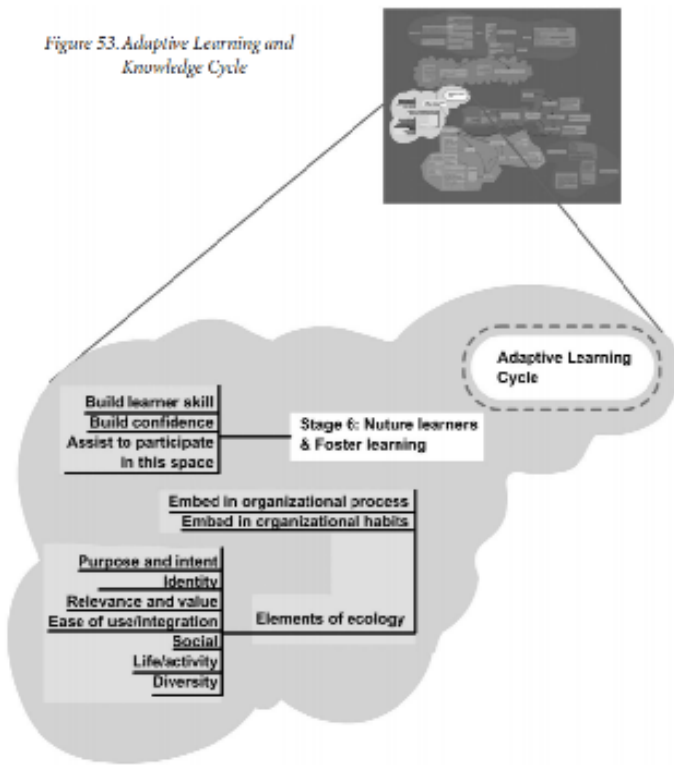


Figure 3: The Adaptive Learning Cycle (Siemens, 2006, p. 135).

**GS:** The difficulty with especially that section around the development cycles with learning and knowledge and connectivism is that, if you have to change the entire system in order to sort of produce the impact or the output that you want to produce, it takes a lot longer. And that means that people who are perhaps even somewhat in agreement with what you're saying, you're fighting against a system.

And so, one that I still feel is that the text does not amount so much to a theory of learning or a theory of knowledge specifically, because the context matters so much. It determines which elements are salient in a particular set of courses. So just as an example, let's say, I'm a student that's going to university and I come from a low socio-economic background: the way I'm taught, and the type of information that I come in contact with, is not necessarily the things that will make the most impact in my academic success. A lot of it will have to do with my background and a range of things that are related to my background. And so, context matters a lot, but we don't really have a meaningful theory of context in a way that we can sort of make sense of it. Because it is so sloppy and messy and there's so many variations of what context could be or what it could actually end up looking like. So, I think that was one of the angles, I was trying to just emphasize the definitional challenges of doing knowledge work in this regard. For learning, there are a lot of really complex integrated pieces there, and determining the right context for assessment evaluation is what almost matters more than anything else.

We've started almost all of our teaching and learning practices in formal education from a perspective of 'I know what you need to know'. So usually, when you begin developing a new course, you might have a group of academics that will come

together with the learning designer. You'll pull together the course material, might bring in expert panels from industry to make sure that you've got the topics properly covered, and then that's what ends up sort of becoming your main curriculum or your outputs. The difficulty with that is, like I've already said, the context may matter a lot for the individual student, it matters for the different personalities that are involved in taking that particular course or the content. As a result, the way that you promote knowledge is to put greater emphasis on the individual, greater responsibility.

So, you can't expect an algorithm to identify all sources of false information. But if you begin to train individual students or individual members of society to make sense of information, then you may have a better outcome of solving that particular problem. The emphasis then of personal knowledge, and personal knowledge management, and personal knowledge plans, is that you begin to recognize that the way that you interact, and the networks that you're a part of, are critical to your overall development or the sophistication of your understanding of a particular subject area.

That's where the emphasis starts to become much more significantly oriented toward: what it is an individual is doing, the capabilities that an individual has, and how we've developed an individual's skill sets to navigate these kinds of complex digital landscape where you do have intentionally false information being shared by actors who have a particular outcome that isn't about overall student success or student quality of learning and so on.

