Digital Smarts

Enhancing Learning & Teaching

Edited by
Noeline Wright & Dianne Forbes

Wilf Malcolm Institute
of Educational Research
Te Pūtahi Rangahau Mātauranga o Wilf Malcolm
THE UNIVERSITY OF WAIKATO

Digital Smarts: Enhancing Learning and Teaching

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THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

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Introduction

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This book is a partnership on many levels—between co-editors, with and among the other chapter authors, external, international reviewers, and eventually with you, the book's readership. Our colleagues have also had to trust us in the mentoring, leadership and fruition of this project. We also hope that the work is trusted in the sense of having a quality assurance process that stands up as rigorous and befitting an academic text. We will address that aspect in more detail later in this introduction.

Partnership, trust and integrity are implicit in any edited book development that grows from within a shared context such as ours, the University of Waikato's Faculty of Education.

Where did it come from?

The book's inception was heavily influenced by international colleagues' books in both distance and teacher education where they too have collaborated with academic colleagues within their own institutions. Two such texts have been a particular inspiration: Atkinson and Claxton (2000), and Anderson (2008). They also worked with colleagues at their respective institutions. Atkinson and Claxton (2000), for example, challenged their authors to tackle and unpick one pivotal concept: the notion of "intuition" and what role it plays in teaching. Their text benefits from multiple perspectives and interpretations of the concept from across different domains (such as professional learning, ITE, continuing PD and assessment), while also pioneering a collaborative approach between the contributors as they worked together on the ideas.

In a similar way, Anderson's (2008) edited text, like ours, was mostly written by authors from within a single institution. Updated from a highly successful 2004 first edition, this text is a collection of work by distance educators, where each author addresses a component of the whole. Some chapters are mainly theoretical in nature, while others are more practically oriented. Overall, the chapters are representative of a community and are intended as a launchpad for reflection, discussion and action, inviting reader responses.

We liked the open-access character of Anderson and colleagues' work at Athabasca, the first university to produce freely available texts. We are also inspired by Anderson's reasoning for selecting the open-access format to foster knowledge-sharing and equitable access, intending it as a gift to readers to encourage the growth of ideas and knowledge. Freed from considerations of profit, like Anderson and colleagues, we can disseminate the work widely to prompt critical dialogue and reflection with a wider readership, we hope, than might otherwise be possible.

Our own collaboration also shares multiple perspectives on the notion of 'digital smarts' across a range of educational sectors and contexts. It brings a distinct institutional understanding to the scope of the book. This collaboration, while using rigorous quality assurance processes, means we can be in control the book and its publishing process rather than following the systems imposed by a traditional

publishing house. And we get to experience the layers of process involved in such undertakings in order to maintain a high level of academic rigour.

Digital texts and the social networks developing for academics (for example, ResearchGate, Academia.edu) can mitigate some effects of distance, population and price, but this also means texts need to be freely accessible. Current publishing arrangements through traditional academic publishers, as noted above, can be obstacles for teachers in schools, with access prevented unless a library subscribes to the text/journal or a reader is willing to pay for an article. Admittedly, publishing houses are recognising the growing clamour from academics that openly sharing our work to a wider public—particularly relevant in education—is important and must be available more widely than the traditional academic repositories and publishing houses. We want teachers to read this text, regardless of sector and access to academic libraries, so we have taken things into our own hands.

The book's format and quality assurance processes

Our isolation from the traditional main centres of academic publishing in the English-speaking world (such as the United Kingdom and the United States) meant we have done what our forebears have done—found a way around those impediments. To mess with Ernest Rutherford's comment about creativity and making do, since we don't have a lot of money or access to the readerships in other countries through the usual publishing means, we have to think of other ways to make things happen.

To that end, we have applied the peculiarly Kiwi Number 8[1] wire mentality to this project, choosing a digital format with a Creative Commons licence. Through an open source format and by making the text as widely available as possible, we hope to share this book with academics and practitioners across sectors, contributing to debate about the value of digital technologies in educational contexts.

Within the quality assurance process, this book is the culmination of a two-year process of collaboration. Contributing authors shared drafts at regular monthly meetings, leading to an open peer review of each other's progress. This open review phase had a number of purposes, including sharing and developing emerging ideas into something cohesive, with digital smarts as the glue. It was also for newer research colleagues to experience both sides of the reviewing process, a key quality assurance aspect of academic writing. Through access to each other's work, chapter authors could better see how their own work fitted the wider scheme of things. In turn, this assisted in refining and editing the chapters, thus contributing to a greater cohesion of the book as a whole. This has led us to organise the book in a certain way. We have put complementary chapters together, beginning with early childhood through to tertiary sociocultural educational contexts.

A final step in the chapter revision process was drawing on our international academic networks to provide external, blind peer-reviews before the chapters were finalised, formatted and digitised for open sharing.

To that end, we cannot thank the Wilf Malcolm Institute of Educational Research (WMIER) enough for providing us with the means to pay for the major costs involved, that of professional

[1] Built as we are on an agricultural backbone, Number 8 fencing wire has been relatively plentiful—it became the go-to resource for many things on farms.

proof-reading, graphic design and digitising. We also thank the University of Waikato's Faculty of Education for providing the context in which this book could grow.

Why 'digital smarts'?

We chose digital smarts as the key phrase for the book because we have appropriated it to encompass the following

- an emphasis on **pedagogy**
- **agency**, or students' active participation in their learning. This includes any learner in early childhood through to secondary and tertiary learning contexts where learners exercise agency over the focus of learning, generate content and resources, and are encouraged to provide feedback and feedforward to each other
- creativity
- **risk-taking**, experimentation, inquiry
- **challenging** the publishing status quo—managing our own workload, using open review processes, viewing assessment as learning, posing challenges for teachers and seeking open access to research publications.

In terms of using an e-book format, we make it easier for authors to include aspects such as:

- multimedia content
- small scale **case studies**—collectively a rich picture
- attention to **participant perspectives**—students, staff, researchers, authors.

The word 'smart' also links to an early statement by the New Zealand Ministry of Education in 2002 which talked about the 'smart use of ICT' in educational contexts. Over time, the sense of agency that the word 'smart' has for both learners and teachers has disappeared. More recent MOE statements about e-learning focus instead on describing the potential influence of the technologies on the learning, not the learning on the technologies and how they are used. We think it is important for digital technologies to be seen as the servants of learning, providing opportunities for all learners to be adaptive help-seekers and agents of their own lives as they appropriate these technologies as cultural tools (see Pachler, Seipold, & Bachmair (n.d.) for example, for an exploration of agency, culture, appropriation and the idea of the 'mobile complex').

We think the Ministry of Education's emphasis on the technology rather than pedagogy is misplaced. For example, the ministry's Learning with digital technologies page is mostly about ultra-fast broadband, not learning. The technologies should always be servant to pedagogy; teachers' deliberate planning that incorporates opportunities for students to learn through or with these technologies is what makes a difference—not the provision of technology itself. Evidence for our emphasis is contained in this book, where educators' thinking about how digital technologies are used for learning is the focus. It is this active thinking and pedagogical design that makes the difference to the value of the technology in a learning context, not the technology itself. Later in this introduction, we outline the ideas in each chapter that show how the author has approached learning with and through digital technologies.

This emphasis on the "potential influence of the technologies on the learning, not the learning on the technologies" also raises concerns about agency and the apparent diminishing of the teacher's role. Some technologies are dazzling but they end up overshadowing what we are in education for, which is teaching and learning—helping people learn how to think critically and deeply.

Digital technologies are helpful for teaching and learning but should never drive it. We need to always think, is this technology appropriate for my intended learning purpose? The technology should not be a solution looking for a problem (Campbell, 2001). With such an orientation, busy work rather than intellectual labour as part of longer term learning goals may easily eventuate. Our contention, therefore, is that being digitally 'smart' is about purposeful pedagogical thinking and practice: it is agentic. Digital technologies can help with smart endeavours but should never take over or drive them.

We are therefore reclaiming the word 'smart'. Having multiple meanings also makes it easy for our chapter contributors to interpret this term for themselves. For example, 'smart' can refer to 'smarting'—in the sense of being hurt, either physically or emotionally; it can also refer to creativity in the making of digital products; or the idea of a smart piece of work, something polished and sophisticated; or the degree of agency one exercises, such as in phrase *working smarter, not harder*; and we mustn't forget the 'smart' acronym for something that is Specific, Measurable, Attainable, Relevant and Timely.

These chapters are, we believe, the products of SMART thinking by the authors. What we are producing is *specific* (for it traverses individual education sectors, and is interpreted for the specifics of each chapter's context), *measurable* and *attainable* (in that the research has produced findings (attainable) arrived at through a rigorous process of investigation (in a sense they have been 'measured'). It is *relevant* (in that the book focuses on digital technologies in educational contexts) and *timely*. The here and now is always a good time to explore and share what is happening, suggesting implications for pedagogical practices across sectors. In other words, the term 'digital smarts' represents intelligent, pedagogically oriented and strategic uses of digital technologies to benefit learners of all kinds.

Introducing the chapters

In the realm of early childhood education, *Elaine Khoo* and *Rosina Merry*, in partnership with early childhood teachers and children, explore the impact of iPad use on young children's relationships and interactive learning. The authors interpret digital smarts in terms of quality pedagogy and the ways in which teachers responsively seize opportunities to extend children's interests, meaningfully integrating iPads into the teaching and learning context. Khoo and Merry emphasise, among other important factors, the agency of children, the awareness of teachers and the salience of learning alongside the affordances of iPads. Staying with an early childhood context, *Sara* and *Simon Archard* build on these themes with a case study of diverse and creative ways of using ICT to learn in early childhood. Central to Archard and Archard's work is the construct of digital habitus, representing the competencies and understandings that children bring from home to preschool settings. Their chapter examines the diversity of digital experiences and implications for teachers.

As in the first two chapters, *Garry Falloon* also presents a case study view of ICT use with children, this time in terms of digital learning objects in a primary (elementary) school. Falloon takes us behind the screens to share insights into how children interact with digital learning objects and with

each other. He explores the levels of thinking stimulated by the design of particular learning objects in a literacy learning context, indicating implications for future learning for primary school children. A challenge is issued to researchers and educators to develop smarter ways of evaluating the value of digital resources for learning.

These three chapters suggest to teachers and, by extension, to teacher educators, that in complex and changing times, it is vital to maintain our focus on quality learning in terms of higher order thinking, creativity and active decision-making, even when learners are very young. A key message is for teachers to recognise and celebrate student agency and diversity. These, and other chapters, reflect the importance of student perspectives on learning and teaching.

Kerry Earl shifts the focus to the preservice teacher education sector, surveying student perspectives on assessment within online courses. Earl proposes smart assessment design via short text assignments in a modular format as a means of enhancing student learning and balancing the complex demands of tertiary education. Her case study is illustrated with assignments from online courses, reflecting choice, variety and support for learning through assessment. Creative approaches to assessment incorporate tasks that are relevant to diverse students, enabling management of workload and digital affordances.

Further insights into initial teacher education are provided by *Dianne Forbes* in her chapter about negotiating guidelines for asynchronous online discussion with students. The idea is to elicit student perspectives and to surface their expectations of peers in online discussion. As students in each class contribute to shaping guidelines for working and learning together, the guidelines are passed forward as a legacy to subsequent classes as a starting point for renegotiating their own set of guidelines. In this way, each cohort of students contributes actively to decisions and protocols for working together, and each contributes to the learning of the next group of student teachers.

Noeline Wright's chapter moves the focus from online to in class, and from primary to secondary school classrooms. Her initial teacher education students needed to review their incorporation of digital technologies into specific lessons of their choosing while on practicum. She argues that it isn't enough to consider the uptake of digital technologies in terms of ease of use or satisfaction in getting a job done. For teachers, it's much more complex than that. Teachers—whether in ITE or in compulsory school classrooms—are much more likely to persist with using digital tools if their students broadly find favour with with them and if there appears to be a change in how they go about their learning. Wright appropriates the Continuance Theory model and applies the Kiwi Number 8 wire attitude to it. Through this appropriation, she suggests that for educational contexts, when digital technologies positively affect students' learning, task concentration and task completion, teachers will continue using these tools, even if some there are some impediments to doing so. Her pre-service teachers, many of whom were anxious about this task, were also keen to persist once their students indicated their positive responses.

Anne Ferrier-Watson looks at initial teacher education from another viewpoint, that of a librarian offering online support. She investigates how widely a specific group of online ITE undergraduate students use the virtual services of the library. She wanted to find out what sorts of library services these students valued, and what sorts of behaviours characterised their online library use. Her study sheds light on being digitally smart when learning at a distance. Through the lens of invitational theory, Ferrier-Watson examines the extent to which the university's library services provide an inviting and trusted support environment for these online learners. She unearthed the

striking influence of Google as go-to search engine: 65% of students surveyed used the general Google site to search, and just over a quarter of them used Google Scholar. However, more pleasing was that over half also used the university library's databases to search for texts beyond those in each course's readings. One finding was the frustration students felt when they searched for texts outside the university's library services, finding paywalls preventing access—perhaps prompting a turn towards the free library services. Another important finding was a lack of well-developed interpretive skills to make sense of options arising from search attempts. An important implication for practice is to help learners develop the critical and inferential thinking needed to navigate texts found via search attempts in order to select relevant items for reading and assignment tasks. This means greater links with academic staff to weave the library's key services into programmes that support this critical thinking need and improve the learning experience for all learners.

