Breaking the walls: Digital Learning and the Future of Education

A speech delivered by Yvon Englert, Rector of the Université libre de Bruxelles, at the Academic conference on how technology shapes the new ways of learning in academic and professional environments (Tokyo, July 3d, 2019)

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Introduction

In 1994, a report sent by a group of experts to French Prime Minister Édouard Balladur (Théry, 1994) claimed that the internet was too limited to serve as the backbone for the future information highways. The following year, American astronomer Clifford Stoll expressed the same scepticism about the internet’s potential, declaring: ‘The truth is no online database will replace your daily newspaper, no CD-ROM can take the place of a competent teacher and no computer network will change the way government works.’ (Stoll, 1995a).

Twenty-five years later, such statements are lost in a long history of misguided prophecies about technological development, confirming Steven Pinker’s beautiful maxim: ‘The one prediction coming out of futurology that is undoubtedly correct is that in the future today’s futurologists will look silly.’ (Pinker, 1997, p. 83).

After such an introduction, I shall have to be very careful about what I say next about the changes brought to education by digital technology, just in case one of you decides to dig up this speech twenty years from now! And so, rather than make claims about some more or less distant future, rather than speculating about the dematerialization of universities, I shall discuss changes that are already taking place in higher education today, but whose long-term implications we can only speculate about.

I shall discuss five major areas of change: space, time, personalization, teaching methods, and roles.

Breaking the campus walls: abolishing spatial constraints

The first universities were founded in large urban centres such as Bologna and Paris, where teachers would gather around them students who had sometimes come from afar to attend
their classes. In fact, the word ‘college’ originates from the Latin *colligere*, meaning to gather. Due to the scarcity of teachers, manuscripts and libraries, people who wanted access to knowledge had no choice but to converge towards intellectual centres. Our campuses were born.

Inside these campuses, it is interesting to see how universities recreate the traditional classroom model on a larger scale, with a podium, rows of seats, and so on. This type of spatial organisation is now increasingly called into question by Active Learning Classrooms, in which students are gathered around small tables to facilitate group work and communication. The furniture is easy to move, so that groups can quickly be reorganised. Students can connect their laptop to a shared screen, and work together on the same document. Classrooms are becoming more flexible, and full of high-tech equipment.

On a more fundamental level, the classroom’s walls, and those of the campus, are gradually fading, as technology enables universities to reach students around the world.

Last year, one of our English teachers, Marjorie Castermans, was on holiday abroad when a complete stranger came up to her and said: ‘Hi, Marjorie!’ The stranger was one of the 150,000 people who had signed up to the MOOC entitled ‘Spice Up Your English’ launched by Marjorie Castermans in 2015, with an average of 30,000 students per session: that’s as many as ULB’s entire student body! So if MOOC’s are today put into question, it is mainly the economic model that is challenged but not the extraordinary tool it is for diffusion of knowledge.

Thanks to digital technology, virtual classrooms and online courses, universities can now spread their knowledge far beyond their natural geographical boundaries – and reach anywhere in the world where internet access is available.

This broader recruitment pool obviously means more competition between universities. If you can recruit your neighbour’s students remotely, then your neighbour can also recruit yours. This, in turn, could force study programmes, or even universities themselves, to become more specialised to refocus on their core strengths.

Another likely consequence is the growing importance of inter-university networks, as universities will have to join forces in order to stay competitive. One recent project that is especially dear to me is the creation of ‘CIVIS’, an alliance of 8 European universities from Stockholm to Athens, totalling nearly 400,000 students, around their three missions: education, research, and civic engagement. As you can imagine, innovative teaching methods and digital transformations, physical and virtual mobility of students and staff, will play a key part in our collaborations. The project was a few days ago selected by the European Commission as one of the first pilot projects for its "European Universities" programme and constitutes a major step towards the creation of a European Higher Education Area.