**JR:** When it comes to these plans, the personal knowledge plans, I guess they could be short term. So, let's say I want to learn how to use certain software, then that could be part of my multi-year learning plan. So, do you have something like a vision of yourself or the person who is creating that plan? Or is it forever in flux? Do you create a record of this?

**GS:** Well, so it is forever in flux, obviously, especially now that we're seeing a lot more attention being paid to this idea of reskilling. The labour market changes, new skills are required. So even that is part of it. Rather than necessarily a discrete or even a static plan. I think the point is to recognize that there are very specific kinds of needs that people have in their general experience of learning. That often requires that we are willing to develop our skills such as self-regulation, we're able to develop sort of a goal orientation mindset to the kind of curriculum that we want to interact with or that we want to connect with.

So, it's really about strongly promoting the view that we are untethered from the constraints that we've perhaps had in the past. If you have a topic area that doesn't make a lot of sense to you, you can go online and find a series of YouTube or related lectures, open online courses that have done similar work, and the list goes on. So, the focus then becomes much more around the parts of the learning experience, that we as individuals are able to control ourselves and the kinds of attributes that are going to enable us to be effective. So what I mean with that is it's not that we have a discrete plan of learning that's constant all the time, but instead that we have some attributes that promote goal orientation that

promote our ability to track our progress toward a goal that help us become effective in a range of work environments or work settings. Based on the things that we do, rather than waiting on a broad set of guidelines from an expert, or even us having planned and done everything in advance, if that makes sense.

**JR:** That makes sense. So, for instance, many universities come up with graduate attributes. So, for instance, they would say, we want our graduates to be critically reflective and creative. I think these are very good attributes that would also be probably in line with what you're saying, that we are able to critically evaluate information. So, we don't believe everything and we can sort of differentiate what is, to use that tricky word, 'scientific', and what needs to be triangulated or contested and maybe verified?

**GS:** Absolutely. This is precisely what you need to do in terms of being able to develop the skill sets and the mindsets that you could call metacognitive processes. There are other terms that can be used to describe them, especially today we're seeing a significant rise in the use of words that relate to soft skills. You know, World Economic Forum has put together a document that says these are the kinds of attributes that people need to be successful, and there's a range. They're typically not listed as being the key criteria of what you learn in a university program, they focus more on what you become as a result of the university program: in your ability to collaborate with others, work with others, identify false information, the ability to receive feedback, provide feedback, the ability to think in a range of different ways, communicate with a range of different audiences. Those are all the kinds of approaches and skills that are needed. This isn't to say that content knowledge or traditional academic knowledge is not needed. It's just to say that it's a much different world than it used to be. And there's a range of interconnected skill sets that you need to have in order to be successful in this kind of an environment today,

**JR:** Absolutely. I very much like the term metacognition. So, I think that that is probably the one word that encompasses a lot of the thoughts. So, if we know how to learn and if we know how to know, I think that would help a lot.

**GS:** Absolutely.

**JR:** My next question is, of course, very much related. I'm really amazed at all the things that you do because I also read that the National Institute of Education (NIE) in Singapore hosted you as the 14th CJ Koh Professor in October 2019 (NIE, 2019), and currently you are in Australia. And you're in Texas. It's wonderful talking to you because you have all these experiences, the different continents with different types of learners. And there's a cultural element of course, which would make some difference. So, what's your view on how can education systems encourage more creativity, innovation and connectivism? There have of course been - for instance, in the 1970s - some alternative approaches like Paulo Freire, *The pedagogy of the oppressed*, and Ivan Illich with his *Deschooling society*, and things like that. And when I last had the honour to interview you, we were also talking about disruptive innovation (Rudolph, 2014). And I

remember that you don't like that word because it doesn't really translate all that well to education. Do you see any disruptions in higher education that we should all sort of prepare for?

