Preface

PROMOTING INTEGRATED TECHNOLOGIES FOR INNOVATION AND CHANGE: AN OVERVIEW OF THE IMPLICATIONS FOR VIRTUAL AND PERSONAL LEARNING ENVIRONMENTS

INTRODUCTION

The term Information and Communication Technology (ICT) incorporates two key aspects of the changing worldview associated with the network society. One is the easy access or increasingly overabundance of information, at any time or in any place (Baron, 2009). The second is the emphasis on communication. These new technologies are significant in terms of the opportunities they present for learners to build relationships with one another, the fact that they have achieved an almost “normalised” state (Bax, 2003), and that they aim to improve communication between individuals and organizations. The growing presence of ICTs in education since the early 1990s has been the result of an increasing awareness by national and international policy makers of the need to prepare learners for the challenge of 21st century skills (Economist, 2012). Today’s students and educators are living through an information revolution, a process which reflects the transition to a globalised economy with a high degree of national and international interdependence (Lockard & Pegrum, 2007; Luke, 2003). Significant investment in ICTs by national governments is indicative of its increasing importance in policy terms. This investment reflects the idea that technology can enhance learning outcomes and the growing realization that students’ ICT literacy skills have to develop in order for national economies to remain competitive in an increasingly interconnected world (Negroponte, 1995). Where once such a rationale was clear for more vocational disciplines and training purposes, now it is equally applicable to a range of other disciplines, where educators have sought to foreground the importance of cross-cultural skills and information technology alongside traditional content based learning (Neville, 2009).

In place of face-to-face or presence-based learning new forms of teaching and learning have been promoted alongside these new digital devices of the information age, from blended learning to e-learning, from mobile learning to second generation Internet or Web 2.0 applications (Bruns, 2008; Nivala, 2009). Technology is supporting the development of new approaches to lifelong access to education via a focus on anyone, anytime, anywhere learning (Ito, 2009; Ito et al., 2010; Jenkins, 1992). The new technologies support open and distance learning and the goal of realizing the type of flexible and reflective learning demanded by the information society that is available 24/7 (Kolb, 1984). If these visions are to be achieved, however, the challenge is to ensure that the new learning technologies promote rather than inhibit the spread of learning opportunities (Norton, Tiley, Newstead & Franklin-Stokes, 2001). While the new technologies have found a place in the mainstream, they are also being used to re-enfranchise elements of today’s disaffected youth, subgroups, or minority cultures (Goodfellow, 2006). The tremendous investment in ICT projects and programmes around the world, from the European Union to the United Nations’ UNESCO, attest to the role policy makers ascribe to its ability to narrow or span the so-called digital divide and to promote social inclusion (Oblinger, 2004; Oblinger & Oblinger, 2005).
New learning technologies generate a lot of excitement and a lot of funding and sponsorship as they are often driven by commercial rather than primarily pedagogical objectives (Buckingham, 2007). One-to-one laptop programmes around the world, as well as the use of Interactive Whiteboards and digital gaming (Squire, 2002; Thomas & Schmid, 2010), are two prominent examples of this. Through a lack of strategic planning and concern for appropriate integration, they also generate of lot resistance, failure, and often, a considerable waste of resources. ICT equipment can and often is increasingly made available to people disenfranchised from traditional modes of education, but this access to the physical equipment does little to improve real access if they do not know how to use it, and the trainers have never been properly trained. The shortcomings of many educational projects based on significant injections of funding stem from being high on good intentions but low on overcoming issues related to training and integration (Cuban, 1986).

