Chapter 28
Disruptive Technologies and Education:
Is There Any Disruption After All?

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ABSTRACT

With the rapid development of information and communication technologies at the beginning of the 21st century terms like 'Cloud Learning,' 'Mobile Learning,' 'e-Learning,' and 'MOOCS' have been added to the long list of 'disruptive' technologies expected to revolutionize education forever. But while it is easy to see how ICT's have put unimaginable amounts of information at the fingertips of students, can we say that this is truly revolutionizing education? Are higher education institutions adjusting their pedagogic practices to make full use of these technologies? In fact, are they using them at all? In this chapter we take a closer look at the use of Information and Communication Technologies (ICTs) in higher education and report findings from a study asking how these technologies are being used in academic activities. We set up the framework for the discussion by reviewing some of the most important historical developments in educational technology to then move on to present the study's results. The chapter closes by contrasting these results with past predictions about the disruptive potential of ICTs and finally reflecting on the steps that will have to be taken in order to make the most out of these technologies.

INTRODUCTION

It is common to think of computers when discussing educational technologies, however, while most educational technologies these days are based on the computer, the term *'educational technologies'* comprises many kinds of technologies and processes (Stallard & Cocker, 2001). In the past however, educational technologies have been seen from two different angles; one that saw educational technologies as teaching aids and in the form of hardware, and the other, that saw educational technologies more as a form of educational science and taking the form of software. In general a

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holistic vision considers educational technologies to be the application of all kinds of systems to teaching and learning (Bajpai & Leedham, 1970).

The Revolution that Keeps Coming but Never Arrives

According to Stallard and Cocker (2001) there should be no traditional schools left by the time this chapter is being written; according to their forecast, ICTs would have transformed education in such a way that by 2014 'fixed' learning environments would have disappeared in many communities and learning from printed materials would be the exception (see also Siu, 2001a, 2001b, 2011). In fact books should have disappeared long time ago; in 1922 Edison was the first to assert that film would soon "supplant largely; if not entirely the use of textbooks," something he confirmed three years later when saying that "in ten years textbooks as the principal medium of teaching will be as obsolete as the horse and carnage" (Oppenheimer, 2003, p. 3)

But Edison and Stallard have been far from alone in predicting the revolutionary changes in education that disruptive technologies would bring, in fact others have been far bolder and have predicted nothing less than an entire intellectual revolution, a 'leap' in human evolution (Stallard & Cocker, 2001; Oppenheimer, 2003; Ingram & Tiene, 2001).

At the beginning of the 1950s textbooks were still around, but a new technology was at the center of the next 'revolution' in education; this time was radio. As a new promising technology, radio gave way to a whole new wave of speculation and predictions about its benefits as a medium of instruction (Oppenheimer, 2003); however its popularity as 'the disruptive technology of the moment' did not last long. By the end of the 1950s, programmed instruction and '*teaching machines*,' had embodied software and hardware technologies through which it was possible to "learn twice as much in the same time and with the same effort as in a standard classroom," or so the promoters of these technologies sustained (Oppenheimer, 2003, p. 4).

Ultimately with the development of computers education would move towards the most intense era of educational technologies development seen so far. As Selwyn (2002) points out, out of all 'love affairs' between education and technology, the 'techno-romance' with the computer has undoubtedly been the most impassionate (Selwyn, 2002). No technology has generated more speculation and predicted to change education as profoundly as the computer; in fact the computer has given place to different waves of excitement around revolutionary technologies that were supposed to change education forever.

As early as 1966 Patrick Suppes envisioned that due their interactive nature, computers were going to affect education permanently (Selwyn, 2002), a belief shared by LOGO creator Seymour Papert, who in 1980 sustained that the synergy between humans and computers would eventually "blow up the school" so long computers where sufficiently available (Oppenheimer, 2003, p. 20) He reassured this a decade later noting that; it was now that more computers where at home rather than at school, that the real revolution was about to happen, the rest is history.

If by chance the hype around computers as the ultimate educational technology was winding down, the emergence of the World Wide Web during the 1990s brought with it a whole new era of technological wonders and grand visions of educational revolutions taking place in the years to come. At the turn of the twenty-first century the Internet had become the one technology that would definitively bring drastic changes into education; Stallard (2001) forecasted that by 2007 schools would be facing serious competition from online education providers and that this competition would start tilting in the favor or e-learning as early as 2010 (Stallard & Cocker, 2001).

Around the same time, another technology started to catch the attention of technologists; the