**GS:** There's always the trends that are immediate, and then the ones that run a longer cycle. So, the ones that run a longer cycle, we've seen them coming for decades. They're the growing use of technology, the digitization of society, those we've seen coming for a long period of time. There's now, for example, a lot of universities that are closing, in terms of moving exclusively online with their students for the short term because of the pandemic that's confronting society. But that produces for all of us a very challenging kind of an environment where we have the longer-term trajectory of technology development and adoption, which is disconnected from the education system. If we didn't have universities for teaching purposes, those technologies would have still been adopted, right?

We often appropriate those tools into the university sector. The use of mobile phones increases in societies, we bring mobile phones into our classrooms. We at least experiment with them, and so on. Then there's the ones that we develop distinctly within our university settings. And this is something where people like Paulo Freire and Ivan Illich and others really emphasize that these systems that we're a part of, they're not neutral, they sometimes favour certain people at the expense of other people. And if we want to really make an impact on society, we need to evaluate the systems that we're a part of, and it's an important element of it. The same holds true if we want to see how technology is biased, especially with the growth of AI and other tool sets, how they may identify certain races or certain nationalities for unfair discrimination, even though it might not have been intentionally built in. It's the impact that it has.

So that is from the university sector, what is the trend coming? There are really a lot of emphases. Now I would say that takes a far more serious stance on how we are going to do a better job of making the kinds of knowledge systems that matter to all members of society, the traditional voices that have been sort of marginalized, in some cases intentionally, in other cases, just as a by-product of how society evolves. So, what I mean from that lens, then, is to get to your question around what emerging, what innovations matter and so on. Equity and fairness and access for all people to the university sector is a critical angle.

Technologically, the move to digitization has been going on for decades, and it's still ongoing. But with Covid right now, it's accelerating the adoption really quickly. So, you have the longer-term trend, and then all of a sudden, you have this very rapid acceleration. That's not really due to the maturing of technology. But it's forcing a cultural shift in our society. And that's certainly one of the bigger challenges. There's a lot of additional things happening. I'm sure you're aware of all the buzzwords because you're in the education field as well, everything from blockchain to the growing influence of AI to a list of other tools or technologies or concerns that are coming up on the horizon. So those are still certainly there.

The bulk of our challenges right now aren't technological, the way that they may have been in the past. I think the bulk of our challenges right now are much more centred on the cultural aspects. How do we evaluate the things within our current system of higher education that we want to preserve in the context of the society that we're a part of? So that's why we're seeing such a big attention to, to non-knowledge-based facts. We're talking about the environment, the climate within our university, we're talking about the people who have access to higher degrees of learning and so on, because that's a broader reflection of society. And obviously, universities don't exist in a vacuum, we reflect at some level what's going on in society. In the U.S. context, we've had a range of end-user-led social movements, whether it's Black Lives Matters, or whether it's things like #MeToo. What it's doing is, it's drawing attention to the fact that there are systems, there are parts of the system, that work for certain people, and certain races, in many cases certain genders even, that don't necessarily work for others, and now there is a concerted effort to try and recalibrate that.

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So that's what I mean when I say the technology trend is ongoing, long-term. We've had Covid push it up higher. But the current thing that's most significant that we're facing is the cultural shifts to realign the university toward fairness and equity and so on, toward all members, and that's going to take us a generation-plus to absorb as a university system.

**JR:** I think you have also commented on one of the perhaps more careless comments of Sebastian Thrun when he was predicting the end of universities (Watters, 2013). So perhaps we would say that universities are changing very quickly, also forced by external circumstances like Covid. But there is still a future of universities. Probably also because there will be many more people in the future, with the global population growing, who want to actually go to universities as compared to in the past? So, universities will probably look very different in the future. But there will probably be more universities rather than just ten?

**GS:** [Chuckles.] One of the things that a lot of educators found upsetting – seven, eight years ago, when there was this big push from Silicon Valley – that people who had never really taught formally in the university sector were very eager to announce the new era. And people like Sebastian Thrun and Clay Shirky and others ended up expressing opinions and views that now seem very childish in their insight. We have the benefit of the lens of today to look back at it. We recognize that universities, or education in general, are an interconnected system. It's a system of systems, you can't just make one change and expect all the other pieces to realign to it.