By increasing the reach of our universities, we can not only reach out to more students who live farther away, but also design new teaching scenarios that would have been impossible until very recently. Let me give just one example.
In August 2018, heavy monsoon rains in the Indian state of Kerala led to severe floods. Nearly 500 people died and a further million were displaced. In the months that followed, ULB students in the ‘Digital Fabrication Studio’ class, under the supervision of Professors Denis Terwagne (physics) and Victor Levy (architecture), sprang into action and used their digital fabrication laboratory, or Fablab, to design a series of devices that could help victims of similar disasters. They drew up plans for a folding boat, a life jacket for dogs, a water filter, etc., and the plans could immediately be shared with the Fablabs network in India.¹

This example clearly shows that digital technology is not only about replicating remotely what was done in a traditional classroom. By opening up our campuses more widely, digital technology creates new teaching opportunities by connecting teachers and students with people around the globe, involving them actively in the societal issues of their time.

**Shaking the course schedule: abolishing the time constraint**

Let’s now turn to the way technology disrupts the ‘unity of time’. In some ways, a university lecture is a performance: there may be course notes or textbooks, but transmission is mainly oral. So, being absent from class is like missing a show that will not be performed again until the following year. This is obviously a problem for the increasing number of students who have to work to pay for their education.

This is another area where technology has changed things. Technologies like the podcast, in which lectures are recorded as audio or video files, enable students to follow lectures they have missed, watch a lecture for a second time, or review parts of the lecture they found more challenging.

Technology can also upset the time organisation of traditional lectures. Flipped classrooms ask students to prepare the course material at home before coming to the lecture. The teacher’s role is then no longer to present the course material, but rather to answer questions, work on applications, solve problems, and so on.

With online classes, or blended classes (involving both face-to-face and distance learning), the academic calendar can change in even more drastically. Teachers and students no longer need to be online and working at the same time. Students can work at their own pace, at whatever time suits them best.

This flexibility is essential for traditional students who work alongside their studies, but even more for lifelong learning. While the target population of universities remains 18 to 24-year-olds, we must give people who are already working the opportunity to change track or obtain further training. Without the flexible schedules that digital technology allows, we will be unable to meet these challenges without massive investments in staff our universities cannot afford.

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Challenging the one-size-fits-all model

After time and space, I shall now focus on the personalization of learning activities. The model organizing our current teaching is called the ‘simultaneous model’: a teacher presents the same material in the same way to the same group of students. This model is so dominant, from primary school all the way up to university, that it almost seems the only option. However, as Jean Houssaye (2012) reminds us, other models have existed, such as the ‘individual model’, where the teacher devotes his attention to one pupil at a time, or the ‘mutual model’, in which large classes are divided into ability groups, supervised by more advanced pupils who are themselves supervised by the teacher.

From a teaching perspective, the simultaneous model has a major drawback: it does not address the issue of student heterogeneity. It is based the idea of an abstract ‘average’ student, ignoring individual differences between “real” students. In order to ensure that groups were as homogeneous as possible, a complex system of divisions and orientations was devised, complete with evaluation mechanisms that filter learners and try to ensure that stronger students are grouped with other strong students, and weaker students with other weak students. This, of course, can result in inegalitarian teaching, where students who are slower than average will not receive more support, but will simply be barred from moving up to the next year or relegated to a less prestigious section.

Once again, digital technology has the potential to challenge this age-old model with online platforms that can teach an unlimited number of students while adjusting to the level of each individual.

One of our projects, for example, entitled Objectif Réussite (‘Destination Success’), made thousands of maths, physics, and chemistry exercises available to new students, so that they could fill in any gaps in their knowledge. Students can therefore practice according to their own specific needs.

Let’s also mention the potential of learning analytics, which involves the collection and analysis of student data with a view to optimizing their learning, opening up interesting perspectives for personalised learning. Particularly when it is combined with developments in artificial intelligence, which makes it possible to make sense of very large quantities of data that are difficult to exploit “manually”.

Augmenting the learning experience

A few words now about teaching methods. In most universities, lectures remain the dominant teaching model. It is essentially the lecturers who speak, who “teach their subject matter”, sometimes with short question and answer moments.

