What is driving university teachers' flexible integration of information and communication technologies?

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Introduction

The use of Information and Communication Technologies (ICT) has sparked crucial changes in all aspects of life, especially in higher education since its early developments including the inception of the Internet in 1973 (White, 2008), the first IBM personal computer reaching end-users in 1981 and the emergence of world wide web in 1990 (Hanrahan & Madsen, 2006). The term ICT remains a 'buzzword' (Bonk & Zhang, 2008; Chadha & Kapoor, 2012; Godin, 2006; Micheuz, 2006; Thanuskodi, 2011) in the scholarship of learning, although it now has widespread application in tertiary education. Despite its prevalence, White (2008) among others has suggested that 'more flexibility' in learning modes, along with flexible integration of 'social networking' are required to bring about better learning outcomes.

In this article, we outline three forces driving university teachers' flexible integration of ICT. They are (i) pressure from web2.0/3.0 native peers and learners leading to a need for flexible autonomy in university teachers (ii) teacher professional development resulting in flexible options in teaching and learning; and (iii) mobile learning

collaboration and sharing triggering flexible partnership and cooperation among educational institutions. These three driving forces have an underlying thread: they impact on teacher's flexible integration of emerging technologies in tertiary education.

Pressure from Web2.0/3.0 native peers and learners

Clifford cited in Healey, Ioannou-Georgiou, Kessler, and Ware (2008) emphasized that technology cannot remove teachers but tech savvy teachers 'will replace' the teachers who stay away from technology. Therefore, as suggested by Facer (2012) today's teachers are increasingly aware that they must learn to not only 'keep up' but 'catch-up' with latest ICT developments (Facer, 2012). Earlier Facer (2011) also pointed out that the necessity of up-to-date knowledge of technology for teachers because what can be considered as their 'today's expertise', 'will not guarantee expertise in tomorrow's' university environment.

Keeping up to date, however, is more than just periodically renewing knowledge of technologies. An entirely different pedagogy is required from the technology-based learning of the 1980s and 1990s where teachers/

instructional designers and technology developers worked together to develop educational technologies to convey knowledge and skills to their learners. Instead, the challenge for today's teachers is that they are no longer seen as the single source of knowledge. Learners growing up in the Web 2.0 (online interactive and collaborative) (Gonca Telli & Faruk, 2011) and Web 3.0 (incorporated intelligence and responsiveness) (Rajiv & Manohar, 2011) environments believe that they have the right to participate in and even intervene in all the teaching processes and decisions (Crook, 2011; Facer, 2011), and select the setting in which they immerse themselves (Selwyn, 2011). This places pressure on the teacher to operate within and compete with the interactive and responsive digital world. In addition to pressure from Web2.0/3.0 native students, 'tech savvy' colleagues who operate confidently within social networks and online communities and easily access varied digital resources may place invisible pressure upon their non-digitally confident colleagues.

The difficulty however is training university teachers within this rapidly changing environment. Technology resistant teachers recognise a 'push' to keep abreast with the 'tech savvy' teachers if they wish to retain their students respect and trust. However, lack of ICT knowledge may 'pull' these teacher back to traditional pedagogy in which teachers dominate the class and learners remain passive recipients. Instead of acquiring technology skills per se, university teachers need to learn further flexibility in engaging with technological options, 'solving their teaching problems' (Gonca Telli & Faruk, 2011) and engaging students with knowledge and skills Bonk and Zhang (2008) stressed that developing teachers' autonomy or choice is a vital principle in effective teaching with technology. Therefore, we see that it is the teachers' responsibility to self-equip, adapt and respond to ICT requirements, while technology training should develop skills in flexible decision-making.

(ii) Professional development

Becoming familiar with the use of technology has become a standard

professional requirement for teachers in schools as well as in universities (Grajek, 2012). However, rather than training teachers to use individual technologies, the movement has been towards providing teachers with models of technology use in Education such as the Substitution, Augmentation, Modification and Redefinition (SAMR) model proposed by Puentedura (2006), the Unified Theory of Acceptance and Use of Technology (UTAUT) model developed by Venkatesh, Morris, Gordon, and Davis (2003), and the Technological, Pedagogical and Content Knowledge (TPACK) model designed and renewed by Roblyer and Doering (2010). These models provide university teachers with the conceptual tools to flexibly integrate a variety of technologies to maximise teaching and better learning outcomes. The teacher is once again given prominence in the teaching/ learning transaction, not as a purveyor of knowledge, but one who, in the words of Goicoechea & Parker cited in Williams (2012), facilitates 'learning [that] entails both personal and social transformation'. As teaching is yet another form of learning, the teacher is also potentially transformed.

Professional development for teachers in the Web2.0/Web3.0 environment is not limited to face-to-face or static online courses. Teachers can get mutual support thanks to 'collective wisdom' from their community of practice (Rollett, Lux, Strohmaier, & Dosinger, 2007). In the process of teaching their students the new 'literacies' (Gee, 2004) of flexible online communication, the teachers develop their own 'new literacies' and pedagogies negotiating a matrix of emerging technologies including physical technology facilities, generic software and IT solutions, including laptops, iPads, interactive whiteboards, wikis, webinars, Dropbox etc. Teachers have a range of choices to utilize to develop their students' knowledge and skills, and a flexible range of professional development opportunities including self-training, communities of practice or learning from tech savvy peers will help to facilitate their autonomy in flexibly integrating these technologies.

(iii) Mobile trend

Another important element driving flexible integration of technology is the trend toward the use of mobile devices. University teachers no longer need access to computer laboratories, projectors or even bulky laptops to guide their students' learning. The emergence of mobile devices and students' ability to quickly access resources have changed the roles of university teachers from 'transmitters of knowledge to guiders of learning resources' (Naismith, Lonsdale, Vavoula, & Sharples, 2004). Mobile learning devices specifically such as iPad, iPhone, Galaxy Tab and the new Microsoft Surface are increasingly common in classrooms and provide learning opportunities that teachers need to take up or be left redundant (Van Oostveen, Muirhead, & Goodman, 2011). As these mobile learning technologies create greater access to learning , university teachers face the challenge of losing their monopoly as the sole provider of educational knowledge due to the fact that learning environment and materials can be accessed anywhere and anytime (Marco & Giovanni, 2010). The concept of 'open learning' (Winch & Gingell, 2008) and open courseware initiatives such as the MIT project (Vladoiu, 2011) have paved the way for limitless learning opportunities and unlimited sharing of educational resources. It also created intensive and extensive interaction among teachers and learners. Mobile technologies and devices with its increasingly application in higher education call for a flexible partnership among educators and educational institutions as well as flexible access to educational resources. In other words, it calls for greater cooperation and better preparation to join the online community towards the so-called 'internationalisation' of higher education (Amirault & Visser, 2010) where all stakeholders could converge with a common goal through different pathways.

Conclusion

We believe that the focus of ICT in education should not lie in the technology itself; rather it is the question of how technology is integrated in a flexible way that enhances learning outcomes. Otherwise, ICT uptake only creates greater 'dependency' resulting in educational failure (Toure, Tchombe, & Karsenti, 2008). In other words, instead of paving the way for a greater autonomy, learners might be forced to be dependent on technology and the availability of technological facilities might be just employed for the sake of decoration for the learning environment. In order to achieve effective learning in this new learning environment, knowledge of pedagogy remains as necessary as knowledge of technology. Teachers require support in making autonomous decisions and flexibly making choices of the best technological applications to guide their students in the development of knowledge and skills. Support from peers, a range of professional development options, pedagogical models and cooperation among educational stakeholders will provide university teachers with the confidence to take up the challenges of flexible technology integration.

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