Over the last decade there has been a growing focus on how learners use and experience learning in technology-mediated contexts. In this context, learners are typically perceived as creators of knowledge and content (Bennett, Maton & Kervin, 2008; de Freitas & Maharg, 2011; Palfrey, 2008; Pegrum, 2009). Nevertheless, more critical research is required on the diversity of student use of technologies in ICT enabled learning contexts, as well as their perceptions of computer-mediated learning, from digital gaming to virtual worlds (Bogost, 2007; Brown & Murray, 2005; Peterson, 2010, 2011). In technology-based learning, there has been a movement away from tutor-centred models of instruction to user-generated content and participatory and collaborative forms of learning (Gromik, 2012; Prensky, 2001, 2005, 2007). An important aspect of this is to what extent digital age learners are acquiring the skills required to be effective at critical reading without the active participation of educators in the process (Purushotma, Thorne & Wheatley, 2008; Reinders, 2012). The role of the educator is not merely to satisfy learner expectations. Although the case for collaborative learning has been repeatedly made, pedagogical models have not emerged that clearly identify strategies for realising it (Rheingold, 2003). It is important to understand the growing awareness of the intersection of digital literacies and ICT skills, the importance of effective national policies on learning, and economic competitiveness within a globalized world (Lankshear & Knobel, 2008).

In this context, second-generation Internet applications in particular have been heralded as the harbingers of a radical transformation of pedagogy that replaces the “read-only Internet” (Web 1.0) with the “read/write web” (Web 2.0)—establishing increased potential for student participation, higher quality instructor feedback, as well as enhanced interactivity and collaboration through the development of user-generated content (Comas-Quinn & Mardomingo, 2011; Sykes, Oskoz & Thorne, 2008). Significant changes in the way people use the World Wide Web have occurred since the emergence of the second generation of the Internet in 2003 (Roberts & Foehr, 2008; Tapscott, 2009). As Warschauer and Grimes (2007) argue, “there is little doubt that the ways people make use of the Web have qualitatively changed in the last few years” (p. 2). The differences between the first and second generation of the Web are concerned with “an evolution from the linking of information to the linking of people” (p. 2). Web 2.0 is having a particular effect on modes of communication (Soloman & Schrum, 2007; Warschauer, 2011; Zheng, Young, Brewer & Wagner, 2009), especially in relation to new ways of interacting with one another, as well as how people participate and collaborate, both in and outside of learning environments (Sharpe, Beetham & de Freitas, 2010; Terdiman, 2010; Thomas, 2009).

In methodological terms these trends are associated with a shift towards social constructivist theories of teaching and learning, which foregrounds the importance of task-based learning (TBL), project-based learning (PBL) and personal learning environments (PLEs) (Selwyn, 2011a, 2011b; Selwyn, Potter &
Crammer, 2010; Thomas, 2011a, 2011b; Thomas & Reinders, 2010). Research by the British Educational Communications and Technology Agency (BECTA, 2006) identified that learning could be supported by the use of the new digital technologies in five main ways:

- Greater choice in learning opportunities and modes for all learners.
- Learners have increased motivation for and engagement in learning.
- Fewer learners under-perform or fail to succeed in education.
- There is improved child safety and protection.
- Practitioners collaborate and share good practice and learning resources. (see also, UNESCO, 2012a, 2012b, 2012c).

BECTA’s research goes even further and attempts to situate this vision of a Web 2.0 pedagogy in a wider educational policy context of e-strategy. Web 2.0 social software can also help, it suggests, by:

- Tackling social equity by reducing inequality in educational opportunity, targeting technology for learning support and resources to those who need it most.
- Narrowing achievement gaps by applying technology to increase opportunity and engagement with under-achieving groups.
- Personalizing education—providing greater customization, match to individual needs and greater choice and opportunity for learners and developing more responsive and flexible arrangements for learning both in and outside of formal curricula.
- Exploring different and transformed models for delivering personalized educational services to users, particularly to under-achieving, hard to reach and disengaged groups.

When stated in such terms, this is a compelling vision of a new pedagogy mediated by digital technologies. Much of it however is based on assumptions about the ICT skills contemporary students are thought to possess and more specific and detailed research needs to be done in specific disciplines in order to map these new contours.

This collection of twenty chapters engages with some of the most important areas of research arising from this context and presents interventions from a range of international educators and researchers. The book is divided into three parts focusing on ‘technologies,’ ‘innovation’ and ‘change’ respectively and presents a snapshot of contemporary research in the field.