*Universities are an interconnected system. It's a system of systems, you can't just make one change and expect all the other pieces to realign to it.*

That's why the cultural dynamics, that I was just mentioning, around making sure everybody has access to learning, everybody has an opportunity to engage in learning, are so intractable because we can give people technology, but that doesn't necessarily correct some of the underlying social challenges that exist. Now with that said, I do think there was a positive legacy in some regards to the Silicon Valley interest in Massive Open Online Courses (MOOCs) and online learning and so on in that it helped force the Academy to somewhat rethink itself.

In some cases, early universities that signed up to Coursera and edX, they've benefited enormously. To experiment with technology in a way that they might not have in the past. The University of Michigan has been one of the best leaders in this regard. UCF [University of Central Florida] has been fantastic. There's a number of universities like Georgia Tech that have really advanced their programs. And all of those can be based back into their early attempts at large-scale learning online, or at least online learning in general, by partnering with Coursera or edX. Where that becomes more difficult is that their online medium is a unique space. You can't just take content that you taught in a classroom and drop it online and expect it will be effective. You need to do a range of other things to try and make it work and to try and make it have an impact.

That's where I think the early sort of provocateurs that were telling us how the university is different and it's a new reality, ended up being so completely wrong because they didn't see that the university was a system of systems. They didn't see that culture mattered a lot. They didn't see that capability development preceded broad scale deployment. And they also really missed the value of social systems and social interactions as part of the learning process. So, what I mean with that is you see that now there's a greater shift more and more towards more social learning, more collaborative learning, some of the metacognitive attributes that we were just chatting about. And if you look today, where the early initiatives that were going to change the universities, where they've been prominent, they've actually been most successful in the corporate learning space – the space where you have adult learners that maybe need expert service or some discrete names in a specific area of focus before they can move on. That's where I think they've had their biggest impact.

**JR:** I'm sure you've been asked to tell the story of the first MOOC that you were masterminding many times. But would you mind telling the story? What made you do it in the first place? And what happened thereafter? And what's your current research on MOOCs and what are your current views? You were already highlighting some universities just now. So, there must be some good stuff around.

**GS:** Well, to give you the background to the first part of your question, I was actually in Memphis with Stephen Downes,



we were at a Design to Learn conference and I met him in the lobby, and we were just chatting, and we were just talking about some of the trends at that point that were going on in the university sector, and a big one obviously, was the curriculum there. At that point, we had the MIT OpenCourseWare initiative going, David Wiley was doing quite a bit of work around open education resources. And so we thought, well, 'what if we tried to do for teaching what these universities had done for the curriculum?' Like, there's no reason why we couldn't teach this stuff online, at scale, right? And we thought, well, 'let's run this', it didn't have a name at the time, we just thought we'd run an open course where anybody could access. And we ran at University of Manitoba. And this conversation happened earlier in the year [2008], probably May or June. And then we got to the few other people who had run open courses up until that point, and we had a meeting in August to discuss what could this look like, what might this look like? And I'd already run a series of courses that were open on Moodle at the time where we were just an icon, like a mini conference, you'd spend a week discussing a particular topic of interest and then you would go and evaluate to do some kind of a summary and go on, rather than a formally structured multi-week course, I'd been doing it with a short run. Stephen [Downes] had some software that he had developed over time, Grasshopper, and a daily newsletter that he still runs (<https://www.downes.ca/news/OLDaily.htm>). And then we decided to use that as sort of the central approach. And we would distribute the interactions across individuals, blogs or social media at that point. Twitter was still not extensively used. I remember somebody created an entire room or place in Second Life for it as well, because it was more prominent at the time. But that's really how the first course was started, and we just announced it.

conversation going. We kept running a large number of them, we ran about three, four or five courses at that stage. I was at Athabasca by that time. So, we ended up running a course on Learning Analytics, which was a conference that we had just started at around that time. So, we had that particular program going, and we ran the course on personal learning environments. So, we ran a number of them. But then, of course, as the Coursera initiative started, that's when it really opened things up. And then the New York Times requested an interview on this kind of distributed environment, and Dave Cormier and Brian Alexander, who had actually coined the term, 'Massive Open Online Courses', were the ones that were most prominent. We initially gave it the name, if you will, and it's sort of stuck, and that's how we got to where we are.

