

## **Deep Learning in a Digital World**

### **Michael Fullan Balance, Technology and Pedagogy**

MICHAEL: The role of technology or digital is fascinating I guess is the way I would put it because it happened before pedagogy caught up to it. That is it started to come from the marketplace and it kind of [INAUDIBLE] and when we first looked at it I did a book called stratosphere that said technology is not necessarily a good thing. It's inevitable so let's think about it.

We ended up saying technology is not the driver, it's the accelerator. But now I've kind of a more balanced view because technology is so ubiquitous, there's so much social media part that it's a cause as well an outcome, as an accelerator as we put it. So I think the notion of it is first of all it's easy to overrate it so let's put it in perspective as we've heard people say technology is no more necessary than the pencil was.

So technology is what you do with it that makes the difference. So I think people have been--romanticized technology as some kind of phenomenal thing. And it is phenomenal in many ways in terms of its inner workings, but from a learning point of view you can use technology to do the most superficial things imaginable. Or you can ignore it and miss a lot of information.

So the role of technology is to get this equation I want to put it. The equation is what do we want to learn and how do we want to learn it? I've said the deep learning, the six Cs, the partnership, that's one half of our equation. And then how do we best learn that? And we learn it by tackling real problems. How do we tackle real problems? Technology gives us access to much more insight. So we've got to use technology to do that.

So wherever you start I think you want to end up with tightening the relationship between pedagogy and digital. I don't mean tightening it in a narrow way. I mean, even in an innovative focus way you can tighten it and that. And so as long as you start to have the two kind of feed on each other you're on the right track. Don't let either one dominate if you do. Pedagogy that say issues or tries to issue technology will not be as powerful.

Technology which is more likely, doesn't go deep in a pedagogy will end up being superficial and a waste of time. So technology is powerful, it's a means to an end.

Some examples of technology we're seeing now, students as change agents. So let's take a really low development, but high exciting example. One of our countries is Uruguay in Latin America. Very poor country aspiring towards democracy, doesn't have

much good teacher capacity yet. Teachers have very little training and so we have 100 schools working with us and here's a typical set of examples.

They have technology. They use YouTube type instruction along with the teacher helping. The students then start to look at and build robotic kits. So this is what they did. Students said "well, we're supposed to help humanity so we think we'll start in our own neighborhood." So one group took this group and said okay what are some local issues for us? Birds are eating the vegetables from the vegetable garden before we can reap the benefit of it.

And what they did is create a small robotic unit that vibrated when a bird came near the vegetable garden. It scared the birds away to preserve the garden.

So, simple example student invention. Another group were studying world war and the landmines. So they put together a robot that would detect landmines and go along and sensitize it. A third group said "well, lightning has killed recently some people on the beach including two children from a family." So when they literally created this I have no idea how they could do it. I wouldn't know how, but they created something that would detect the imminent presence of lightning 10 minutes before it happened and people would clear the beach, that type of thing.

So this really kind of in a sense going from nowhere to something that to me is pretty profound. So we have those examples but there are other examples where students have--I think of for example John. A. Lesley at eastern Toronto where the students were a high percentage of Bangladesh students. Parents wanted their children to thrive, not much going, and what happened in that school without our connection, I visited the school but it wasn't part of us causing it for sure. They created a theme, the students almost I think formulated students as change agents. So they began to say "what's learning about? What are we studying? What's Lake Ontario and its water like compared to at home in Bangladesh?"

One of the themes we have found and we didn't really--it wasn't part of our design. It just came out of the interaction, the creativity of deep learning, was student as change agent I've ended up calling it. And student as change agent means that students are effecting pedagogy, they're effecting learning environments, they're effecting the world actually, the world issues. They're learning and I think the millennials born since 1982 let's say onward, they don't want to be in an organization that's old fashioned, they actually don't want to be organizational people. But they have a propensity to wanting to have something meaningful in life, to make a contribution, to connect with others. What I call the helping humanity theme.

Again, it's not a theme where we said please help humanity. We didn't say that to them, it came out of deep learning. And so what's happening in this is students are not lots of examples, causing change in pedagogy. That is the way that teachers teach. They're causing change in the learning environment and a great example is John A. Lesley in Eastern Toronto and one day the principle Greg MacLeod came into his office and on his desk was an iPad, and there was a sticky note on the iPad that said "play me." And so he did that and it was his grade 1 students, seven years old and they said in this video "we have some ideas to change our learning environment." That was the language they used. "We want it to be organized so that we can be more collaborative, more focused, learn more." And so you take those ideas out and what a starting point for a discussion with students in grade 1? And then in that school they also studied the role of water in water rich countries and water poor countries. They were from Bangladesh many of these students. Lake Ontario was 1,000 metres away from them. So they began then to study the role of water.

So you could see the liveliness. They said "students are change agents." And then they began to say "well, who else are change agents in the world" so that pictures on the wall of famous change agents. The difference though now, it's not the famous change agents that are counting in deep learning, it's the everyday student. These are the change agents, individual and collective. Ordinary people, the collectivity, and this is why we're so excited about this.

Engage the world to change the world. If you have students en masse thinking like this and acting like this you're going to make an impact compared to if you have a few heroes or heroines who do this work. It does make a difference when that happens, but what really makes a difference is when the collectivity arises in sub-groups and combinations of groups. Again I say the big picture, where's the world going? Where's the universe going? And the small picture, what's my role in it? They begin to be on the same page for these people and this is what makes this exciting.