Pip Bruce Ferguson examines the value of an open peer review process to both reviewers and authors. Through feedback from four participants active in *Educational Journal of Living Theories* (EJOLTS—www.ejolts.net), she examines the value of such an open peer review process to developing transnational and cross-cultural research communities. Her four participants represented both experienced and novice researchers and reviewers. She wonders about the extent to which the online and open nature of the journal creates a digitally smart and connected community that exhibits the kinds of rhizomatic links George Siemen's (2004) Connectivism Theory sought to document. The chapter also calls into question the accepted blind review format, questioning also notions of academic rigour. Bruce Ferguson contends that the open review process is more robust than the traditional process because the communication between reviewers and authors means ideas and authorship can develop in a rich and meaningful way. It is certainly food for thought if we are to contest notions of academic publishing rigour and align the review process with a more supervisory and supportive process that appropriates digital smart technologies to facilitate a two-way process.

Digital smartness is next interpreted by *Stephen Bright,* who in interviewing a number of academics within the University of Waikato, but across a range of faculties, considers workload implications for those teaching fully online compared with partially or wholly face-to-face. He sought to find out from 10 staff what their experiences were like and how they managed their workloads. Those who taught fully online felt most able to manage their workloads and were happiest in their work. Those teaching a blend of face-to-face and online courses felt the most compromised and believed they were burdened with a heavier than usual workload.

His chapter segues well to *lisahunter*'s where she describes, via an autoethnographic approach, what it is like to newly arrive at the university and immediately begin teaching online while still getting used to the new systems and online processes, including the help function. Not initially knowing who to call or how the systems worked makes for a painful experience. She therefore explores digital smarts in terms of something being prickly or biting, playing on the concept of digital bytes and attending to the positioning of her academic pedagogical self. Her chapter concludes the book and identifies some of the issues academics can face when including digital technologies in tertiary learning contexts and when associated technical issues are not always known in advance, or when the help provided doesn't always match the support needed.

The book therefore spans a wide range of education sectors from early childhood contexts where young children use digital tools through to university academics teaching and learning online.

External reviewers

Our group of external reviewers also contributed ideas about being digitally smart, such as this being a term best understood through the lens of digital fluency rather than digital literacy. From an educational perspective it is about insight into the affordances of technologies and their application to different teaching and learning contexts. This relates to a critical appreciation of the opportunities for the effective employment of tools—an awareness of place and space for their use, addressing both the *when* and *why* rather than just the *how* of using digital tools effectively. In short, it is all about ensuring that the outcomes of using digital tools match the original intentions of the user.

Another external reviewer argued that digital smarts is no longer simply about basic information literacy or keeping your information safe and private. Digital smarts is about developing a positive and powerful digital identity, establishing a voice within a global network, and nurturing creative and inclusive communities.

We wish to thank our external reviewers for their advice and for being prepared to volunteer precious professional time. Their feedback to individual authors has been an invaluable contribution to the academic rigour of this book. Our external review group represented reviewers from Australia, The United Kingdom and Canada. They are (in no particular order):

Alec Couros
Steve Wheeler
Caroline Daly
Gilly Salmon
Richard Walker
Kevin Burden

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Chapter 1: "It's about the relationships that we build": iPad-supported relational pedagogy (Ngā Hononga) with young children

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Abstract

Although iPads have gained much attention and are being increasingly adopted into educational practices, concerns exist as to the suitability and extent of their use with and by young children. This chapter reports on the findings of a qualitative study exploring iPad use in the sustaining and extending of relationships in an early childhood education and care centre in New Zealand. Guided by the notion of a relational pedagogy, espoused in *Te Whāriki*, the New Zealand early childhood curriculum, the research involved collaborations with two early childhood teachers and children at the centre to obtain perspectives of teachers, young children and their parents/caregivers regarding iPad adoption and use. The findings highlight the potential of using iPads to support and further develop young children's relationships with people, places and objects within their immediate contexts, which are underpinned importantly by a clear teacher awareness, adoption of and being informed by a relational pedagogy perspective. This has implications for how teachers can be supported to use the iPad to create meaningful and relevant teaching and learning experiences for and with young children.

Keywords: early childhood education (ECE), affordances, iPads, relational pedagogy, young children, digital smarts

Introduction

Sensational headlines such as "Forget nap time; it's app time" (Evans, 2013), "Techno-toddlers skype their parents" ("Techno-toddlers", 2012), "Is my iPad in my backpack?" (Timmermann, 2010), "The screens that are stealing childhood" (Stevenson, 2012), "iPads helping or hindering infants?" (Miletic, 2012) and "iPads bridge kindy generation gap" (Wade, 2012), just to name a few, abound today as an indication of the increasingly digitally saturated culture that we live in. These articles tout young children's prowess, capability and ease in picking up the skills to use and manage mobile and tablet devices such as iPads as part and parcel of today's digital generation. The iPad's touch screen

properties, mobility, multimodality, connectivity (to the Internet) and interactivity (for example, with various learning applications or apps) allows children to intuitively learn to use it with relatively ease and convenience. Expectations are thus fuelled and imperatives issued for teachers to take up the use of these devices in an attempt to enhance their students' learning (and hopefully provide the sorely needed panacea for a flailing education system). This poses a challenge, however, for the majority of teachers who neither grew up in the digital generation nor are accustomed to using technologies, and who are highly likely to be already stretched for time in their current work roles and responsibilities.

This chapter reports on a study in an early childhood and care centre and is intended to disseminate ideas for iPad-supported innovative practice with young children. The study explored the educational affordances of iPads from the perspectives of teachers and children with a specific focus on supporting relational pedagogy. We describe three examples from the study to illustrate how iPads can be valuable in supporting teachers' enacting of a relational pedagogy within an ECE context. Teachers' meaningful integration of iPads in their teaching and learning context as underpinned by a relational pedagogy therefore constitutes our notion of 'digital smarts' .

Relational pedagogy, as described in New Zealand's early childhood curriculum document, *Te Whāriki* (Ministry of Education [MoE], 1996) values children's learning through interactions with people, places and things, and opportunities for shared sustained thinking. Children's ability, understanding and confidence to use iPads productively is facilitated by their developing a responsive and reciprocal relationship with teachers/others interested in their learning and development. Put another way, teacher awareness of and ability to form responsive and reciprocal relationships with children as a basis for iPad-supported practice to maintain and extend children's learning interests of people, places and things constitutes a vital aspect of relational pedagogy in our view of teacher digital smartness. Such teacher qualities are necessary to identify and seize the opportunities to nurture and extend young children's learning interests and understanding of the world around them. This underpinning will go a long way in the light of the ever-changing and transient technologies that educators face in their practice.

The study is premised on two strands of current trends. Firstly, the ubiquitous and pervasive use of ICTs has exposed the current generation to more digitally mediated learning and recreational experiences. Labels such as digital natives (also 'Net-Geners', 'Gen-Xers' and 'millennials') have been used to characterise a new generation of learners capable of multitasking, imagining and visualising while communicating in multiple modalities in a digitally saturated environment (Prensky, 2001; Zevenbergen, 2007). Current views of young children acknowledge them to be active, competent, knowledgeable and able learners capable of directing attention towards their learning interests and keen to experiment with/draw from multiple resources to inform and help them make sense of their surroundings (Ebrahim, 2011; James & Prout, 1997). Such a view is sympathetic to ICT use in its various forms as an appealing and motivating source for the new generation of digital learners (see Archard & Archard, this volume). Teachers are therefore encouraged to examine this assumption and build their pedagogies to leverage ICTs to support children's learning interests and expectations (Bolstad, 2004; Buckingham & Willett, 2006) by drawing from their unique knowledge, skills and languages typically developed in the home (funds of knowledge) to extend their learning and exploration of their surroundings (Moll, Amanti, Neff, & Gonzalez, 1992).

Secondly, we take the view that technology on its own is not the driver of pedagogical change. That is, meaningful and appropriate integration of ICTs directed at enhancing learning occurs when teachers, informed by clear pedagogical frameworks, begin to consider the possibilities of re-imagining their practice in support of extending their students' learning interests and needs. This

requires an examination of teachers' beliefs and practices and adopting technology that aligns with their teaching and assessment beliefs, goals and practices (Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013; Joyes, 2005/2006).

We begin the chapter by providing an overview of *Te Whāriki*, the New Zealand Early Childhood Curriculum. Attention is given to the principle "Ngā Hononga" or Relationships as it framed and guided the teachers in our study's interaction and assessment for learning with young children. Educational affordances of iPads are described next before the research context and findings from our research are detailed. The chapter concludes with a discussion and implications for ECE practice.

Te Whāriki: Early Childhood Curriculum

Te Whāriki is a curriculum framework designed to support teachers and young children's learning opportunities within a sociocultural context (MoE, 1996). Partnerships between teachers, parents and children are emphasized in the curriculum. Te Whāriki is built on four principles, one of which is Ngā Hononga or Relationships, and five supporting strands. The curriculum recognises that learning is not segmented into discrete parts, domains or topics and that all those aspects of a child's learning and development are integrated, interrelated and interconnected (MoE, 1996).

The notion of relationships in Te Whāriki

The principle Ngā Hononga/Relationships is a key feature of the sociocultural view of teaching and learning in *Te Whāriki*. It recognises the sociocultural and relational nature of learning. Relationships are multifaceted between the individual and his/her peers/teachers/families including environment with a focus on developing communities with a sense of belonging and the freedom to participate through these responsive and reciprocal relationships (Papatheodorou & Moyles, 2009). In ECE settings, this principle is realised through three aspects—children's developing relationships with people, places and things—pivotal to their developing exploration and understanding of the world around them.

Developing relationships with people is established when children start to share their thinking, co-inquire and co-construct knowledge with those around them, be it within the early childhood environment or their family/whānau and even their wider world. It is through developing relationships with others to share ideas in a reciprocal manner that children develop a sense of belonging, a development empowering them to explore further ideas and participate in new and different learning activities. For example, the mobility and flexibility of iPads allow children to become the authors of their own work and to critique and evaluate it with their peers/teachers/families. This joint enterprise approach to learning sits well with the sociocultural philosophy of Te Whāriki (Carr, 2001; MoE, 1996).

Children relating to places around them is evident through events such as visiting the local library, parks and exhibitions and includes their sharing artefacts/significant toys/items from their homes with peers and teachers in the ECE setting. This constitute the multifaceted nature of the relationships between people and place (MoE, 1996). Finally, developing relationships with things is valued as children form different degrees of attachment and understandings with different objects that they come across in their home and centre experiences. Lee, Carr, Soutar and Mitchell (2013) note

that objects in early childhood provision provide props for dramatic play and the taking on of a new identity; blocks, sand tools, books, trees, paintbrushes, computers and pencils enable young children to symbolise, represent, imagine, problem-solve, find out, play and learn. (p. 47)

The authors contend that such objects including photographs, food and even works of art that are brought from home to be shared with others at the centre help to validate children's home experiences such that they "cross boundaries, connecting home and early childhood centre" (p. 47) contexts. Consequently, children mutually benefit from such sharing to contribute to the learning and development of the wider learning community in their centre. Findings ways to assess and document children's learning through relationships with people, places and things to be shared with children's families is made possible through the use of "learning stories" (Carr, 2001) .

Te Whāriki, assessment and ICT use: Teachers and children

Learning Stories is a key approach for assessing New Zealand's children in ECE settings. It was developed in response to Te Whāriki as it became clear that assessment of this curriculum would have to be different to the traditional deficit model of assessment, which did not reflect the inherent view of children as capable and competent learners. Learning Stories is a formative framework that is based on the notion of narratives that capture multiple voices, foreground the value of learning dispositions, acknowledge children's strengths and interests, and make transparent the teacher's actions in teaching contexts (Carr, Hatherly, Lee, & Ramsey, 2003). Teachers began to document learning using narratives and photos in ways that reflected the children's interests, ways of being and ways of knowing. Originally, Polaroid or 35mm cameras were used to capture this learning; however ICT tools such digital cameras, iPods and iPads have become more accessible and responsive means of documenting such episodes today. Digital documentation is now integrated into many teacher's work on a daily basis with both teachers and children documenting learning as it occurs (Carr, 2001, 2002). As a result of these changes to the modes of documentation, the speed of technological advances and young children's involvement with a range of ICTs in their daily lives, there has been a recognition by some teachers of the 'funds of knowledge' about ICT that young children bring with them to their early childhood centre. It is becoming more common for children to use a range of ICTs such as iPods, iPads, digital cameras to document their own learning, direct teachers to capture aspects of their play, revisit their learning, create videos of play, use search engines such as Google to investigate ideas and to connect with the world outside of the centre through the use of Skype or FaceTime (Archard & Archard, 2012; Hatherly, 2009; MoE, 2009).

Given that ICTs are already widely incorporated in current ECE contexts in New Zealand, the introduction of iPads is thus an extension of such practices and warrants further investigation to examine the extent to which it can support young children's learning and interests about the wider world.