**JR:** At present, I believe the Gates Foundation has given you some grants to do research into MOOCs. So, what would be your current assessment of MOOCs, their usefulness and their state of affairs?

**GS:** The big shift has been, they've become a little more utilitarian. They've focused on teaching and learning from the lens of a particular need, which is why the corporate interest in MOOCs is so high, being able to give your employees an opportunity to reskill. Because reskilling is a huge knowledge need that corporations have, for individuals who've maybe been working for a decade or two or more, and now they're given an opportunity to sort of restructure or reset their skill set because of the different technologies that have advanced since they were perhaps in the university sector themselves.

The interest in the research that's currently prominent and relevant in this space. There's a lot that really gets at a couple of the sort of nuanced elements of teaching, learning and ultimately, the ability for you to develop your skills as needed. So, what we've seen with courses, they've gone from 12- to 16-week MOOCs. They were initially short MOOCs, they may run several weeks, two, three weeks, for example. We've also seen a big interest in the idea of stackable degrees or stackable credentials, where you could take a few courses that could then ladder into a Master's with university, both Coursera and edX have comparable programs. There's a way that they're treating the course environment as a lead into that more broadly.

The opportunity for data collection hasn't expired, but you can only get so much insight from clickstream data. You have to look more explicitly. How do you design the learning experiences and the learning opportunities for longer term impact with these kinds of courses? Because that's going to make a much bigger difference in terms of your ability to do quality research down the road. That means you need to pay a little more attention around the psychological attributes of the learner population. You perhaps need to pay, when you're doing research in this area, a lot more interest to the design principles that impact how you've structured your particular set of course resources that you're using. Because if you haven't designed it in a certain way, you may not be able to access the kind of insight that you might want to be able to get out of the particular courses that you're running and so on. The other aspect is that the interest in

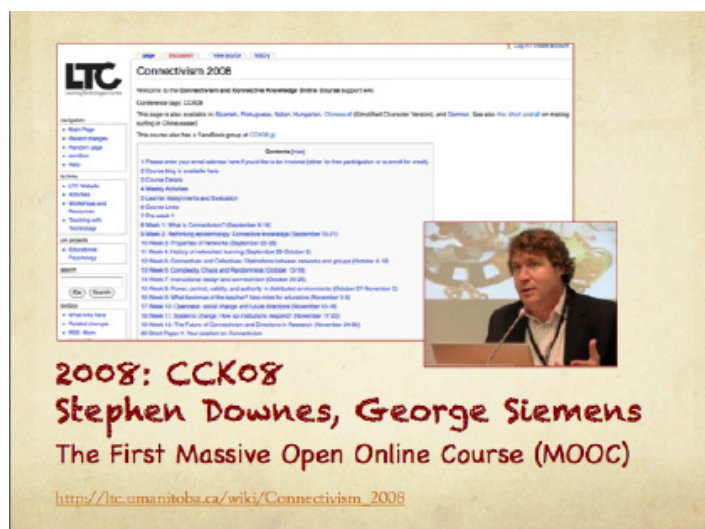


Figure 4: The first MOOC: Connectivism and Connected Knowledge (CCK08).

By today's standards, we didn't have a huge impact. We had 2,300 students. Now obviously, you can have hundreds of thousands or tens of thousands at a minimum, and it is not uncommon to be taught in that kind of an environment. So that's really where we went and started and ran. And by and large, I thought it was quite an effective approach to get the



MOOCs per se has morphed into a broader interest in online learning. And the broader interest in online learning just really focuses on not explicitly large-scale courses, but it can focus on smaller environments as well. It doesn't need to be the huge course environment that we're currently talking about.

