Education's Digital Future
Gerard Kilkenny

Introduction

In the video, Robinson argues that we have an education system designed in the intellectual culture of the enlightenment and the economic circumstances of the industrial revolution. The manifestation of this can be seen in the ringing of bells between lessons and the education of children in 'batches'. He asks two key questions: how do we educate our children to (a) take their place in the economies of the 21st century (b) have a sense of cultural identity while being part of the process of globalisation?

His hypothesis essentially is that the education system was driven by the economic imperative of the time and the enlightenment's view of intelligence as an intellectual model of the mind whereby some students benefit but most do not. He argues that we need to think differently about human capacity, to organise for more collaborative learning and to change the culture of our institutions. (Robinson, 2010).

The NMC Horizon Report is the result of a collaborative research effort between the NMC, NIDL and ILTA. It selected the most notable developments in technology, trends, and challenges for Irish higher education over the next five years. The twelve most important developments in technology, with indicative time to adoption, are as follows:

Category 1 (0-1 Years): Bring Your Own Device, Flipped Classroom, Mobile Learning, Online Learning

Category 2 (2-3 Years): Badges/Microcredit, Games and Gamification, Learning Analytics, Open Content

Category 3 (4-5 Years): Adaptive Learning Technologies, Collaborative Environments, Digital Identity, Social Networks. (Johnson, Adams Becker, Cummins, Estrada and Freeman, 2015).

Educational Change and Learning Technologies

How can we effect the kind of radical change envisaged by Robinson by using some of the twelve developments in learning technologies cited in the NMC Horizon Report? Before proceeding, we should be mindful of this quotation from Bill Gates: "We always overestimate the change that will occur in the next two years and and underestimate the change that will occur in the next ten." (Gates, Myhrvold and Rinearson, 1996).

The Category 1 technologies have all been a feature of the DIT TELTA module and with reference to the Slack app in particular, it would have been extremely difficult to engage fully with the module without my own devices. I think that BYOD should be replaced by **UYOD** (Use Your Own Device) because this is really the common denominator for all four technologies. I have re-configured my classroom learning space to allow my students to use the 23 school iPads containing the GeoGebra app and other Maths apps. I see the flipped classroom as an approach to teaching and learning

that is supported by mobile and online learning. From personal experience and research, there are considerable technical challenges associated with introducing tablet devices into schools. (Hallissy, Gallagher, Hurley and Ryan, 2013).

Looking at the Category 2 technologies, badges have been a pervasive feature of the DIT TELTA module. Mozilla has published an open specification for badging called the OBI. (Mozilla, 2017). I think that digital badges are an excellent way to 'microcredit' student achievement and there is pleasant finality in receiving a badge at the end of each CA. Learning analytics is an educational application of "big data" and can be used to identify students' learning needs as well as to create adaptive learning software.

The Category 3 technologies include adaptive learning technologies which adjust to individual students' needs as they learn. In Ireland, Professor Vincent Wade has been a leading researcher in this area for a number of years (O'Donnell, Lawless, Sharp and Wade, 2015) while the US company FishTree has been working with NIDL. The idea of collaborative learning has been greatly influenced by the learning theory 'connectivism' proposed by George Siemens. In a seminal paper, he presents a model of learning which is no longer an individualistic activity and argues that connectivism has implications for the design of learning environments. (Siemens, 2005). This echoes Sir Ken Robinson's assertion that "most great learning happens in groups" and his concerns about outdated factory style educational institutions. (Robinson, 2010). Blackboard Collaborate, used successfully on the DIT TELTA module, is a very good example of software that supports collaborative environments.

Conclusion
The Department of Education's vision for ICT integration in Irish schools is to "realise the potential of digital technologies to enhance teaching, learning and assessment so that Ireland's young people become engaged thinkers, active learners, knowledge constructors and global citizens to participate fully in society and the economy." (DES, 2015, p.12). Perhaps it is the case that many of the technologies that are considered in the NMC Horizon Report will be left behind by some 'killer application' or hardware technology that is beyond the visible eLearning horizon, possibly in the fields of robotics, artificial intelligence and virtual reality. In the meantime, the introduction of the new Junior Cycle, which will allow schools to create their own new syllabuses, may help to address the human capacity and creative thinking issues referred to by Robinson. (JCIE, 2017). This introduction has created an argument for one hour classes which may allow for different modes of teaching and learning within the class period, including collaborative and mobile learning. (NAPD, 2017).

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