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Introduction to Digital Technology

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The use of digital technologies in education has been widely advocated (Aldrich, 2004; Quinn, 2005), and institutions such as the British Educational Communications and Technology Agency (BECTA, 2003) strongly encourage the adoption of information technology in teaching and learning. These technologies are most commonly employed by students, who use digital technologies for both academic learning and entertainment (Tien & Fu, 2008), primarily develop digital literacy skills outside formal education (Ito et al. 2008) and are able to easily use unfamiliar technologies. Prensky (2001) adopted the term 'digital natives' to refer to students who have grown up in the realm of digital technologies and are fluent in them. Those who have not grown up in this environment and who may adopt these technologies are referred to as 'digital immigrants'. The concept is similar to the notion of the 'Net Generation' (Tapscott, 1998). This does not, however, preclude other non-native students, often targeted by widening participation schemes, from adopting these technologies. Intergenerational differences in the perceived usefulness and importance of digital technologies are minimal (Salajan, Schonwetter, & Cleghorn, 2010), and some researchers have questioned the assumed divide between digital natives and digital immigrants (Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010).

A range of digital methods have been adopted, including blogging (Azizinezhad & Hashemi, 2011), microblogging (Grosseck & Holotescu, 2010), the Internet (Blaska & Sedlacek, 2008; Rolando, Salvador & Luz, 2013), podcasts (Lonn & Teasley, 2009), videos (Savas, 2012), digital stories (Bran, 2010), digital games (Sun, Wang, & Chan, 2011; Watson, Mong, & Harris, 2011; Yang & Chang, 2013) and audio feedback (Ice, Curtis, Phillips & Wells, 2007). It is suggested that digital technologies are most valuable when combined with a social constructivist approach, whereby knowledge is constructed by students using digital technologies (Fosnot, 1996; Prawat, 1996). The inclusion of digital technologies in teaching may encourage the transition from a teacher-centred to an active student-centred learning environment (McDonald & Hannafin, 2003; Watson et al.,

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2011). Students exposed to these digital technologies experience a number of advantages, including enhanced student engagement (Yang & Chang, 2013), focus (Barab, Thomas, Dodge, Carteaux & Tuzun, 2005), attitudes towards learning (Szafron et al. 2005; Wu, Yen, & Marek, 2011), self-efficacy (Freeman, 2012) and motivation (Barab et al. 2005; Wu et al. 2011). Consequently, students who experience digital technologies in education display enhanced critical thinking skills (ELSPA, 2006), academic achievement (Chiou, Lee, & Liu, 2012; Freeman, 2012) and proficiency (Savas, 2012). In addition, the use of digital technologies increases teacher professional development (Wu & Kao, 2008).

There are, however, a number of limitations associated with the introduction of digital technologies, such as increased inequalities between student groups and student failure to connect the digital technology with subject specific knowledge. Traditional barriers to the adoption of digital technologies by tutors include resource limitations such as a lack of knowledge, time or the cost of hardware (Ortegren, 2012), administrative or workload issues (Schneckenberg, 2009; Van Tartwijk, Driessen, Van Der Vleuten, & Stokking, 2007), staff resistance (De Rijdt, Tiquet, Dochy, & Devolder, 2006), skill or confidence levels (Hew & Brush, 2007) and perceived ease of use or utility (Venkatesh & Davis, 2000; Yuen & Ma, 2002). A range of factors influence the manner in which digital technologies are introduced and received. These include the specific subject discipline (John, 2005; Ortegren, 2012) and cultural values (Herbig & Dunphy, 1998). There are also gender and ethnic group differences (Fan & Li, 2005) related to the access to and use of digital technologies. Furthermore, whilst digital technologies offer education practitioners a range of opportunities for enhancing practice, these technologies may be rarely or inappropriately (Hew & Brush, 2007) employed in teaching practice. For example, digital technologies are often used in a manner which is familiar or convenient to supporting traditional teaching practices rather than for more innovative or creative forms of education (Hughes, 2005; Zhao, Pugh, Sheldon, & Byers, 2002). In this manner, digital technologies may increase access to traditional teaching but not influence or improve teaching style (Rolando et al., 2013).

References

Aldrich, C. (2004). *Simulations and the Future of Learning: An Innovative (and Perhaps Revolutionary) Approach to e-Learning*. San Francisco, CA: Pfeiffer.

Azizinezhad, M. & Hashemi, M. (2011). The use of blogs in teaching and learning translation. *Procedia: Social and Behavioral Sciences, 28*, 867–871.

Barab, S., Thomas, M., Dodge, T., Carteaux, R. & Tuzun, H. (2005). Making learning fun: Quest Atlantis, a game without guns. *Educational Technology Research and Development, 53*, 86–107.

Blaska, J. & Sedlacek, M. (2008). Teaching basic measurement algorithms via Internet. *Measurement, 41*, 130–134.