**JR:** Are you still conducting MOOCs? Are you even taking some MOOCs yourself as a participant?

**GS:** Always taking them, absolutely. There's a few that we did. Two years ago, we did a group on learning analytics that were done on edX. There's a program on edX that Dave Cormier and I are going to start in mid-April. There's going to be a course on edX on teaching online, given the current interest with Covid and the concern about what that means, that'll start within about a week's time (Pivoting to Online Teaching: Research and Practitioner Perspectives).

In spite of some of the negatives that have been discovered around the environment, namely the low completion rates and so on, it is still a very effective way to provide opportunities for a group of individuals who have a particular topic of interest that they may not readily be able to get insight into in their own universities.



Figure 5: George Siemens' latest MOOC.

**JR:** Just now you already mentioned Learning Analytics a couple of times. Would it be fair to say that, apart from the MOOCs and connectivism, that is another area of focus for you? And what's your view on Learning Analytics? How do you make use of it and what's the major purpose?

**GS:** Learning analytics. You could trace the currents to what happened with the web in general. You had many years of development of the Internet and the use of web technologies before people really started recognizing that the data that was being generated by people interacting online could provide you with novel insights, say, new products that you might want to develop or new ways to support your users. Around the early 2000s, there was some work that came out of EDUCAUSE that called it 'academic analytics'.

It was really targeted sort of at the VP IT level or the CIO level of an institution, it would be basically the equivalent of business intelligence, meaning you just want to use institutional data to better understand how to, in this case with EDUCAUSE, utility-use on campus, room allocation and so on. But then, by 2008, 2009, 2010, there was a big increase, partly driven by a small cluster of the big companies out of Silicon Valley, Yahoo and Google. Yahoo - they don't matter that much anymore. But Google and a few others that were deep into web technologies, were starting to take the data that was being generated as people interact with their system. And they were starting to add better computation capability, better data collection, better data storage, different approaches to how they managed databases, and suddenly they were able to start gaining insights from these growing data sets that would help them better understand their users. Now, around that time in 2010, 2011, we're becoming aware that when you teach in MOOCs, when you teach in online settings, even if it's in a university course using Moodle or something else, you're getting some data trails that might indicate social presence of the individuals in a course you might be able to gain insight into, or to build what you'd call sort of derived measures such as engagement patterns by looking at multiple data points. You could form networks that indicated who contributed when and how information flowed, and the list goes on.

So I think that's really with the development of digitization, the large scale development of MOOCs where you suddenly had 100,000 students clicking in interacting with content and you could start to ask a number of questions around the profiles of students, you could ask questions around the social activities, the engagement patterns and a range of other factors that eventually gave researchers some insight into how data might support improving the quality of the learning experience for students. So, I think that was the sort of the trajectory of how learning analytics developed in prominence. And now, I think, the most prominent organization in the learning analytics space, Society for Learning Analytics Research, they're having their 10th year anniversary this year and they've got a journal set up, it was just recently formally indexed.

It's really been a field that in spite of being 10 years old, has really had a significant impact rapidly, and seeing the number of programs now that are offered as Master's streams. University of Texas recently had a Master of Science and Learning Analytics announced. Colleagues like Mia Dowell out of University of California Irvine and people like Ryan Baker out of U Penn [University of Pennsylvania], Charles Lang out of Teachers College [Columbia University] are all either working on a series of courses in Learning Analytics or need to develop specific programs. In Australia,

there's probably the biggest concentration of learning analytics people at the Centre for Change and Complexity in Learning (C3L) here at UniSA [University of South Australia]. Colleagues like Dragan Gašević out of Monash or Simon Buckingham Shum out of University of Technology Sydney, there's a lot of work that's happened in really quite a short period of time. That is if you look back at it from the lens of today, it exhibits a surprising amount of surprising speed of development, if you will.

**JR:** That's a brilliant overview and gives me quite a quite a to do list to follow up on some of these things. And also, thanks for highlighting the MOOC that you will do. I think I will definitely sign up for that one. So, I think you are also concerned about some of the ethical and privacy issues that might arise. And earlier you were saying that there are some actors who are not so well-meaning when it comes to connecting with people. So, how do you address these kinds of challenges when you do learning analytics?