Educational affordances of iPads in ECE contexts

Some gains have been made in terms of studying the effects and impact of iPad use in teaching and learning contexts to inform current practice (see for example, Burden, Hopkins, Male, Martin, & Trala, 2012; Clark & Luckin, 2013; Cochrane, Narayan, & Oldfield, 2013; Culén & Gasparini, 2011; Falloon, 2013; Heinrich, 2013; Hoover & Valencia, 2011; Nguyen, Barton, & Nguyen, 2014). The

studies reported thus far are limited to the compulsory schooling sectors or post-schooling or tertiary sectors.

Archard and Archard (2012, see also this volume) suggest that when technology is used in ECE settings it can support a combination of informal and formal learning opportunities. This enables learning to take place through a mix of learner-centered and adult-directed activities. They also suggest that teachers' intentions and pedagogical approaches can influence the outcomes of these opportunities along with children's own purposeful use of ICT. Very little has been written specifically about children's use of iPads in early childhood settings; however the current literature contains similar views to those expressed by Archard and Archard (2012).

Emerging evidence for iPad use in supporting and extending learning opportunities for young children have been found, for example, to support children's engagement with drawing (Couse & Chen, 2010) , (digital) play practices (Verenikina & Kervin, 2011), literacy development in tandem with developing emotional competencies (Hatherly & Chapman, 2014) as well as more inclusive home practices for the visually impaired (Fleer, 2014) and to expand teachers' pedagogical practices (Fagan & Coutts, 2012; Khoo, Merry, Nguyen, Bennett, & MacMillan, 2014). Verenikina and Kervin (2011) found that iPad use for digitally mediated play can foster imagination, encourage collaborative play and provide for further opportunities for young children's sustained imaginative play. There is mention of the relational nature of iPads through social interaction between children and adults when using iPads. Fagan and Coutts (2012) describe the educational use of iPads by young children to include opportunities for children to work collaboratively, produce their own stories and engage in digital forms of literacy. They suggest that iPads can also play a role in fostering and developing relationships between the centre, home and children's wider worlds. They indicate that teachers' interactions and pedagogical approaches are more important than the technology itself. Furthermore, they argue for iPad use to be combined with thoughtful teaching strategies to maximise children's learning opportunities. Extending these findings, Khoo et al. (2014) identified four different strategies to ECE teachers' iPad-supported practices to expand children's learning opportunities and foster closer home–centre links: using the iPad as a relational tool, as a communicative tool, as a documentation tool and as an informational tool for supporting child-led learning. A key implication was for teachers to consider the interplay between the opportunities that iPads offered, their own pedagogical views and children's learning needs and contexts. These ideas are further expanded in the study reported next through a focus on teacher enactment of iPad-supported relational pedagogy practices. The study is timely as little has been written about pedagogical frames that might help us better understand how iPads can be the game changer in altering teacher-child relationships and roles in favour of more personalised learning contexts (Fortson, 2013; Woolf, 2010) in ECE settings.

Overall, the studies cited recognise the growing importance of iPads in young children's daily lives, prompting teachers to integrate them into the curriculum. If teachers are to be successful in facilitating the dispositions, skills and attitudes for children to become lifelong learners in a digital generation, they will have to embrace the technologies and understand their educational affordances to create varied and rich learning opportunities for children.

Research context

The research reported in this chapter is based at one of the early childhood education and care centres situated in an urban area within Hamilton city. Campus Creche (Creche) is a large organisation with

five centres that cater for children from 3 months to 5 years of age. Approximately 30 early childhood teachers, a small management and administrative team headed by a director and regular part-time staff are employed so that the children develop familiarity with staff. The curriculum is emergent, as it stems from the interests of individual/groups of children and staff and engagement with the learning environment. Sustained and meaningful learning opportunities are provided and the emotional well-being of each child is supported in every aspect of the programme.

Our research is based at one of Creche's centres - Preschool Centre (Preschool from here on) - which has a typical enrolment of 35-40 children. The staff to child ratio at Preschool is one staff to nine children in attendance. In mid-2011, two of the teachers, Tim and Nadine (the teachers agreed to their real names being used), initiated bringing their personal iPads for the children to explore and use. This generated much interest from the children. Use of the iPads was informal and children took turns exploring different apps and activities that they were interested in with other children watching within a group. Either Tim or Nadine was always present to help and guide the children's use. This experience was limited by the teachers' availability to use the iPad with the children, which was determined in part by the daily routines already established at Preschool. Tim and Nadine were both keen to participate in further research to explore and extend the possibilities of iPad use with the children.

In collaboration with Tim and Nadine, we explored the educational affordances of iPads for engaging children's interest and learning. This chapter focuses on one aspect of our findings—what it might mean to use iPads to support a relational pedagogy with children developing relationships with people, places and things as part of their learning and exploration of the world.

A qualitative interpretive methodology framed the research design (Maykut & Morehouse, 1994). Data was collected through teacher interviews, observations (video, audio recordings and photos) of teacher interactions with children using the iPad, and copies of children's artefacts produced as part of the teaching and learning process using the iPad. Interviews with both Tim and Nadine were conducted prior to and on completion of the study to ascertain changes to their perspectives on and extent of iPad use in their teaching and learning explorations. A total of eight observations (each lasting between an hour to two hours) were conducted with both teachers. Each observation session concluded with a teacher-researcher debriefing of the session with negotiated planning for further exploration or refinement of iPad use for the next session. The project obtained human ethics approval from the University of Waikato and all participants participated on a voluntary basis.

The data collected was analysed based on sociocultural theory, which directed attention to the interaction between people, the tools they use to achieve particular purposes and the settings in which the interactions occur (Wertsch, 1998). Within-case and cross-case analyses of the case studies of the teachers and children were developed (Merriam, 2002). Emergent themes were identified through a process of inductive reasoning (Braun & Clarke, 2006). A process of collaborative data analysis (Armstrong & Curran, 2006; Hennessy & Deaney, 2009) between the teachers and research team was also established to share the emerging findings with the teacher participants and provided them with opportunities to contribute to refining the analyses. This included the teachers viewing and responding to a short video compilation of highlights from the thematised initial findings from the data collected with a focus on the different ways they had engaged and interacted with the children and children's interactions amongst their peers while using the iPad. This process added rigour and credibility to the analysis and allowed the teachers to take an active and central part in the meaning-making process (Lincoln & Guba, 1985).

The participants in this study represent a convenient purposive sample of teachers and young children in one early childhood educational setting. Although the findings will not necessarily be generalisable to a wider population, the text-based data are sufficiently detailed to inform similar ECE contexts. We intend that by proving "rich thick descriptions" (Lincoln & Guba, 1985) of the study setting the findings can also contribute nuanced insights into issues and practices relating to the teaching and learning of young children in relation to iPad adoption and use.

Findings

In our findings, we describe three examples of iPad-supported relational pedagogy as illustrations of teacher digital smartness as they play out in the study setting. They are drawn from contextualized interpretations and participant excerpts to illustrate what these ideas might mean to young children's developing interests and learning about their immediate and wider contexts

Episode 1: Establishing an understanding of the child as a person

This first episode is based on Nadine's intent on understanding each child as a person with different ideas and interests or funds of knowledge that they bring with them to Preschool. In her interactions with the children, Nadine observed the potential for using the iPad to access information and for relationship building in the way that it allows for children's voices to be heard.

In this episode, Nadine used the iPad when she became alerted to a child's keen interest in a video camera at Preschool. The child, Zach (pseudonyms are used for the children), was fascinated by the researcher's video camera, which had been set up in an unobtrusive corner of the main play area. Zach was turning the swivel handle and peering into the viewing area of the camera to try and figure out how it worked. Nadine captured Zach's actions using the camera on the iPad. She used these photos as a provocation to encourage Zach to share his interest and ideas on what/how he thought the video camera might work. While reviewing the photos with Nadine, Zach pointed to them, sliding different ones across the screen and explaining what he was doing with the camera. From this initial interest in reviewing his photos, Zach asked to explore other apps on the iPad. He initiated working on an app about shapes. Nadine guided his exploration, explaining the different buttons to push on the screen to allow his further engagement with the app. Children who gathered around them to watch cheered and supported Zach as he successfully navigated the different tasks to learn about shapes. This newfound confidence and skill in using the iPad led Zach to explore a drawing app in which he selected the different options available to draw and colour his picture. Keen to share this with his family, Nadine guided him on how to save the picture and print as well as email it to his parents.

Figure 1: Nadine working with Zach

Reflecting on this episode, Nadine commented on the need for attending to and valuing the ideas that children bring with them to Preschool as a basis for relationship building:

> There is so much more than who they [the children] are at the centre. This [act of children sharing their funds of knowledge with their peers on the iPads] builds up relationships with their peers and teachers, sharing with their peers and teachers what they know.

Nadine was cognisant that relationships were important for children to develop trust and to take risk in engaging with new learning experiences. She sees the iPad as an enabler in this process as children were generally keen and interested to use iPads:

> It comes back to the relationships and relationships we build with the children that are the most important aspect of my job. Relationship building is about the trust for the children to take risks and try new things and be brave. They need to trust the people that they are with. That's why relationships are important. The iPad offers more possibilities to build those relationships.

This valuing of relationships is consistent with how Nadine sees her role as a co-explorer with the children, offering different possibilities to help them develop their learning interests:

> [My role is as] an Explorer … there's still lots of things we haven't explored and lots of ways that can go terribly wrong and all of that stuff which we are going to find out about but we will be doing it together. It's not teacher-led anymore. It's about co-exploring and it's not even about facilitating but about offering possibilities and ideas. They have their own ideas and they run with it once I show them. I think that lots of children are really competent and guiding their own learning and they know what they want to do and don't need assistance in getting there. So this [the iPad] is another vehicle for them to do that. It's also there for the children that haven't developed those skills yet and it doesn't need to be me that's guiding them, it can be their peers. For children that are unsure what to do

next, they might want to be holding the iPad but don't actually have any idea about what to do with it.

In this episode, use of the iPad was integrated into Nadine's teaching practice. It enabled the recording and documenting of Zach's work and the sharing of his work with his family. It allowed for more seamless connections between home and centre learning such that Zach's parents can view and have input into this learning episode. Nadine knew that Zach had some familiarity with his family's iPhone at home and was therefore aware of some of the basic functions of touch technologies such as swiping his finger to move from screen to screen, holding an app icon down to open it up and going into iTunes to listen to music. The fact Nadine was alert and aware of Zach's interest and encouraged his exploration in using the iPad to foster further interests contributed to his sense of belonging at Preschool and was fundamental in this process. Use of iPads was not teacher dictated but was a shared tool for both teacher and child to co-explore—the teacher in finding out about and supporting Zach's interest and guiding him to work out how apps that suited his interest worked, and, for Zach, in enabling him to find and explore an app that supported his drawing interests. This process was not without its challenges as some apps were new to both teacher and child and at times both had to undertake trial-and-error strategies together to ascertain how a particular app worked.

At other times, some functionalities had to be turned off or ignored (for example, pop-up advertisements). In all this, Zach by being supported by his teacher and peers, feel valued and affirmed and developed further confidence to use the iPad to create and share his creations with those who mattered and had interests in his learning and development. The episode with Zach reflects Nadine's relational pedagogy as an example of her being digitally smart in tapping into the relationship between teacher-child and technology. Nadine's relationship with Zach, and her understanding of the affordances of the iPad, ensured that the focus, which could have become teacher dominated, shifted to one that placed Zach in control his own learning. The immediacy that the iPad affords meant Zach could create, edit and share his work with his peers without leaving the context, reflecting the natural workings of a teacher and child learning together.

Episode 2: Allowing for children's voices in co-constructing a learning story

In this second example, as part of his assessment practice, Tim opted to take photos of children pursuing their learning interests. He used the camera on the iPad to take photos of the different children playing and interacting in the outdoor play area. The children gathered around him when he later sat and reviewed the photos with them. A child, Fred, was interested to view the photos taken of him. Fred had never used an iPad before and was eager to do so. Tim proceeded by guiding Fred to slide his fingers to review and select the photos he would like to talk more about. Fred was prompted to explain his actions in the selected photos. Tim then explained that Fred can share the interesting events indicated in the photos with his family in the form of a learning story. He firstly asked Fred for a title that encapsulated the event then prompted him on the details he'd like to include.

Tim: What do you want to say about that? Do you want to say how you found the aeroplane? (Both look over the photos taken on the iPad.)

Figure 2: Fred working with Tim to co-document and construct a learning story

Fred was keen to include his full name and went on to share some phrases to explain his photos to his family. Tim guided Fred to type his name and the title of his learning story. He then took over and added in the phrases that Fred had shared earlier. Fred was able to make other suggestions when Tim prompted him to do so. After the learning story was completed and Fred was happy it accurately reflected his earlier outdoor play interests, Tim saved his work to incorporate it later in Fred's learning portfolios. It was also possible to email a copy to Fred's parents.

In this episode, the iPad afforded instantaneous capture and recording of the children's play and learning interests in action and was important in supporting Tim's assessment practice:

> It's handy that it's [iPad] got a camera on the back, it's not a very good quality camera but it does mean that we can take photos and insert those photos straight into a learning story on the go. And everything's there, you've got the keyboard and the photos and everything's already there on the screen. You don't need to get things from the office to do it. You just need the iPad and you might see something happening so you can take some photos and then those children can be involved in their assessment for learning.