**AN OVERVIEW OF THIS BOOK**

**Section 1: Technologies**

In Section 1, there are seven chapters each addressing a range of technologies that have influenced the direction of presence-based and virtual education. In chapter 1, “Learning Molecular Structures in a Tangible Augmented Reality Environment,” Asai and Takase focus on an area that has the potential to make a significant contribution to virtual environments over the next five to ten years (Dede, 2002). Using augmented reality (AR) technologies in a tabletop environment, the article explores how enables learners to observe three-dimensional molecular structures. The research highlights how the AR tech-
nologies aided the faster identification of molecular structures than students who merely had access to traditional PC environments utilizing a more limited Web browser experience. AR was shown to induce a greater level motivation and enjoyment on behalf of the students and they were able to achieve enhanced manipulation and presence of the biological structures as a result.

Since around 2005, Web 2.0 technologies have been associated with the issue of increased learner engagement. In a corporate work-based training context, wikis and blogs have been the two most frequently adopted Web 2.0 tools. In “Organisational Blogging: The Problem of Engagement,” Baxter, Connolly, and Stansfield discuss this area with research on an internal organisational blog that is used with an HR division of a large public sector company in the United Kingdom. The research adopts a qualitative approach utilising case studies to explore how members of staff use the blog and its impact on facilitating learning within the organisation. Findings from the research underline the importance of staff training prior to implementation and the chapter outlines a number of insights about organizational management and behaviour in an environment in which technology is being integrated with new users for the first time. The chapter will be of particular practical value in the work-based training field in which Enterprise 2.0 solutions are being developed.

The remainder of the chapters in this section focus on digital gaming (Shaffer, 2008). In the first of these chapters, “Game-Like Technology Innovation Education,” Magnussen explores the use of games in school science education in a Danish public school with students aged 13-15, focusing in particular on the challenges presented by these technologies in terms of methodology and design issues (Gee, 2007, 2008, 2011). Using a scenario in which learners are involved with playing the role of a company head whose role is to produce intelligent music technology, it was designed to examine how games can be used to simulate practical learning situations.

Games can also be used to enable learners to simulate their engagement with risk and uncertainty. In “‘World of Uncertainty’ Game for Decision-Makers,” Jyldyz Tabyldy Kyzy outlines a proposal for a game in which the objective is to enable learners to examine their subjective uncertainty and receive digital feedback on their performance. Learners engage with a complex array of simulations in which they have the opportunity to estimate probability and improve their accuracy.

The theme of simulation is also evident in “The Siren Song of Digital Simulation: Games, Procedural Rhetoric, and the Process of Historical Education,” in which Jerremie Clyde examines how digital games can be used to teach history in post-secondary education. Contrasting procedural rhetoric with that of history themed digital simulations, an evaluation of current practices in history education is articulated prior to a deeper engagement with how simulations are an ineffective way to realize learning goals. Clyde argues for a re-evaluation of the role of simulations and more research on how digital games can be used to involve learners in historical reconstruction and historical argument.

The use of mobile devices to promote digital gaming experiences is evident in an increasing number of research studies (Kukulska-Hulme, 2009; Kukulska-Hulme & Jones, 2011). Petley, Attewell, and Savill-Smith’s chapter, “Not Just Playing Around: The MoLeNET Experience of Using Games Technologies to Support Teaching and Learning,” describes a three-year research study exploring the potential role of mobile learning in English post-14 education. The MoLeNET project is a collaborative project that explores handheld devices and the use of three platforms, Sony PSP, Nintendo DS, and the Nintendo Wii to promote strategies for engaging learners who require support primarily due to learning problems or disabilities. Other aspects of the research suggest that these gaming platforms can also be used to aid the development of academic and social skills as well as having the potential to explore other issues such as games for healthcare.
In the final chapter in this opening section of the book, Hollins and Whitton provide a thorough evaluation of research to date on the potential of gaming in education in their chapter, “From the Games Industry: Ten Lessons for Game-Based Learning.” Drawing on research from entertainment games, the authors highlight a series of opportunities and challenges that will face educational policy makers and examines ways in which the field of digital games in education may evolve. In conclusion, the chapter is especially useful for identifying ten key points that can be used in the development of digital game-based learning in the future.

Section 2: Innovation

The second section of the book focuses on seven chapters that address areas of research including social networking sites, the use of learning platforms for collaborative learning, video conferencing, digital gaming, and personal learning environments.