**GS:** So with learning analytics generally, if you sort of develop your own courses within a university setting, you're able to build in some of the key assessment questions that you might want to know about learning and learning performance, even assessment support or pathways through a set of courses and so on. There's less of an issue of sort of bad actors in that kind of a setting.

But if you have a secondary approach, such as you have a group of individuals who are trying to quantify the learning experience... - and like I said earlier, I think what's probably most needed is a theory of context in the learning space, because context matters significantly in terms of the results that we get and the outputs that we're actually working with and are assessing. So, from that angle to try and promote or assess how we do a better job of addressing that aspect starts to become quite significant.

Fortunately, within the specifics of data, we're not talking social media, where bad actors can manipulate and engage in various inappropriate ways to, say, move a conversation politically. In a university environment, most of the data that we're dealing with doesn't have that same capability for manipulation, because it's in a learning management system, it might be relating to course engagement, it might be related to eBooks or a range of other things that you're doing. So, you don't have quite that output.

But as you might have seen recently, there was this big uproar with what happened to the data that Instructure has access to as a result of being one of the largest learning management systems in the world. They're cloud based, which means they have all of this clickstream or interaction data from tens of millions of students and what are the ethical implications of that? I think that isn't a unique problem to education. Everybody, every company, is looking at what are your privacy rights? Germany has certainly taken an aggressive approach, Europe in general, with GDPR [General Data Protection Regulation], and others are taking an aggressive approach to how they respond to this. And so those are the kinds of questions that aren't unique for higher education to solve. Much like I said earlier, there are certain things technologically that we import into the university,

such as mobile phones or web-based technologies that are used in society. I think a lot of the issues around privacy and ethics with data and with analytics aren't going to be solved by the universities themselves. They're going to be solved by importing and reflecting the solutions that are common use in society more generally, in relation to technology use.

**JR:** You emphasize in your book and also just now the importance of context. So that's why I'm wondering if it's even possible to answer the question. So, the question is, do you have any views on what constitutes best practices of teaching and learning and also assessment in higher education? And I'm a little bit worried that you may say 'it depends'. But how would you respond to that?

**GS:** We do know, in higher education, much more than we actually practice. Part of the problem for things that we do know like best practices not being adopted is because, like I stated earlier, it's a system of systems. Ideally, if we had small student numbers with greater numbers of faculty, then good teaching and learning is relational. At the end of the day, especially at an undergraduate level, when you're transitioning into university at a graduate level, when you're becoming more nuanced in the academic discipline: those kinds of connections that you have with the people that you're working with, with researchers that are world leading experts and so on are critical to the cognitive and emotional development of students. So, I think from that end, we know a lot more than we practice. We know the importance of that relationship. We know the importance of a sort of a culture of care and concern for the individual students, making sure that people feel a sense of belonging, all of the fuzzy kinds of words that are quite important for students to succeed. Not all. Some students require very little sense of assurance and support, and others require much more. It's just recognizing that there's different profiles that are there. We also know a lot more than we practice about how we want to promote curriculum and optimal learning. And what's the role of goal orientation? What's the role of self-regulation? How do you take a student and give her an opportunity to feel a sense of community with the kinds of people that she might be learning with? And the list goes on.

So I think best practices really are those at a very broad level that affirm the value of human beings, that affirm the value of students, and the value of that relationship between the expert, namely the faculty member and the student because that's how these kinds of environments or these kinds of learnings are optimally communicated. There's a SEC report that's done now in the United States that looks at student engagement. And one of the big factors that they emphasize is the quality of the faculty relationship with a student is critical. Some work that Vincent Tinto has done as well, that addresses that when you have that kind of connection to university, it makes a big impact in terms of the students' longer-term success. I think this relates very well to topics you asked about earlier, relating to connectivism. It really starts with the quality of the relationship between the student and the faculty member and then over time, the quality of that student's ability to explore new topic areas by connecting them to new concepts based on things that they already know.