Tim explained the possibilities for including children's voice for assessment using the iPad:

> The children would be interested in seeing their photos and being able to move their photos where they wanted to in their learning story and then they can tell me what they were thinking at that time of each photo so we can make captions under each photo or they can dictate a story to me and I can type it up. It won't be very common for a child to type up their own story but they can certainly dictate and we can type as they talk … The whole point is to make assessment for learning exciting so that they can be empowered to be part of that process.

This episode highlights how teachers can make use of the iPad's affordances to capture, record and document children's interest in action. Children's voice in the form of their ideas, explanation, questions and elaborations could be incorporated immediately on-site and recorded for sharing with

their parents/family at home. Both teacher and child worked together to co-construct the learning story but importantly the child was empowered to be involved in the entire process of selecting, documenting and editing the story. Put another way, Tim's relational pedagogy, exemplifying his digital smartness, considered it important that the child was given ownership and agency to act in the moment rather than the story being written solely from the teacher's perspective at a later time, as is typical in current early childhood and care practices. Agency is an important element in relationships. The principle of Ngā Hononga/Relationships contains notions of agency and identity based on trust. Trusting the people, the place and the things we do are fundamental aspects that contribute to learning (Carr & Lee, 2012). Assessments which include the child's voice can be influenced by the relationship between the teacher and the child. Shared interactions based on positive relationships contribute to the child's agency; this is evident in the episode with Fred and is a good example of a child co-authoring and self-assessing as he and Tim documented his learning together. Fred trusts that his contribution to his assessment is valued in this place. including his developing sense of identity as a person who has a contribution to make to the assessment of his own learning.

Episode 3: Enabling children to communicate and share their interests

In this last example, Tim made use of the FaceTime app on the iPad (an app that allows for synchronous video communication) to allow for children at Preschool to communicate with younger children from one of the other centres within Creche. Younger children will eventually transition to Preschool as they grow older. Although they can physically visit Preschool, this opportunity is limited by the availability of teachers and the suitability of timing as both centres have different routines and activities in place. By providing this opportunity for the children at both centres to communicate, Tim intended for the younger children to become familiar with the available activities and environment at Preschool and for the children at Preschool to share their knowledge and communicate events of interests to their younger audience. Some of the children at Preschool had transitioned from those other centres, hence their sharing and communicating with the younger children would be affirming for them and would also connect them with past teachers who had interests in their learning. Tim had pre-arranged with staff at the other centre to communicate via FaceTime on a staff member's iPad.

Tim set up the FaceTime communication with the other centre and started speaking with staff there. Children gathered around him with apparent curiosity. Four girls in particular became quite interested in the activity. One of them, Rosy, had transitioned from that centre not long ago and was keen to talk to younger peers and teachers, one of whom was her parent, there. The children greeted staff and children (who were captured in the frame of the iPad camera) from the other centre, waved and shared the events and activities of that day. Rosy had brought along her doll. The doll was meaningful for Rosy as it had been a gift from her uncle overseas and it came with a special doll care kit. Rosy first spoke to her parent, showed her doll and, affirmed by her parent, started sharing different aspects about her doll and how it was special to her with the younger girls at the other centre. Rosy's peers at Preschool, who had gathered around her, were also curious and asked questions and prompted her to elaborate on her sharing. The episode was empowering for Rosy, who was able to share an interest with an especially personal meaning with her peers, a younger but still curious audience and adults (teachers and parent) who had an interest in their learning.

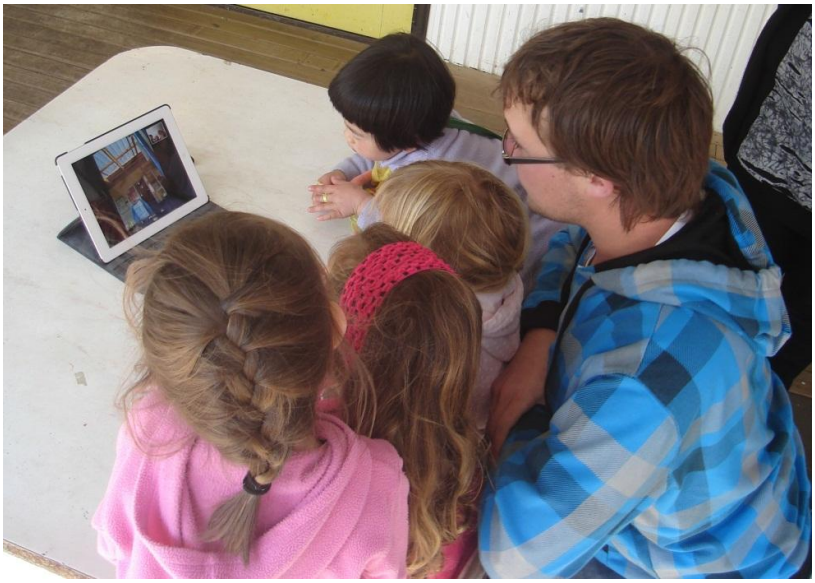

Figure 3: Children communicating on FaceTime with children at other centres (Tim is guiding them and looking on)

Tim thought that the FaceTime activity worked well to establish communication between the different centres. He highlighted that the children at Preschool who were mostly interested in the activity were those who had transitioned from the centre or had younger siblings there. He explained:

> We can FaceTime other children around the centre which we did on Friday last week and that's quite neat for them to see other children at another place at the same time.

In this episode, the iPad afforded children's exploration of a different form of communicating, sharing and contributing of ideas, events and objects (toys) meaningful to them from within a comfortable and familiar context , helping to establish a sense of belonging and worth at Preschool. Children were able to develop and sustain valued relationships with their younger peers as well as become aware of and able to make connections with the wider world through this experience.

As with the second example, this episode reflects Tim's perspective on iPad and ICT use in general in support of his teaching belief and practice where ICT use was a means to achieve particular teaching and learning goals and, through this, offer the children a broader range of learning experiences:

> I see ICT as a part of early childhood and not early childhood as a whole. I'm quite a naturalist as well, so I'm not wouldn't like to see ICT as taking over early childhood … We are actually getting people saying maybe we should be having nature as the early childhood but actually ICT has a part in it as well. The two are not mutually exclusive but they are not the same either. I think we need to have a broader range of experiences available for children.

Episode 3 is an example of the three key elements of relationships with people, places and things. Teachers being digitally smart in this episode recognised that a practical and social gap existed for the children at Preschool. They addressed these by providing opportunities for the children to experiment

with FaceTime on the iPad to connect, share interests and build relationships with other children and staff across spaces without leaving their own contexts. This sits well within the Ngā Hononga/Relationships curriculum principle. This example also served a practical consideration; that is, it supported relationships across spaces with the other centres as a supplement to the teachers having to organise staff coverage to be able to take the children physically to each centre. FaceTime enabled Rosy to share something that was of interest to her with other children across a virtual space whilst remaining in her own context. This allowed her to reconnect with her friends in the centre that she had recently transitioned from, thus supporting the relationships she had developed there. Through FaceTime, Rosy could share her immediate interest rather than suspending it until an opportunity arose to physically revisit her previous centre. She was able to communicate in the 'here and now' rather than at a later date when her interest may have shifted.

Discussion and conclusion

We began this chapter by asking what iPad-supported relational pedagogy might look like in early childhood education and care settings where teachers have the aim of developing and extending children's learning and exploration of the world around them based on the notion of building relationships with people, places and things. In all episodes, iPad use was appropriately integrated into children's sociocultural context and supported rich meaningful interactions between teachers and peers rather than in isolated and disconnected ways. In the examples provided, each instance was child-led and teacher-guided based on children's interest and focused on what was meaningful, important and accessible to them and how they could communicate this with their peers, teachers and family/caregivers, those who had personal interests in their learning and development. In the first example, Zach's initial interest with the researcher's equipment eventually developed into his further exploration, documenting and sharing of his work on the iPad with his family. In the second, Fred's interest in outdoor play and his ability to navigate through the play equipment successfully was co-constructed and documented for further sharing with his family. Finally, Rosy was able to share and communicate her interest and knowledge about dolls with her peers and a younger audience and her parent based at one of the other centres.

These examples illustrate the fostering of strong connections between home and centre learning, allowing children to share personal interests and knowledge that are valued and extended at Preschool. These experiences are then shared with children's families/caregivers, who can act on and extend on them. In all this, children experience a process that is affirming of their value as individuals within the context of their cultural and social contribution to their own and other children's learning and exploration of the world around them.

In each instance, iPad use on its own was not the main focus. Tim and Nadine used the iPads as part of their repertoire of teaching tools to engage, sustain and extend children's interests further. Realising the iPad's potential was possible when the teachers had a clear pedagogical frame and purpose for its use. In this case the teachers were guided by a relational pedagogical perspective. Put another way, the teachers adopted a relational perspective to encapsulate what it might mean to use iPads to engage young children's interests and learning. Although the iPad afforded particular opportunities for teaching and learning that would not have been possible before, iPad use on its own would not have brought about the types of interesting, productive interactions and learning

experiences reported in our examples. Tim and Nadine had to carefully consider the opportunities iPads opened up in supporting their relational pedagogy teaching belief and to integrate these opportunities into practice to bring about productive learning experiences for the children. Our examples demonstrate the ways iPads can be seamlessly embedded into and expand teachers' and children's teaching and learning experiences where the focus is on developing and sustaining relationships valuable to learning, supporting how educators can take advantage of the affordances of technology by teaching with and through it as part of their social practices (Carr, 2001). As a result, children feel their knowledge and contributions are valued and affirmed, developing trusting relationships with those who had interests in their learning as a basis for further learning and exploration. From this they become empowered to share and contribute to their peers' learning, in a reciprocal manner, thus mutually enriching each other's learning and awareness of the world around them.

Three implications emerge from these findings for ECE practices. Firstly, being guided by a relational pedagogy view (Ngā Hononga) implies teachers valuing the ideas, interests and dispositions that children bring from home (Hedges & Cullen, 2011; Papatheodorou & Moyles, 2009). Awareness of children's funds of knowledge and locating children's interests through everyday ordinary experiences, events and incidents that are meaningful and accessible (be it in outdoor play, dolls or video cameras) is imperative. This can then serve as a basis for teachers to then consider the affordances of iPads in supporting and extending children's sharing, co-constructing and communicating of ideas with peers and families.

Secondly, teachers need to recognise the affordances that iPads can offer to their practice. For this, they will need "sandpit" time (Otrel-Cass, Cowie, & Khoo, 2011) to explore and experiment with the device's different functionalities and possibilities in order to develop the skills and confidence to incorporate iPads in their practice. As our examples have shown, iPad use can complement and expand current teaching and assessment practice. Professional development in the form of collegial sharing and dissemination of innovative practice (either through face-to-face sharing or through virtual communities of practice) will be beneficial to this process. Teachers are thus encouraged to examine their pedagogical beliefs, reimagine and adapt their practices to leverage the affordances of the iPad to support and create meaningful teaching and learning aims and purposes. Teacher awareness of the physical care of and appropriate guidelines (including limits) necessary to engage young children productively with iPads is necessary. They need to be able to model and guide the children in these aspects. We agree with current analyses that teacher excitement and beliefs in any ICT uptake context is essential to enable learners to participate equitably and adequately in teaching and learning processes (Blackwell et al., 2013; Woolf, 2010). Young children will need the skills to use the iPad appropriately. Our study indicated that although children tend to find iPad uptake less challenging than other ICT forms, teacher guidance was still necessary to help them become aware of its care and appropriate use to support and expand their learning interests.

Thirdly, using iPads is appealing, motivating and interesting for children. They find iPads easy to use and the range of multimodal apps and resources appealing for playing a variety of games (educational or recreational). When asked what makes the iPad special, one of the children cited that "the iPad can't break" referring to its ease of functionality and access to different applications in comparison to clunkier point and click desktop/computer systems. Nadine elaborated on how a child who was shy to draw on paper experimented with a drawing app on the iPad that allowed him to create and erase his mistakes easily multiple times. This experience developed his confidence and helped him transfer that confidence and skill to paper-based drawing. IPads therefore constitute a part

of the wide repertoire of ICTs available to today's young children to access resources to inform their and their peers' learning and to share, communicate and express their ideas in multimodal ways that are appealing and meaningful to them. Teacher recognition and taking advantage of this observation can leverage iPad use for supporting children's learning and exploration in early childhood and early primary school contexts.

In conclusion, our definition of teacher digital smartness at the beginning of this chapter signals and celebrate the important role ECE teachers play in supporting and preparing today's digital learners for a world where ICTs, including mobile and tablet technologies, are becoming increasingly central and pivotal in almost every sphere of life. We encourage teachers to boldly take up this challenge and forge new and different exciting possibilities for teaching and learning in their own contexts. We hope this study has illustrated such possibilities in informing ECE iPad-supported practice for and with young children and opened further avenues for scholarship in this area.