In Chapter 8, “Social Networking Sites and Language Learning,” Brick explores LiveMocha, a popular website that is based on the principle of social networking and enables language learners all over the world to develop peer-to-peer language exchange. Focusing on a small-scale case study that took place over three months, the chapter explores the features of LiveMocha and learner perceptions of them. Results suggest that learners valued immediate peer feedback, as well as the flexibility that enabled them to interact with native speakers in the target language utilizing both synchronous and asynchronous technologies. While learners also identified challenges in using a social network platform to learn languages based on LiveMocha’s peer model, particularly the potential abuse associated with cyber-flirting, the study presents some valuable evidence of the potential role of social platforms in learning contexts.

Armitage’s chapter, “Using Learning Platforms to Support Communication and Effective Learning,” continues the focus on personal learning, describing the process that led to the development of online learning resources for the National Diploma in Information Technology in the UK. The chapter indicates how personal learning is a key theme at this level of education and how personalized learning is aligned with the objective of giving learners more control over the direction, progression and outcomes of their learning. A central element of the resources attempt to promote learners’ metacognitive skills thus encouraging them to reflect on their learning as part of the learning process.

The importance of these themes is continued in Hunter’s chapter, “Connected Learning in an Australian Technology Program: A Case Study,” which discusses important developments in Web 2.0 and the digital classroom in an Australian context. The significant investment in digital infrastructure by the Australia the New South Wales Department of Education and Training (NSWDET) represents an investment of approximately $AUS 158 million spread over 2,240 schools. The target of this investment is to produce the “connected school” of the twenty-first century in which learners can engage in collaborative and communicative activity according to the principle of ‘anywhere, anytime’ learning. Hunter’s case study provides a detailed overview of the implementation of the project, and it should be valuable for policy makers and those responsible for ICT planning and integration.

The focus on learner engagement continues in Chapter 11, in which Iacovides, Aczel, Scanlon, Taylor, and Woods from the UK Open University discuss “Motivation, Engagement, and Learning through Digital Games.” The authors address the argument that digital games have the potential to improve learner participation, while also recognizing the inherent challenges they present in terms of being integrated into formal learning environments. Educators need to understand how games motivate and engage learners and the authors identify the need for more research that will guide this process in future.
The requirement for a more theoretical approach to games-based education research is also evident in the penultimate chapter of this section, in which Khan and Reed examine a group of computer games called Neurogames that focus on enhancing reading and basic maths. “An Evaluation of Neurogames®: A Collection of Computer Games Designed to Improve Literacy and Numeracy,” presents research from a study using matched pairs within an experimental design. Findings suggest that the use of the Neurogames led to a “significant increase” in mathematical and reading ability compared to learners in the control groups and further research is called for to explore how this potential can best be harnessed.

The final chapter in this section examines mobile learning and the potential role of smartphones in personal learning environments. In “Personal Smartphones in Primary School: Devices for a PLE?” Honegger and Neff articulate the goals and initial results of a two year case study in a European primary school in which teachers and learners were provided with smartphones to aid learning. Costs were covered by the school and learners were given access to the web in order to facilitate learning. The research explored how the potential of the devices could be harnessed in relation to a range of skills including reading, writing, and communication using a phone’s convergent technologies, both in and outside of school.

**Section 3: Change**

The final section contains seven articles in a range of topics covering future definitions of personal learning environments, task-based learning, blended learning approaches to course delivery, mobile learning, and the use of Web 2.0 tools (Lai & Li, 2011). In “Personal Learning Environments: Concept or Technology?” Fiedler and Väljataga provide a critical overview of research on personal learning environments to date, noting a series of rather contradictory approaches. These differences and contradictions are a result of the tensions between the possibilities offered by digital technologies and the restrictions and expectations offered by traditional learning contexts. In response, the chapter argues against the identification of PLEs with exclusively Web 2.0 technologies, a tendency that has been strikingly evident over the last few years, and to examine the underlying educational and curricula infrastructure which has remained unchanged. If PLEs are to be realized, then new forms of infrastructure will also need to be developed to match the innovative opportunities presented by the digital technologies.

