A Historical Review on Learning With Technology:
From Computers to Smartphones

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INTRODUCTION

To harness technology in education has been a long-lasting endeavour by technology specialists, educators and also learners themselves (Facer, 2011; Somekh, 2007; Starkey, 2012). Among a variety of other terms in history, e-learning can be used as an umbrella term to cover their ongoing efforts. E-learning has been operating like a powerful lever that sparks a revolution in light of service of evaluation, institutional structure, relationships between the instructor and learner etc. (Horton & Horton, 2003). In a word, focus should be put on a cross-field content when it comes to e-learning. In the meantime, with mobile technology developing and spreading rapidly in recent years, 'mobile learning' or 'm-learning' has gained a solid foothold (Traxler, 2009a, 2009b, 2009c). With the increasing convergence of technology and education, the tool and medium to facilitate learning is shifting from stationary book pages to interactive digital screens. Digital technology has great potentials to breed a pedagogical transformation based on novel approaches and methods.

This chapter focuses on the broad contexts of e-learning and m-learning. By comparison, e-learning is not discussed that much due to its extremely wide coverage, while m-learning is elaborated despite its short history of development in recent decades.

E-LEARNING: EDUCATIONAL TECHNOLOGY ON THE COMPUTER MEDIUM

The umbrella term 'electronic learning', or 'e-learning' for short (also as 'E-Learning', 'e-Learning' or 'E-learning' in prior literature), is a broadly defined tool that may apply to any digital media in the course of learning and training, covering the overwhelming majority of, if not all, technologies in modern times. Although ICT (information and communication technologies) seems to be a more accurate term to include comprehensive digital technologies, e-learning seems to be more widely accepted and influential than 'ICT-based learning', which emerged at the turn of this century (Finger, Russell, Jamieson-Proctor, & Russell, 2007, p. 2).

In fact, the scope of e-learning varies across time and users. Generally speaking, e-learning includes computer-based learning, web-based learning, virtual classrooms and digital collaboration. In some conceptualisation, e-learning seems largely synonymous with the term "online learning" and overlaps with "distance learning" (Pachler & Daly, 2011, p. 11). In a narrow definition, e-learning is confined to

"online access to learning resources, anywhere and anytime" (Holmes & Gardner, 2006, p. 14). Nevertheless, other researchers hold that, as fundamental terms, 'e-learning', 'online learning' and 'distance learning' are often used in a rather conflicting manner, and e-learning should not refer to web-based practice only (Moore, Dickson-Deane, & Galyen, 2011). In recent years, researchers on e-learning tend to prefer a more flexible boundary of the concept, adopting an open approach to define e-learning. In an inclusive definition, e-learning is described as learning assisted by almost any kind of technology (Daly & Pachler, 2010, p. 217):

[A] set of practices which enhance the potential of people to learn with others via technology-aided interaction, in contexts which can be 'free' of barriers of time and place. It involves the utilisation of a range of digital resources - visual, auditory and text-based - which enable learners to access, create and publish material which serves educational purposes.

The computer, increasingly sophisticated, versatile and integrative, always serves as the medium of e-learning. Researchers have long been using 'computer' to represent educational technology, with acronyms including but not limited to CAL (computer-assisted learning), CAI (computer-aided instruction), CML (computer-managed learning), CBE (computer-based education), and CmC (computer-mediated communication). The role of the computer in education might be slightly different. According to Higgins (1983), US researchers often used 'aided' and 'instruction' as in CAI, while their British counterparts favoured 'assisted' and 'learning' as in CAL. It seems that 'assist' may better describe the role of computers in education, while 'learning' can imply that the focus of this process is on the student's side.

E-LEARNING: FOR AND BY AUTONOMOUS LEARNERS

It is believed that e-learning may afford multiple pedagogical advantages in terms of, among others, availability, accessibility, and perhaps most importantly, learner autonomy (Ellis & Goodyear, 2010). At first, the richness of educational resources in e-learning settings significantly outperform those of traditional offline classrooms. Multimodal materials in various forms (e.g., spoken or written words, moving or stationary images, audios and videos) often abound in e-learning, offering different learning experiences (Domingo, 2014). Learners can also navigate to a wide range of expanded topics and related resources through hyperlinks, which is virtually impossible via physical textbooks. Shifting from pages to screens has made a huge difference.

In addition, it is apparent that live and/or prepared materials on e-learning platforms can reach a larger group of targeted learners simultaneously than those confined to an offline classroom. The MOOC project, for example, with its access to open learning resources, provides learners with unprecedented forms of courses beyond spatial-temporal limits. Teaching practitioners are enabled to offer equal opportunities for those who are disadvantaged by physical, geographical and social-cultural issues, without making special trips and visits to approach them. In this case, a crippled student living afar with slightly inferior academic performance can receive online courses as well, not being left behind by the peers. This indiscriminate and effective learning model may foster more potential advantages.

Furthermore, e-learning may help foster a higher level of learner autonomy. Researchers generally believe that e-learning features and enhances learner-centredness instead of traditional teacher-centredness (Doyle, 2008; Duffy & Kirkley, 2008; Luckin, 2010). In the meantime, e-learning is strongly associated with constructivism, both cognitive and social (Felix, 2005b; Koohang, Riley, & Smith, 2009; Rennie

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