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Chapter 2: A diversity of digital smartness: A case study of children's uses of Information and Communication Technology in an early childhood education setting

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Abstract

Information and Communication Technology is regarded as playing an ever-increasing role in the lives of people, which includes young children. The role of ICT in early childhood educational services in Aotearoa New Zealand is still being argued by teachers despite policy expectations that endorse and support its integration into practice. This chapter draws upon a small qualitative case study involving young children and their uses of ICT in one early childhood setting. It identifies and examines the diversity of ways that children, and other people involved in their lives, might use ICT as a means of initiating, facilitating and supporting learning. We define this as digital smartness. A socio-cultural perspective is used to recognise and examine this notion of children's digital smartness. ICT and learning is examined in terms of the social and cultural contexts of the young children with particular focus on the influences of family/whānau and the early childhood education setting. We examine how the digital smartness of children can be understood and affirmed in early childhood settings. We identify the Bourdieuian construct of habitus as a valid perspective to informing and meeting obligations of a more coherent teacher pedagogy of ICT. We contend that certain factors need to be in place to welcome the diversity of children's digital habitus into early childhood education settings that affirm the digital smartness of children learning and living in the 21st century.

Keywords: early childhood education (ECE), digital habitus, information communication technology (ICT), pedagogy, sociocultural theory

Introduction

In young children's lives it is now recognised that a wide range of new technologies are shaping their interactions and learning, with ICT forming an integral part of their increasingly diverse and multi-modal literacy environment (Ministry of Education, 2009; Plowman, McPake, & Stephen, 2008; Selwyn & Facer, 2007). This exposure to, and learning through, ICT by young children has been influenced by the impact ICT is having on popular culture and how it features as part of many young children's daily lives (Somekh, 2007; Plowman et al., 2008). It is also recognised that the affordances of digital technologies are enabling a move towards children being knowledge creators rather than just knowledge consumers in the digital world (Falloon, 2013). This means that today's generation of young children are increasingly likely to use digital technologies in diverse and creative ways for

communication and information. This generational distinction is leading to the development of some different dispositions, skills and expectations of learning in young children that may differ to ones held by some adults in their lives (Hatherly, 2010; Selwyn & Facer, 2007; Zevenbergen, 2007).

In this chapter we consider how the expectations and the cultural practices of children in the use of ICT are met in one particular early childhood service and what the implications might be for teachers and their pedagogy. In the context of this chapter we propose that these expectations, skills and cultural practices of children can be viewed and termed as their digital smartness. What is also of interest is the diversity of each child's digital smartness and how it is influenced by the type of learner the child is and their sociocultural practices.

We consider the potential dissonance between the digital smartness of children and teachers in the use of ICT in early childhood education (ECE) settings. The function of the chapter is to identify, through a small case study, not only how diverse the digital smartness of children can be but also how children's digital smartness can contrast with and contradict some of the adults' (predominantly teachers') digital smartness in the early childhood setting. We contend that the concept of digital smartness of children can be usefully understood and portrayed through the Bourdieuian construct of habitus.

The chapter begins by contextualising early childhood services in Aotearoa New Zealand with a focus on the national early childhood curriculum, Te Whāriki (Ministry of Education [MoE], 1996), and ICT policy initiatives in early childhood education. We explore the concepts of habitus and digital habitus before outlining the research methodology and discussing the findings of our small-scale case study.

Early childhood education in Aotearoa/New Zealand

In Aotearoa New Zealand there is a diverse range of early childhood education and care services catering for the age ranges of 0–school age years (Merry, 2007). The services, including Te Kohanga Reo (Māori tikanga [customs and practices] and Te Reo Māori [language] immersion centres), Tagata Pasifika (Pacific Island centres), Playcentres (parent/whānau run services) and public, community, or privately run kindergartens and early childhood education and care centres, all exist under the auspices of the Ministry of Education (Stover, 2010). Although not a compulsory education sector all services are brought together under the mandatory implementation of the early childhood national curriculum, *Te Whāriki* (MoE, 1996).

Te Whāriki has been strongly shaped by Aotearoa New Zealand's past and its aspirations for the country's future. It recognises the unique bicultural nature of Aotearoa New Zealand (Māori and European heritages) and the diversity of the early childhood sector (Reedy, 2003). *Te Whāriki*, a woven mat in Te Reo Māori, is a metaphor which represents a place for all to stand and embraces the diversity, programmes and philosophies of early childhood education and care services (Lee, Carr, Soutar, & Mitchell, 2013). The overarching aspiration of the curriculum for children is

> to grow up as confident and competent communicators, healthy in mind body and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society. (MoE, 1996. p, 9)

The curriculum is underpinned by a socio-cultural framework that takes a holistic view of both learning and the learner recognising that patterns of learning and development are fluid (MoE, 1996).

The key premise is that children learn through responsive, reciprocal relationships with people, places and things in, and from, their own social and cultural contexts (MoE, 1996). In this context social situations are viewed as rich places for learning where children will use the intellectual tools of their community (Rogoff, 1990, 2003). For many of today's young children such tools and practices include ICT (Bolstad, 2004; MoE, 2005).

ICT can be defined as electronic or digital equipment that allows information to be gathered or communication to take place (MoE, 2005). This broad definition of ICT has been extended to now include identified affordances of many of the contemporary ICT tools and programmes. For example, ICT is being recognised more and more as supporting exploration, documenting and communicating learning episodes and enabling critical questioning and inquiry by children (Archard, 2013;MoE, 2009). This includes how children explore their worlds and make meaning of things that are of interest to them (Archard, 2013; MoE, 2009). ICT is also affording opportunities and discoveries for collaborative teaching and learning and can suit individual children and their own unique ways of being as learners (Archard, 2013; Hatherly, 2009).

In early childhood education in Aotearoa New Zealand, the term ICT extends to including tools such as digital cameras, the internet, video cameras, telecommunication tools, programmes and many other electronic or digital devices and resources (Bolstad, 2004). The range and diversity of these tools, along with their availability and targeting to young children and early childhood services, continues to grow. New technologies continue to evolve, bringing advances such as greater portability of devices along with reduced costs that make them accessible to more people. This is taking place within the rapidly growing applications (apps) market, which offers a broad range of programmes with educational and entertainment uses aimed at young children and the early childhood services they attend (Falloon, 2013; Hatherly, 2010; Hatherly & Chapman, 2013). It is of interest that the range of tools and resources available for children further endorses the focus of early childhood education ICT policy, which rejects the notion that ICT is simply "children using computers" (MoE, 2005, p. 2) in predominantly drill and skill exercises. Instead it is about a range of ICTs that are accessible and can be chosen and used by children and teachers for meaningful purposes. This includes ICT contributing to the sociocultural features of teaching and learning such as co-constructing, scaffolding and episodes of sustained shared thinking (Archard, 2013; Hatherly, 2009; Siraj-Blatchford, Sylva, Muttock, Gilden, & Bell, 2002). Such practices define educational activity as relational and collaborative between children, their peers and teachers.

Indeed, the significance of socio-cultural understanding of learning has also been specifically identified in the Aotearoa New Zealand early childhood education ICT policy, *Foundations for Discovery* (MoE, 2005). This policy document was developed to provide a framework to support and guide the implementation of ICT in early childhood settings. It states that "in New Zealand , our lives are increasingly influenced by information and communication technologies (ICT) which support, facilitate and shape the things that people do and the lives that we lead" (p. 2).

Foundations for Discovery supports the notion that pedagogy could, and should, "enhance learning opportunities through the meaningful use of ICT" (MoE, 2009, p. 2). This policy acknowledges that children will be reflecting on their own learning and communicating to others about it (MoE, 2005). It recognises ICT as playing a role in enabling children to "broaden their horizons by exploring the wider world" (MoE, 2009, p. 2).

In order for such policy expectations to be integrated into teacher pedagogy two factors need to be understood by teachers. Firstly, children will come with ICT cultural practices, expectations and skills and these need to be recognised and responded to. This will allow children to draw upon and have these skills and expectations affirmed in supporting their own learning through what we regard as their digital smartness. Secondly, teachers must recognise that many of the children they work with will have diversity in this digital smartness, which is introduced and constructed in their family and community practices and has been further shaped by the diversity of the digital world itself (Hatherly & Chapman, 2013; Plowman, McPake, & Stephen, 2008). This construction of digital smartness is unique to the child and is used by them to both meet and reflect their own ways of being as a learner.

As stated earlier the notion of ICT in early childhood education is far more than 'children using computers' and this can be shaped with the interactions between aspects of an effective learning environment. Clark and Grey (2010) define this as a composition of static and dynamic elements. An environment incorporating a varied range of readily available and portable ICT equipment (static elements) for children to use illustrates this. Such environments also include teachers who invite and encourage children to use such equipment to explore and collaborate in individual and shared learning moments (dynamic elements).

This affirms the need for a philosophy, pedagogy and practice that will support its meaningful use by children. Hatherly (2009) indicates that the "teacher's mind" is essential and without a consciousness of what meaningful learning opportunities can come through ICT, "ICTs are no more than jazzy and expensive alternatives to existing resources" (p. 9).

This concurs with the ICT in early childhood education literature, which identifies a focus on ways ICT supports learning and scaffolding techniques (Archard, 2013; Bolstad, 2004; Hatherly, 2009). Bolstad notes that things don't just happen and that "practitioners must be conscious of the kinds of interactions they would like to occur in the context of ICT use and adopt pedagogical strategies to support these" (Bolstad, 2004, p. viii). We identify the Bourdieuian construct of habitus as a useful lens to further understand children's uses of ICT and inform teacher pedagogy.

Habitus and digital habitus as a lens

Habitus is a social construct popularised by Pierre Bourdieu, who theorised it as a person's dispositional approach to particular ways of being and doing in society that are defined by their socio-cultural contexts and experiences . Bourdieu defines habitus as "a durable, transposable system of definitions acquired initially by the young child in the home as a result of the conscious and unconscious practices of her/his family" (Bourdieu & Wacquant, 1992, p. 143).

Zevenbergen (2007) notes that "while Bourdieu's work theorises the construction of a class habitus, the process through which a habitus is realised can be re-appropriated for other forms of habitus" (p. 20). We agree with Zevenbergen (2007) that habitus can be re-appropriated to include digital habitus and represents a useful way of understanding the cultural experiences and expectations of young children in our education systems today. This is because children who have grown up with ICT are confident and responsive users of technology in diverse ways.

Children may have experienced different ways of being and doing in their own family cultural practices and therefore draw from a different set of dispositions. This can create a mismatch of digital habitus that may cause dissonance in the context of early childhood education where the child is the

competent ICT user and the teacher may be the less competent and/or even resistant one (Zevenbergen, 2007). The 21st century child may well have moved past marvelling at what digital technologies can do and instead be using technology in their everyday lives with purpose and meaning. This digital smartness, as we have previously identified, includes exploring and choosing from a wide range of digital materials that may suit or attract them and that fit with their learner identity. Thomson (2002) uses a valuable metaphor of a "virtual school bag" to describe how children bring all the knowledge that they "have already learned at home, with their friends, and in and from the world in which they live" (p. 1) into their educational settings. In this chapter we contend that 21st century children have a 'digital habitus' and this can be viewed and termed as digital smartness, forming a significant part of the content of their virtual school bag. These theoretical perspectives contribute to understandings and findings of the case study conducted.

The research context

This small case study was titled 'Digital Citizens in Action' and was a collaboration between the authors. At the time of the research we were positioned in different roles in relation to the case study. One of us was a lecturer at the University of Waikato and the other was an early childhood teacher in the setting for the study. Our interest in the topic of ICT originated from conversations and professional development liaisons about the uses of, and practices in, ICT at this early childhood setting. In particular there was a shared interest in how to implement ICT effectively for children's learning and understand and meet the digital socio-cultural expectations and experiences of the 21st century learners at the setting.

Case study setting

The study was undertaken in a privately owned, teacher-led kindergarten for children aged 3.5 years to school age. It was located in an urban setting in a well-established and medium/high socioeconomic suburb of Hamilton, a city with a population of approximately 130,000 (Statistics New Zealand, 2006). There was a teaching team of four qualified early childhood teachers and a roll of 30 children per session. The kindergarten had two sessions per day with each session lasting for three hours. Children attended morning, afternoon or six hour 'all day' sessions.

The kindergarten had a good ICT infrastructure with a range of technologies available to children and teachers. The teachers had access to two desktop computers with Internet availability. Children had access to one desktop computer with Internet availability in the learning environment. Teachers and children had access to a digital camera, Flip video recorder and a digital microscope. The group time space (a designated space for children and teachers to come together for group activities) in the kindergarten had a computer (with Internet access) linked to a large TV screen so that children and teachers could use tools together such as YouTube and Google. The computer and screen also enabled children and teachers to share photographs and other digital information. All computers in the kindergarten were connected to one printer.

Research objectives

This study aimed to explore how children may be drawing on their digital experiences and applying their inculturated expectations of ICT to their own learning, and in what ways. To understand and

analyse children's socio-cultural expectations of ICT it was important to capture the types and use of ICT in the home by the young child and their families. This involved asking parents and whānau about uses of ICT in their, and their children's, lives and gathering information about episodes of learning that include ICT in the early childhood setting and home.

Methodology

A qualitative case study research approach was adopted that had an interpretivist epistemological orientation focusing on "the understanding of the social world through an examination of the interpretation of that world by its participants" (Bryman, 2004, p. 266). Through this investigation, a case study seeks to provide a picture of the richness and depth of a situation and a construction of the reality of the participants' lived experiences within a bounded system (Cohen, Manion, & Morrison, 2000; Cresswell, 2005).