This discussion is continued in “Making it Rich and Personal: Crafting an Institutional Personal Learning Environment,” in which White and Davis consider the institutional resistances within universities to implementing radical changes such as those required for personal learning environments. While pedagogical change is driven forward by academic researchers, university services typically have more “risk-averse” philosophies due to the financial implications of such changes. White and Davis discuss a case study in which a strategy for overcoming these resistances was a crucial element in the process, as was the need to prepare learning environments fit for learners in the twenty-first century.

The turn towards personalized learning has often been allied with task- or inquiry-based forms of teaching and learning (Lave & Wenger, 1991). In “Exploring Task-Based Curriculum Development in a Blended-Learning Conversational Chinese Program,” Hill and Tschudi explore the use of task-based approaches in a blended learning context. Set in the context of task-based language teaching (TBLT), the authors present the results of their research from an online Chinese course (Van den Branden, 2006; Van den Branden, Bygate & Norris, 2008). Based on a rigorous engagement with the task-based approach in terms of needs analysis and task sequencing, the chapter demonstrates how online platforms can also be used to develop task-based approaches and such research will be important for the future of personalized learning approaches.
The focus on computer-assisted language learning (CALL) contexts (Beatty, 2010), where so much innovation with digital technologies is often apparent, is the subject of the “My Personal Mobile Language Learning Environment: An Exploration and Classification of Language Learning Possibilities Using the iPhone” by Perifanou. The author discusses how mobiles can be used to offer language learners a “self-regulated” and “personal approach to learning.” Enabling learning in a variety of new spaces and places, the chapter presents a theoretical framework for establishing a PLE in a mobile language learning context. Moreover, the chapter presents a practical overview and classification of a number of iPhone applications that can be used in an educational context. In conclusion, a design for a PLE utilizing mobile learning for Italian language learners is outlined (Chinnery, 2006).

The design of a PLE is also the concern of the next chapter, “Factors Affecting the Design and Development of a Personal Learning Environment: Research on Super-Users.” Fournier and Kop discuss their research on user expectations of PLEs. The surveys of users were comprehensive and sought to gain an insight into which features and tools are required by users and which they will be able to empower their learning. The findings of the research are now being used to design an interface for a future PLE.

In the penultimate chapter of the volume, Kitchener, Murphy, and Lebans engage with a number of themes from this section in their chapter, “Developing New Literacies through Blended Learning: Challenges and Lessons Learned in Ontario, Canada.” The chapter discusses the implications of research arising from two blended models of teacher professional learning, each focusing on the innovative use of technology to enhance literacy and numeracy in the Ontario school district. The chapter explores the Advanced Broadband Enabled Learning Program (ABEL), situated at York University in Toronto, examining how a blend of F2F interaction, e-resources and tools, and online support can be used to enhance learning environments. The second project, Learning Connections (LC), explores the same mix of teaching methods but is focused on enhancing literacy and numeracy. Data from both projects is noteworthy in that it suggests enhancement gains in terms of both achievement and learning engagement in relation to literacy and numeracy.

In the final chapter, “Creative Networks of Practice Using Web 2.0 Tools,” Orava and Worrall discuss the role that Web 2.0 tools can play in teacher professional development (Wang & Chern, 2008). Arising from a European eTwinning Learning Lab initiative in spring of 2009, the chapter reports on the creative use of the media online learning event, which involved participants from over 27 countries. Based on an inquiry led model of education that encouraged learning collaboration and creativity, the event introduced new ways of instruction with innovative Web 2.0 tools and facilitated a blended mode of learning that incorporated visual, audiovisual and multimedia types of enquiry. Such inquiry based model promoted risk-taking models of education within a social learning framework in order to engage learners in “customer-driven collaborative knowledge building” utilizing open source and open access resources.

These twenty chapters present a snapshot of the international research currently being undertaken in learning technologies, indicating the importance of trends in virtual and personalised learning. Including research from approximately forty educators and researchers from over ten countries, it is hoped the book will be of value to educators, academics, and policy makers working with digital technologies in education today.

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REFERENCES