*It really starts with the quality of the relationship between the student and the faculty member and then over time, the quality of that student's ability to explore new topic areas by connecting them to new concepts based on things that they already know.*

Now, to the second part of the question, which is assessment, I think this is a difficult one because assessment plays a different role in the university than many of us are aware. What I mean is assessment is about evaluating, in many cases, sorting students into different buckets. It's not so much explicitly assessing their learning. There have been a number of examples. Harvard has their private universe. About 20 years ago, they discovered students graduating Harvard had fundamental scientific misunderstandings. MIT had something comparable, where they had graduates at MIT being unable to light a light bulb with a wire, a battery and a bulb. They had passed. They had met all the assessment needs, but they hadn't learned fundamental core concepts. And so that's the difficulty with assessment. Assessment is as much an evaluation of teaching as it is of the individual mastery of students and what you're mastering, what you're assessing, in many cases isn't what the student knows because they had a number of errors that have crept in, like the private universe and the MIT study indicates. What you end up with instead is individuals who can jump through assessment hoops, but actually haven't learned the material.

*What you end up with instead is individuals who can jump through assessment hoops, but actually haven't learned the material.*

**JR:** Any advice on how to make this better? Maybe having authentic assessments?

**GS:** I think a large part of it has to do with the saying I have used before: technology creates problems that only more technology can solve. And what that essentially means is that as we bring more students to the university sector, we provide them with better opportunities to learn but you have larger class sizes. It's no longer one faculty member for 20 students, you might have 150 or 200 students. So then, to solve that, you have options: you either reduce the size of your classes, which is not a realistic expectation, or you end up having a completely different transition to where you end up having to take advantage of approaches like learning analytics and so on to do a better job of assessing and evaluating students across a range of different approaches.

**JR:** Absolutely. Would you like to share with us what you're currently working on? My perhaps very superficial impression is that you like to work on many different things? And you don't want to be stuck in a certain area. So, what are you currently working on, any plans for the future?

**GS:** That's a great question. I think on the broad level, I'm interested around how human and artificial cognition influences knowledge processes and how that impacts society. That's essentially looking at, until now, we've largely

had this view of human knowers. Even when we talk about a knowledge network, we assume a human being. And I think, increasingly, that's not just going to be human beings. There will be artificial agents or AI models that will be part of our thinking process as a whole. That's going to be a key area of interest and where I'm devoting quite a bit of time focusing on right now. Also, I'm very interested in some of the psychological or cognitive dimensions of learning in digital settings, that's looking at AI and trust. For example, do we trust algorithms in the knowledge process? We're focused on group and collaborative processes, and what's the effect of being in certain kinds of networks? And if we are in a suboptimal network for learning, how can we change it? Same thing with sensemaking, I think how do we make sense of the world around us is increasingly important. Because it's a little different from learning the way we understand learning, but most of what we do each day is we try to make sense of the things that are happening around us and what does that mean and what's the longer-term impact of it? And so on. So, we spend quite a bit of time looking at least at some of those specific areas and then, of course, the ongoing interest in being in learning analytics and how we better assess, evaluate and support students when they're learning, especially in digital environments.

**JR:** Anything else that you would like to talk about?

*In many cases, as people use more and more technology, there's less and less humanity...what do we become when we use technology extensively? And do we like what that is?*

**GS:** Not really. We covered a pretty broad swath. But I do think that there's a fantastic opportunity that we face as a society for increasing the use of teaching and learning through these digital kinds of settings or digital environments. And I think that's going to have a tremendous long-term impact. But we do have a real need to be aware of: what we are losing in that process. And in many cases, as people use more and more technology, there's less and less humanity. And I think that's going to be a key problem for researchers, academics and others to focus on. Not so much: what can we do with technology? But: what do we become when we use technology extensively? And do we like what that is? Because if you look at it in 2003, 2004, 2005, social media, called web 2.0, was just starting. There was a lot of really optimistic perspectives on the value of everyone having a voice and the value of us being connected. But today, there's a lot of pushback, saying 'we actually lose a lot in this environment, we lose a lot of our humanity, we lose a lot of our ability to hold people accountable'. People can become mean and vicious online, even though they can be very polite and kind in person. So, there's a dehumanizing aspect, and the list goes on. So, I think there's a lot of core questions that we have not answered to date around the human impact of these technology innovations.



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