This case study was bounded to 3 children and their families who attended the same early childhood centre during the same period of time. The children are Jack, Jessica and Abigail. It is acknowledged that the participants in this study were from similar high socio-economic backgrounds with access to a range of current ICTs in their home environments. Data was collected by conducting semi-structured interviews with teachers and whānau and the voices of the children are captured in the narrative assessment of Learning Stories (Carr, 2001). Interviews were recorded on an MP3 device and stored. The interviews were then transcribed. Thematic analysis was used to identify patterns within data. What is key, according to Braun and Clarke (2006), is that a theme must *"*capture something important about the data in relation to the research question and represents some level of *patterned* response or meaning within the data set*"* (p. 82). The themes identified include the ways children participating in the project use ICT in their learning, how ICT supports a connectedness for learning and the family/whānau and teachers understanding of the child's uses of ICT at the early childhood setting.

Findings

Three themes emerged from the parent interviews. These were the family cultural practices of ICT in the home and the ways children use digital technologies at home. Secondly how children connected and transferred their digital behaviours between home and centre (digital smartness) and finally how teachers responded to children's digital smartness. The themes are captured and supported in the strong commentary at times by family and whānau.

Children's uses of ICT: A diversity of digital smartness

Jessica's parents said that Jessica (age four) is already a competent, confident user of digital technologies. This is captured in some of the usual daily routines in their household, where Jessica's mother describes some instances that capture Jessica's affordances and uses of digital technologies. The example also demonstrates the accessibility and normality of the use of digital tools in the household as a culturally meaningful practice:

> We have the laptop and computer. They [the children] run around the house a lot of the time with the digital camera. They draw chalk pictures on their driveway and before any

> rain comes they photo their pictures. It is an achievement of theirs and they are proud… Jessica will initiate this ("Mum, we need to photo this) … Jessica has several collections of things (e.g. rubber ducks) and she likes to photo these.

Jessica's mother also explained that Jessica initiates and uses these devices in ways that appear meaningful to her and reflect her interests. In photographing the chalk drawings that will eventually be erased, she is able to document and archive her achievements. This seems to be an important part of her play and learning.

Jessica's use of technologies is widened by her participation and engagement with her family in their everyday ICT uses. For example, she uses Skype to talk, sometimes daily, with her grandmothers, who live in America and England. Jessica's mother describes a particular routine: "The girls speak often on Skype with their nannas in England and America. Nanna [in England] has breakfast with us every morning even though she is 15,000 miles away."

These family cultural practices contribute to Jessica's digital habitus through the process of participating in them. They enable Jessica to see digital technologies as a relational tool and serving a purpose for her family. This is indicated by her mother's comment about the influence ICT has on Jessica, as for Jessica ICT "…brought together people and places that are important to her".

Jack is described by his mother as an "avid inquirer". He seems to have many interests that prompt him to ask questions as he makes sense of his world. During the interview Jack's mother noted that he had a wide repertoire of skills and sources that enabled him to undertake his investigations. For example, he uses books, people and digital technologies for information gathering. These cultural tools and practices are available to him in his home environment as part of family life and appear to co-exist successfully. In terms of access to ICT at home, Jack is able to use the computer whenever he wants. Jack and his father often work together at the computer to find interesting websites. These websites can be educational or recreational. Jack's mother reported that Jack has been confident in using technologies in pursuit of his interests from the age of two and a half, saying that "he could navigate websites [from that age]. He goes into Favourites and just goes around".

Although Jack is an inquirer by nature and, as his mother highlights, initiates the act of research, it is by engaging in the practice of collaboration with his father that Jack adds to his digital habitus by experiencing an affordance of ICT as being a tool for inquiry. Jack also understands that digital technologies can be a source of information for his interests. Jack's mother described the diversity of Jack's interests and commented that he will often be aware of, and wanting to know more about, current issues that he has heard about via the Internet and terrestrial media. She commented, " The things that catch him have included the Pike River Mine disaster, earthquakes and the tsunami [Japan, 2011]. He has a thirst for knowledge on these things."[2]

Abigail shared some similar dispositions towards the use and access of ICT in her home setting. Abigail's mother commented that Abigail enjoyed YouTube clips and would request the use of

[2] These denote the Aotearoa New Zealand and world events current in national and international news during this study—severe earthquakes in NZ and Japan in 2010 and 2011 plus the Pike River Mine disaster in which over 25 miners were killed.

Google with the family to look up many topics that she wanted to find out about. The mother explained: "Often we would click into things that Abigail asked us to look up, sometimes it was a topic she had discovered that day [and] Abigail really likes to look at pictures or drawings of things she wants to know and usually wants to print them off."

Transference of digital smartness between home and centre

The children in the study demonstrated an expectation of continuity and drew upon dispositions from their digital habitus to use ICT in meaningful ways. The following excerpt from a Learning Story[3] (Carr, 2001) demonstrates how Jessica used a camera and USB stick to document and share an ongoing learning experience between kindergarten and home:

> Jessica building a wooden birdhouse at the centre saw her involved right from the start in the design and what she wanted to do with it. Jessica planned to have specific coloured pieces of ribbon attached to the wooden structure. She also declared that she wanted it to go home and to be put in a specific tree in her garden. Sure enough at the end of 'Kindy' Jessica collected up her birdhouse shared it with mum and off she went.
> A couple of days passed until one morning just before the session Jessica bounded in to Kindy with mum. She held in her hand a USB. She called me over and handed it to me. "They are on there" she beamed. "What are?" I asked. "My photos, me and Dad and the birdhouse. We can see them on the computer", she said. So we quickly put the USB in the computer and brought up the wonderful collection of photos of Jessica and her Dad putting up the birdhouse in her garden. She explained what they did and what things they thought about when putting it up (could it be seen, was it high enough?). "Can I show them at mat time?" Jessica asked. "Absolutely what a great idea, shall we print them off then?" I suggested. And at mat time Jessica shared her pictures.

Jessica's mother acknowledged the importance of this process for Jessica by commenting: "The birdhouse learning didn't just stop at the end of kindy. It was something to be treasured by Jessica and brought up, recorded and kept as a memory."

The practice of photography as a tool for documentation is used in the kindergarten setting and, as noted earlier, consequently by Jessica in her home environment where she is able to access and freely use a camera. This is an indication of Jessica's digital habitus being constructed by practice in her early childhood setting as well as in her home. She was able to transfer and add to her digital smartness between settings. Of key interest here also is the dissonance between the digital habitus of Jessica and the teacher. The teacher's suggestion and response of printing off the photographs to show at group time rather than projecting them on the TV screen though the USB stick could be an indication of defaulting to the teacher's own ICT cultural practices and knowledge. Although the goal of presenting and sharing information with others is achieved, it could have been undertaken more effectively by using the TV screen. In this instance it would have been interesting to know how Jessica thought they could share the photographs.

Jack was also able to transfer his digital smartness between home and centre. Jack's mother commented that Jack initiated the request of using Google at home to search for answers and that if he

[3] All Learning Story excerpts are in italics.

is not satisfied, although he doesn't talk much about what happens at kindergarten, he will say, "I'll look on the computer at kindy tomorrow".

This could be an indication of an alignment of ICT cultural practice between home and centre as Jack knows that he can use the same digital technologies with the support of teachers to find out the answers he is seeking. This could be perceived as the digital smartness of Jack and his teachers being compatible and therefore his learning being supported and scaffolded. This extract from the abridged Learning Story endorses this:

> This … was triggered by Jack's wondering of what the 'sticky stuff' was that came out of the tree in the kindergarten garden. After some brief discussion with his peers where several names of what the 'stuff' was, Jack asked the teacher, "but what is it and I wonder where it comes from?" He then added " I know! We could look it up on the computer". Jack and the teacher went off together and researched the question (Jack being quite clear what question he wanted typed into Google). The teacher and Jack read through some information and pictures and he decided what he wanted to keep and print off to share with his family at home.

In this example Jack wanted the information printed off and available in hardcopy. With support from his teacher, he analysed what he felt was relevant from the Google hits and saved it as a tangible artefact to share with his family.

Family/whānau and teacher responsiveness to children's digital smartness

A key word used by teachers in the kindergarten when asked about the use of ICT and the children's expectations of it was the word 'struggle'. Struggle can evoke the feeling of hesitancy and might lead to behaviours of avoidance or even dismissiveness in some. The comments of teachers indicate concerns with change and their ability to keep up with the expectations and knowledge of children. Teacher A, for example, said, "It's changing all the time—I struggle to keep up with it [ICT]", and Teacher B argues, "I think we struggle more to adapt than children do. These children see change as good. Why fight it? Go with it."

However, it was also evident that some teachers were accepting of their own capabilities and understandings and were open to being taught by the children. This seems to be a recognition of their own digital smartness whilst being open to learn from the children different ways of being and doing when using ICT. This pedagogical positioning of openness and collaboration then enables children to bring in their own cultural practices to share in the kindergarten. Teacher C remarked, "I've got to be on my game as a result [of children's knowledge of ICT]. I can be learning a lot from them."

As detailed above, one limitation was noted by the teacher working with Jessica and her USB stick, and captured in the reflection she wrote about how Jessica might have shared her photos of her birdhouse more effectively:

> It was some time later that morning that I realised that there was no need to print them off and my narrowed suggestion was a rather unnecessary one. The mat time area has a computer and wide screen monitor and that simply transferring the USB to there was much more useful. I reflected on my limitation to realise how transferable and immediate ICT can be and my knowledge and experience of ICT was limiting some practices for

> both me and [the] children. My suggestion was perhaps the only one on offer (in the child's eyes) and forgetting to ask her what we could do with them might well have shut out her more contemporary understandings of ICT.

Despite differences between the digital smartness of children and teachers, teachers could recognise their pedagogical role as co-constructors and scaffolders during the learning process and could determine when and how to support the child. Teacher D, for example, noted that "it's not just ICT creating independence, it also means being able as a teacher to access things with the child and that might require support even though they might initiate it [the inquiry]".

This is also evident in the following Learning Story where Abigail and the teacher embarked on a shared investigation. The teacher scaffolded Abigail into accessing Google to research her inquiry about recycling. However, Abigail then asserted her own expectations of and purpose in using ICT to develop a presentation to share with others. During her sharing of information, which included YouTube clips via a large-screen computer, an unplanned consequence and unexpected connection emerged.

A relatively new family to the centre viewed Abigail's mat time presentation. An excerpt from the Learning Story explains:

Whilst Abigail and the teacher were undertaking the regular 'Kindy' job of putting out the recycling she asked, "How does paper make new things?" The teacher paused and suggested that they might investigate using the computer. Abigail was willing to do this and they investigated using YouTube clips and Google. As the teacher I asked Abigail what questions we should ask 'Google' and I typed them in and shared the written information with her. Abigail however became very keen to share this back at the end mat time in the centre's practice of 'newsflashes' (a time at the mat to share findings and thinkings that may take place during the session). With the teacher they saved some information, pictures and YouTube clips and Abigail planned what she was going to say. Abigail shared her findings as a 'newsflash' and interestingly a new mother to the centre was watching this while waiting to collect her daughter. At the end she shared that 'K's grandmother owned a recycling plant in South Africa and she would contact her to tell her about the interest shared by Abigail. Sure enough a few days later an email arrives with photos of K's grandmother's recycling plant and information about the work of recycling. A great chance for Abigail (and also 'K') to share information and some great photos together with the other children and teachers.

Discussion and conclusion

We started this chapter by wanting to examine the notion of the 21st century child's diverse digital smartness. To do this we drew upon a socio-cultural perspective to examine ICT and learning in the practices and the contexts of the young children's lives, looking particularly across home and the early childhood education setting attended by these children. We also wanted to consider any dissonance between children's digital smartness and that of their teachers' and the setting.

The three children in the study all demonstrated digital smartness that was constructed from participating in cultural ICT practices at home. It was interesting to note that each child had similar access at home to ICT and it was regarded as just a normal and functional part of everyday life. ICT

was used in purposeful, relevant ways by the family and consequently formed part of the child's digital habitus (Bourdieu & Wacquant, 1992).

It would seem from these findings that the diversity of cultural practices influences the diversity of the digitally smart child. It is acknowledged though that the children in this study are immersed and encouraged to explore, play and learn about things in a consistent ICT-rich environment. This is supported by family and home ICT practices that support their digital smartness. The complexity of digital smartness is further extended by the child's own interest as they use ICT to meet their own ways of being and doing (Hatherly, 2009, 2010). This is indicated by Jack, the inquirer, who uses ICT to ask questions and pursue his curiosities; Jessica, the recorder, who documents and archives things that are important for her; and finally Abigail, the reporter, who presents and shares information with others.

The families in this study displayed different ICT cultural practices as they have different ways of being and doing. For example, Jessica's family used Skype as a relational and staying connected tool as it was the usual way of communicating with overseas family. Jack, on the other hand, explored the Internet with his father from a very young age to find information about the world around them and reinforced his inquiry and collaborative learner identity. In Abigail the attraction of visuals about topics of interest are supported in her ICT use. This is a valuable display of the features of these children's learning styles and what they value as they go about discovering and exploring things that interest them. ICT has contributed to this display.