Nowadays, technologies have considerably improved the learning experience. Thirty years ago, in my university, art history students had to learn about classical Greek and Roman masterpieces through hundreds of poor photocopies, or rather photocopies of photocopies of photocopies, passed down from one generation of students to the next. Today, billions of high-quality photos are available online, websites allow visitors to zoom in on a painting to
see its finer details, or take a virtual tour of a museum or historical site not to mention video, which is now found everywhere from online platforms such as YouTube to educational websites such as the Khan Academy.

But digital technology does not only give access to a profusion of media that students consume passively. It also enables students to experiment, get hands on experience, build bridges between theory and practice, or between academic knowledge and professional life.

Simulation enables students to experience scenarios that are close to real-life situations, without any risk to themselves or anyone else. When I was dean at ULB, for instance, I created SimLabS, a “laboratory for learning healthcare professions through simulation”. With its state-of-the-art equipment and its sophisticated mannequins, the laboratory puts learners in almost real-life situations where they can practise their technical skills and attitudes.

Serious games can be used to tackle complex topics in a more fun way. Denis Delpire, one of our lecturers in architecture, has developed a smartphone game entitled Breaking Beams to teach strength of materials. Students have to meet challenges such as calculating the properties of the correct beam for crossing a deep gap, based on the distance and the character’s weight.

Augmented reality is a technology that uses a tablet or smartphone screen to superimpose visual information on the real-world environment. It also enables us to manipulate manually, in three dimensions, objects such as a bone, a carved flintstone, the solar system, and so on.

By offering the students fully simulated environments, virtual reality enables them to wander round a reconstitution of ancient Pompei, investigate a crime scene, see the world through the senses of a schizophrenic, etc.

I could go on listing examples. As you can see, the contribution of digital technology, where teaching methods are concerned, creates infinite new possibilities for teachers and students alike.

**Blurring the roles**

The final point I would like to mention is the changing of roles. As I said earlier, there once was a time when the best available knowledge of an era was concentrated in our universities. Today, the situation has completely changed. Anyone with an internet connection has access to an infinite number of resources on virtually every subject.

This colossal pool of information is growing at an unbridled pace. Over the past 24 hours, 400,000 hours of videos were published on YouTube, nearly 80 million photos were published on Instagram, 4 billion posts were published on Facebook, and so on - numbers almost too large to comprehend!

Still, just because we all have information at our fingertips does not mean that teachers are no longer needed. Teachers play an indispensable role in helping learners to navigate on this
vast ocean of sources, developing the critical thinking skills they need to cope with an abundance of sources of information. No longer ‘sages on the stage’, teachers are increasingly becoming guides or learning facilitators.

Similarly, digital technology is also changing the students from passive spectators to the role of authors or producers of information and knowledge, thanks to digital technology. For example, in our MOOC entitled ‘Fautomaton’, devoted to French grammar errors, participants are invited to spot errors in their everyday surroundings and share photos of them on Instagram. In a social psychology course, students were asked to write Wikipedia entries on various topics.

Of course, it would be a mistake to assume that students, being digital natives, automatically have all the skills required to navigate the digital world and make the most of it. Research shows that this is not the case, and one of the roles of our universities is therefore to teach our students digital skills that will enable them to operate in tomorrow’s world.

Conclusions

After this necessarily incomplete overview of the changes brought to higher education by digital technology, it may be useful to recall what education technology experts have been saying for decades: technology itself is not the agent of change but, of course, the teaching scenario that is made possible. With technologies, it is perfectly possible to reproduce the most traditional of teaching methods, with all their flaws. Technologies can only improve teaching if the underlying teaching scenarios are well designed. And a teaching scenario can only be well designed by a team of enthusiastic, motivated, and well-trained teachers.

In my introduction, I gently poked fun at astronomer Clifford Still for making unfortunate prophecies about the future of the internet; I shall now conclude by quoting him again, in the hope that he will forgive me: ‘Access to a universe of information cannot solve our problems: we will forever struggle to understand one another. The most important interactions in life happen between people, not between computers’ (Stoll, 1995b, p. 50). I hope this statement will stay true, even if I am not fully sure about it. I thank you for your attention.

References