It is apparent from the findings that children can, and expect to be able to, transfer their digital smartness across settings, in this case between home and centre. For example, when Jessica brought her photographs on a USB stick to share with others in the kindergarten and when Jack asked to print off his research to take home with him or when he intended to find out answers on the computer at the centre when they were not available at home. This transferability of learning across settings that is supported by ICT is another aspect of what we consider to be digital smartness.

One important question is how do others respond to the expectations of children and displays of their learner identity through ICT. In this case study it concerned, in particular, both families and teachers in the early childhood setting. The findings of our study captures some hesitancy from teachers as they recognise their differences to the children's sociocultural ICT practices and seek to keep in touch with them. What would seem to be important to recognise in this chapter is that this setting was ICT rich in terms of equipment and that the teachers were seeking to make sense of ICT practices to support effective learning and teaching. Yet despite this, still a sense of uncertainty prevailed to some extent (Hatherly, 2009; Somekh, 2007). Our recent experiences in early childhood education settings also suggest that the attitudes and knowledge of some teachers is an issue when children introduce the topic of ICT. Our examples indicate that even if a teacher is open and responsive to a child's digital smartness, there may be a slight mismatch of digital smartness between the digital immigrant and digital native (Zevenbergen, 2007). This was evident in the case of the teacher printing photographs to show at mat time rather than uploading them onto a computer for viewing on a large screen. Finally, it was clear that some teachers were able to identify their pedagogical space and role in supporting the learning of a child but were then receptive for the child to draw on their own digital smartness and contribute to their learning instance (Bolstad, 2004; Siraj-Blatchford & Whitebread, 2003). For example, when the teacher suggested to Abigail that they use

Google to find some information, then supported Abigail's suggestion that she presented the information via PowerPoint.

Our findings indicate the importance of teacher pedagogy and early childhood settings aligning themselves to the cultural practices and expectations of children and embracing their digital smartness. The implications for preservice teacher education providers and ongoing professional development are significant to support informed teacher pedagogy. Literature on early childhood education and the implementation of ICT practices continues to see a patchiness of consistent pedagogy (Hatherly, 2010; Hatherly & Chapman, 2013). In our study the requirement to be responsive to children and their ICT smartness was identified by some teachers. This was not aligned to any policy or pedagogical practice, though, and we speculate that such may be the case in many early childhood services. As a result what may well prevail or be cemented in teacher attitudes and practice is an ad hoc appreciation of ICT and of children's digital smartness. Such a response undermines elements of sociocultural practices mandated by the curriculum itself.

We contend that viewing the construct of digital smartness of children through the Bourdieuian lens of digital habitus can contribute to a more effective recognition of and response to ICT in early childhood education (Zevenbergen, 2007). It can contribute to professional development and effective pedagogical understandings. It reaffirms the understandings and meaning of ICT by children as being constructed by cultural practices and applied in ways that reflect the child as an individual and competent learner. As such, it endorses the aspirations and the features of *Te Whāriki* (MoE, 1996) itself.

Effective pedagogical understandings can dispel the fears and hesitancies that accompany some teachers' views about ICT and its place within early childhood education. As Hatherly (2009) and Somekh (2007) assert, there continue to be the doubters who may be struggling to understand and enjoy the shifting patterns of learning and teaching that ICT creates and support. This is critical as we must ensure that it is not just the "ICT-for-learning champions" (Hatherly, 2010, p. 94) that are promoting and responding to the digital habitus of many young children. All teachers need to invite children's digital smartness in the educational setting and enable them to unpack their virtual school bags (Thomson, 2002).

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Chapter 3: Digital Learning Objects and the development of students' thinking skills

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Abstract

Over the past decade, considerable resource has been invested in the development of bite-sized web-delivered Digital Learning Objects (DLOs) designed to assist students to develop specific knowledge and skills. Initiatives such as the now-concluded Australian Le@rning Federation's DLO project and the BBC's Bitesize programme have resulted in online repositories of objects being openly available to teachers to integrate within their curriculum. However while these resources are readily accessible, uptake and use appears limited to being fill-ins or add-ons to other learning activities, rather than the result of deliberately planning to achieve a particular learning purpose.

This Digital Smarts chapter reports on a study that used an innovative methodology to 'go behind the screens' while students working in pairs used two specifically selected DLOs to help develop grammar and problem-solving skills. It used screen capture software to record video and audio data of their interaction with the objects, which was then coded against a thinking skills framework to identify object design and content features that triggered thinking of different types.

Data indicated very different levels of *thoughtful engagement* with each object, and notwithstanding their different purposes, suggests much can be done to improve the design and content of some objects to improve their learning performance. It also suggests that teachers considering using DLOs with their students need to be not only very specific in identifying appropriate learning objectives, but also critically aware of *how* learning objectives are represented and developed through the object's pedagogical design.

Keywords: learning, objects, digital, DLO, thinking, design, pedagogy

Introduction

The 'digital smarts' theme of this book is particularly relevant to this chapter in its exploration of new and smarter ways of using technologies to enhance teaching and learning, and to gather evidence of the impact it has on this process. It responds to this theme by offering a challenge to existing research methodologies in this area, and suggests we now have the opportunity to use more sophisticated digital tools to gather data that accurately represents students' digital interactions, so that educators are in a better position to make smarter choices about where and how technologies can add value to learning. The chapter has three purposes. First, it introduces a study that employed an innovative method for collecting *real time* data of student interaction with two DLOs of very different designs.

Second, it provides an analysis of these data against a thinking levels framework to identify content within the DLOs that stimulated higher and lower order thinking. Finally, it draws implications for teachers considering using DLOs in their classroom and argues that *smartly* selected objects can be valuable tools for teachers wishing to promote students' higher order thinking skills.

Learning objects of various types have been on the education scene for many years. But more recently, attention has turned to the potential of digital technologies—originally CD and DVD-ROM technologies and lately the World Wide Web—to act as delivery systems for objects of a more interactive and engaging design, able to be used and reused in a range of learning situations. These have become known as digital learning objects or DLOs. While contemporary definitions of DLOs differ, broadly speaking they can be described as "interactive web-based tools that support the learning of specific concepts by enhancing, amplifying and guiding the cognitive processes of learners" (Kay & Knaack, 2007, p. 6).

While in terms of the present pace of innovation it could be argued DLOs represent 'yesterday's technology', up until very recently significant resource has been targeted at their development in an effort to provide teachers with easy to access and use digital content, able to be selected and organised to meet the specific learning needs of students. An example of one such initiative is the Australian Le@rning Federation's DLO project, which from 2001 produced and indexed thousands of objects tailored to meet the goals of the Australian and New Zealand curriculums. Presently there are over 3,000 objects listed on the SCSEEC's Scootle website.[4] Despite this significant investment, commentators point to a dearth of robust research evidence signalling any substantial learning benefits from DLOs (e.g., Kay & Knaack, 2007, 2008; Nurmi & Jaakkola, 2007), while others remark on their variable quality and low uptake by teachers as an indication of their underwhelming success (e.g., Butson, 2003). Countering this are studies that suggest learner motivational and engagement benefits from DLO use, although these are speculative on learning gains and are generally student self-reports or teacher perceptions based on observational data (e.g., Cameron & Bennett, 2010; Gronn, Clarke & Lewis, 2006).

While it would be fair to say the jury is still out on the learning value of DLOs, much of this could be attributed to inadequacies in existing research methods to yield data that reveals a more complete and robust picture of how students interact with digital resources such as learning objects. Maddux (1986) and more recently Maddux and Cummings (2004) comment that this situation is not a new one. Maddux (1986) convincingly argues that history is littered with examples of educational innovations that have fallen victim to what he terms "the pendulum syndrome" (p. 27). This he describes as a situation where educational innovations are introduced amidst much fanfare and hype followed by rapid adoption by schools, only to eventually be abandoned when disillusionment sets in after they fail to meet over-inflated expectations. Technology examples listed by Maddux and Cummings (2004) include programming languages such as BASIC and Papert's LOGO, and student-centred Webquests.[5] Maddux and Cummings (2004) speculate that the failure of technology innovations to gain significant traction in education may not be because they are no good but rather

[4] Standing Council for School Education and Early Childhood. Refer http://www.scootle.edu.au/ec/search?contenttype=%22Interactive%20resource%22&sort=contentsource.sort%20asc

[5] An updated list might also include Wikis.

because researchers have inadequately communicated (and/or teachers have inadequately understood) the learning-theoretical foundation upon which effective use could be built. They comment that this leads to adoption decisions being made "because they [technologies] are there" (p. 523) rather than as a result of an informed process based on researched inquiry.

Digital learning objects

The coining of the term Digital Learning Object can be traced back to around 2000, when David Wiley completed his PhD dissertation, entitled *Learning Object Design and Sequencing Theory*. In it he argues the learning value of "instructional components" (objects) that can be reused and organised in different ways by teachers and instructional designers, according to different contexts and different instructional goals. He contends the Internet offers the ideal medium for delivery of these components, as it affords simultaneous access and provides the ideal environment where DLO developers can collaborate in refining and improving their designs. Other researchers have extended Wiley's ideas by suggesting a series of attributes that characterise DLOs from more conventional learning materials accessed online. These include scalability, adaptability, interactivity, reusability, inclusion of different media and graphical content, and accessibility (Ally, Cleveland-Innes, Boskic, & Larwill, 2006; Baki & Cakiroglu, 2010; Butson, 2003; Kay & Knaack, 2007; McCormack & Li, 2006).

Wiley's original argument was that digital learning objects could help teachers and instructors generate learning materials more efficiently, through being able to access small and discrete learning components able to be assembled into 'bundles' matched to instructional or learning goals. He claimed that the process of decomposition and re-composition (reconfiguration) of learning resources was a natural one for educators, who were required to do this by default to ensure materials were best suited to their students' learning needs. Using digital objects could improve this process by potentially increasing the speed and efficiency of instructional resource development, through "bypassing the initial step of decomposition" (Wiley, 2000,p. 2). Although improved learning efficiency claims hold undoubted appeal, some comment that their use for this purpose can encourage a reductionist view of learning manifested through objects delivering 'information bytes', rather than acting as conduits or resources supporting more active, deeper learning (e.g., Ally et al., 2006). This has contributed to investigation of alternative object designs, based in different learning-theory principles.

Ally et al. (2006) argue the desirability of learning objects being designed around more generative principles if they are to successfully accommodate the diversity of learner needs likely to be encountered in various learning situations. They comment that learning objects need to be dynamic and adaptable, thereby "provid[ing] opportunity to accommodate varying learners' readability levels, language levels and learning styles" (p. 46). They assert customisation or adaptability of learning objects is essential to ensure learners actively engage with them, and assist them to "foster understanding, facilitate the opportunity for self-reflection and support individual use" (p. 47). Their study of online learning objects used in a course involving 100 customer service trainees, pointed to the value of objects of an applied nature, containing practical training examples and exercises immediately applicable to the work of the participants. They linked successful use of learning objects in this programme to motivational advantages brought about by the 'learner focus' of object design and content, and their applicability to work and personal goals.

McCormack and Li's (2006) comprehensive study of learning object use involving 770 teachers across six European countries investigated their impact on teaching pedagogy. The European-Union sponsored project was part of a wider initiative known as Context e-Learning with Broadband Technologies (CELEBRATE). Teachers and their students were given access to a portal containing a large number of digital objects that they could select and use across a range of curriculum subjects. The objects were specifically developed to be consistent with constructivist-oriented design principles. This approach was chosen as it was considered to best support the generation of objects compatible with wider project goals, namely to "create citizens who can enter the workforce with the key skills required by the Information Society—collaborative working, creativity, multidisciplinarity, adaptiveness, intercultural communication and problem solving" (McCormark & Li, 2006, p. 214).

McCormack and Li surveyed teachers' perspectives on how flexible content enabled by the web-delivered learning objects impacted upon student learning processes and teacher e-Learning practices. Results indicated that while nearly 70% of teachers considered the objects as useful (or better) in their teaching, *context mattered.* That is, the value of particular pedagogical design and content features of objects was viewed differently by different participants, and this variation generally mapped back to their ICT skills and experiences and the school system in which they worked. For example, some French teachers criticised some objects for their "high-tech visual designs" (p. 222) as this suggested they were more like games than learning resources. Additionally, 60% of all teachers indicated difficulty incorporating the objects into their programmes. Technical considerations also figured strongly, with infrastructure, network and compatibility problems affecting the quality of access and ease of use of the objects. Issues with standardisation of object media also became apparent, as not all teachers had access to correct versions of the players needed to run embedded video or audio content (e.g., Flash, Shockwave, Media Player).

However, despite these issues, teachers strongly supported the value of objects as helping to improve their teaching and enhancing the learning motivation of their students. Many appreciated the specificity of some objects—in particular, their modular nature that better supported incorporation into curriculum. It was this 'fit' characteristic above others—such as granularity and interoperability (Wiley, 2000)—that had the most influence on teachers' perceptions of the value of the objects. Furthermore, it was found that despite object designs being based on constructivist principles, teachers would adapt the way they were used to suit their own context and pedagogy. While McCormack and Li (2006) claim this did not diminish their effectiveness, they did comment that "teachers are likely to superimpose their own pedagogy on any LO, whatever the 'designed' pedagogy" (p. 228).

McCormack and Li's conclusions add limited weight to Wiley's original argument about objects offering cost-effective learning efficiency benefits through reusability and flexibility, but tend to suggest the importance of context in achieving these gains may have been understated. This notion finds support from Nurmi and Jaakkola (2006), who argue that in appraising the worthiness of objects, one cannot separate them from the context in which they are used. They claim that objects are an artefact of time and place, and to make them universally applicable in the way Wiley originally intended, it would require a 'peeling off' or detachment of the content from their original context and developmental environment. To do so, they state, would represent an "objectivistic conception of truth and knowledge" (p. 272) and encourage an "unfortunate emphasis on knowledge transmission" (p. 274) as the driving purpose for object use. Using objects primarily for content delivery severely

limits their value as resources for supporting deeper learning and knowledge construction. While Nurmi and Jaakkola agree the concept of objects is basically sound, they call for a reconceptualisation of their design and purpose to move thinking away from the object as learning objective to the object as a means to engage learners and elevate learning processes and experiences. They sum this up nicely by stating, "learners should learn with, rather that from, learning objects" (p. 280).

This debate has stimulated considerable research into the design of DLOs for different learning purposes (Kirschner, Sweller, & Clark, 2006). Much of this has centred on the function of *structured* vs *open-ended* object environments, where some argue the need for sufficient structure to provide enough guidance to enable mastery of key learning concepts—especially where existing conceptual knowledge may be limited (e.g., Mayer, 2004). Others suggest that deeper and more robust learning occurs when learners interact in open-ended environments and are supplied with a range of tools they are able to select and use as they see fit, to solve higher-order problems (e.g., Steffe & Gale, 1995; Vannatta & Beyerbach, 2000). When considering these arguments in relation to DLOs, a case could be made for designs reflecting both views, with selection and use decisions being made by teachers according to the needs of their students and teaching and learning goals. It also suggests selection of objects taking into account contextual, design and content features such as those described above may be an important element in making smart decisions about their use.

Research goal and questions

Seeking more information about how digital learning objects of different designs can influence the nature of student thinking, the following study mapped a group of primary-aged students' learning interactions with both structured and open-ended objects. Its aim was to reveal information about the type and nature of their thinking while they were working in pairs on objects of each type, and to identify features and content of the objects that appeared to stimulate thinking at different levels. Data collection was guided by these research questions:

1. What differences, if any, exist in levels of student thinking when using digital learning objects of structured and open-ended designs?
2. What design or content features of digital learning objects of each type appear to stimulate thinking at different levels?
3. What implications are there for teachers selecting and using digital learning objects in their classrooms?

Research context

The study was undertaken in a class of 29 year 5 and 6 students (9–11 year olds) situated in a small semi-rural school in the Waikato region of New Zealand. Typically, New Zealand primary schools cater for students from year 1 (5 year olds) through to year 6 (10–11 year olds), with some extending to include year 7 and 8 students (11–13 years). The research class comprised 13 girls and 16 boys. The teacher was an experienced practitioner, having taught at the school for 10 of her 18 teaching years. I approached her to participate in the study following previously successful research involving

the use of digital technologies in a school-scientist partnership (see Falloon, 2011, 2012). During these earlier studies, the teacher had displayed an innovative and open disposition and flexible approach towards using emerging technologies with her students—qualities desirable in this study also. Additionally, she had available a set of netbook computers (n=15) that would be sufficient for paired access to the web-based objects, via the school's WiFi network.

The teacher selected the objects to support specific curriculum goals in literacy (grammar—parts of speech) and problem solving/decision-making. The objects were sourced from the New Zealand Ministry of Education's Digistore (part of the Australian Le@rning Federation's DLO repository). During the eight weeks over which data collection took place, the students accessed and used eight objects including some with multiple levels or versions. A full list of these is included in Appendix A. While eight objects in total were accessed, two were selected for analysis. These were 'Finish the Story: Bushfire' (parts of speech) and 'Catch the Thief': Level 2 (problem-solving/decision-making). These two were selected as they represented the clearest examples of objects based on structured and open-ended design principles (respectively), and were accessed by all students.

Research method and data collection

The study adopted conventional case study methods located in an interpretive theoretical framework. Case study method was chosen as it supported intensive inquiry within the confines of a bounded unit of analysis. It provided a structure for targeted but sustainable interaction that yielded data providing rich visual and audio information about these students' learning pathways with DLOs. Data were collected over an eight-week period at different times of the day, and on different days each week. This was done to randomise data collection, to emulate probable 'normal' classroom use patterns. Unlike more conventional case study methods, a technical recording solution captured video and audio data while the students were using the objects, via an installed app called SnagIt.[6] SnagIt records as an .avi movie what is displayed on the netbook's screen, along with audio through the built-in microphone (see Figure 1). This allows both system sound (i.e., sounds associated with the learning objects) and students' discussions to be recorded. The recorded movies and sound were stored on the netbook's hard drive and later transferred via USB drive to my laptop for analysis.

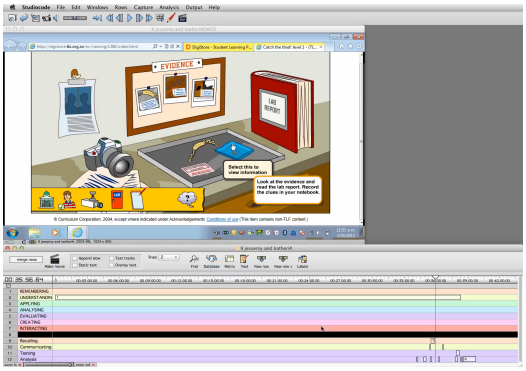


Figure 1: **A typical screen capture recorded by SnagIt and the Studiocode timeline (selection not used in analysis)**

[6] See http://www.techsmith.com/snagit-gslp.html?gclid=COigq4zCsLgCFQghpQodg2YAJw

A multi-user licence allowed five installs of SnagIt, and these machines were rotated around the pairs over the course of the eight weeks to ensure all students were recorded. A typical recording session lasted between 25 and 35 minutes, with student pairings being changed regularly. In all, just over 13 hours of video and audio were captured, representing the interaction of 16 unique student pairings with the objects. From this, all recordings of students using *both* 'Bushfire' and 'Catch the Thief' were collated for analysis. This equated to three hours 27 minutes of recording involving nine pairs.

The two objects for analysis were chosen because they represented the best examples, from the ones selected by the teacher, of objects based on quite different designs. This enabled a comparison to be made between how students responded to the content and structure of both objects and the influence of these on their interaction and thinking. The 'Bushfire' object was of a linear design, with students needing to follow a predetermined interaction pathway with its content. The object, via the characterised editor, effectively dictated the navigation route available to the students from start to finish through sequential activation and deactivation of menu options and content organisation that required students to have at least visited previous screens before moving on to the next one (Figure 2). 'Catch the Thief', however, represented a totally different, menu-driven design, where students were able to generate their own interaction pathways and access content as and when required. While the object placed some parameters around that interaction—such as having to go back to the police station and check their evidence if they chose the wrong suspect—these were generally of a scaffolding nature, cleverly designed to avoid students immediately re-guessing or adopting a 'process of elimination' strategy. Apart from design constraints such as this, students were free to choose which venue they gathered evidence from, when and how they used and recorded that evidence (some used pen and paper), what evidence they compiled into their dossier, and how they selected their suspect from the 'line-up' (Figure 3).

Figure 2: **The object, via the characterised editor, specifies the sequence of activity**

Figure 3: **Selecting suspect matching the evidence in dossier**

Data coding

I made the selection of pairs whose data are included in the Results tables with assistance from a postgraduate research scholar employed under the University's research scholarship programme. Nine student pairs accessed both objects during the period of data collection, and six of these completed each within a single recording period. This is important as using data from pairs whose interaction with a single object spanned more than one recording session was problematic, as they generally restarted the object afresh each time or recommenced at a different place from the previous use. From the six remaining pairs, four were chosen for analysis based on the quality of the data recorded by SnagIt. The decision about 'quality' was negotiated following independent appraisal of the six samples by the research assistant and me, using the following criteria:

1. The extent to which the recordings provided insights into students' thinking and decision-making strategies;
2. The extent to which the recordings illustrated a range of object interaction approaches and strategies;
3. The nature and volume of interaction between the students;
4. The quality of the recorded video and audio (a minor consideration but important for extracting screenshots and video data excerpts).

After discussion, it was also decided to include an additional pair (M&Y) in the data set for 'Catch the Thief' as they displayed particularly high levels of oral interaction that gave excellent insights into the strategies they used to solve the crimes. The other four pairs selected were (first initials only) P&A, J&D, J&K and D&C.

To assist decision-making relating to the complexity of thinking skills students displayed while interacting with the objects, a draft series of descriptors were developed based on Anderson et al.'s (2001) revision of Bloom's Taxonomy (cognitive domain). These descriptors interpreted the six thinking levels represented in the taxonomy in relation to video or audio evidence of students applying these to solve problems or overcome challenges presented by the objects. A summary of the type of evidence used to make these decisions and the way this was interpreted is included in Table 1. To ensure a level of consistency of interpretation against these descriptors, M&Y's video was used to 'calibrate' the scale. To achieve this, data were imported into Studiocode[7] and independently blind coded by myself and the research assistant.

Studiocode enables events contained in video data to be 'tagged' to align to specific themes (macro and sub-codes) identified by an analyst. These are pre-entered into a coding window and relationships mapped, indicating sub-codes linked to main codes. A timeline containing the codes and sub-codes is created for each video, and clicking on the relevant code button activates and deactivates the recording of an instance related to that code from the video. These are grouped so that all instances aligned to the code can be replayed by clicking on the respective code button to the left of the timeline. Alternatively, single instances can be accessed by clicking on the relevant entry point on the timeline (see Figure 1). Entries can also be tagged with text to highlight their significance or add additional information.

Table 1: Framework describing video evidence aligned to levels of thinking (adapted from Anderson et al., 2001)

Level	Description of evidence from video recordings
1. Remembering	Evidence of dialogue or action indicating **recall** of known facts or relevant data (e.g., spoken, graphical, textual) and/or previously learnt procedures or processes of various types to solve problems or meet challenges presented by the object.
2. Understanding	Evidence of dialogue or action indicating or contributing to student comprehension and/or improved clarity relating to learning ideas embedded in the object, and/or instructions or procedures and processes required to solve problems or meet challenges presented by the object.
3. Applying	Evidence of dialogue or action indicating the **recall** and **application** of known facts, other data, processes or procedures of various types and from various sources to solving problems or

[7] See http://www.studiocodegroup.com/?page_id=77

	meeting challenges presented by the object.
4. Analysing	Evidence of dialogue or action indicating reflection on the outcome of the application of learnt facts, other data, processes or procedures of various types and from various sources required to solve problems and meet challenges presented by the object. This may involve deconstructing and critiquing outcome/s or responses and speculating on possible revisions.
5. Evaluation	Evidence of dialogue or action indicating the scrutinising, appraisal, prioritising or ranking of data and/or processes and procedures of various types and from various sources, to solve problems or meet challenges presented by the object.
6. Creating	Evidence of dialogue or action indicating the use of data and/or processes and procedures of various types and from various sources, to the production of new and original content to solve a problem or meet challenges presented by the object.

Copies of M&Y's data were installed on separate computers, and the assistant and I independently coded that data against the six levels of the descriptor framework. As the videos played, incidents or events we deemed to be aligned with the different levels of the framework were entered onto separate timelines. When completed, these analyses were compared using Cohen's coefficient for inter-rater agreement. Consistent with Gwet's (2012) recommendation for handling missing data, calculations were restricted to occurrences that we both identified, to avoid the possibility of underestimation of agreement due to the inclusion of data upon which no agreement was reached. In total, 29 agreed-upon incidents were coded at all levels of the framework. A summary is presented in Table 2.

Table 2: Inter-rater agreement calculation for M&Y

Rater	A	B	Total
A	11	4	15
B	2	12	14
Total	13	16	29
κ=.588	SE=0.1	CI=.297-.879 (95%)	

While the result was reasonable (moderate) according to Landis and Koch's (1977) often-cited guidelines for inter-rater agreement, working together we re-analysed M&Y's video in an effort to reach better agreement on level interpretations. During this exercise each of the 29 agreed-upon incidents in M&Y's video were re-examined, and the allocated levels debated. From this, we achieved greater clarity and consistency in identification of level attributes recorded in the videos. A second

calibration was carried out on another pair's video (C&S—not included in the sample) that yielded 34 agreed-upon incidents at κ=.706 (SE= .121; 95%CI=0.468-0.944). This indicated a good level of rater agreement (Landis & Koch, 1977) and supported confidence that reliable interpretations would be made. The research assistant then proceeded to code the eight remaining data samples, using the C&S example as an interpretation 'template'. He then generated an interaction graph for each pair similar to the ones presented in the Results. The graphs represent a timeline of student progress through the object mapped out in 10 second intervals, with vertical bars projecting to different 'thinking levels' according to the rating given. Multi-coloured bands were collated at the top of each graph, indicating broadly the location or activity within the object each pair was engaged with at the time of rating. While the bars displayed in the graphs suggest a 'one point in time' interpretation, it should be noted that on occasions recorded dialogue or action spanned several seconds. Therefore, the narrower bars should be viewed as an approximate location only. They have been used in the Results to enable presentation of data in a way that allows comparisons to more easily be made between the pairs, using a single graph.

Results

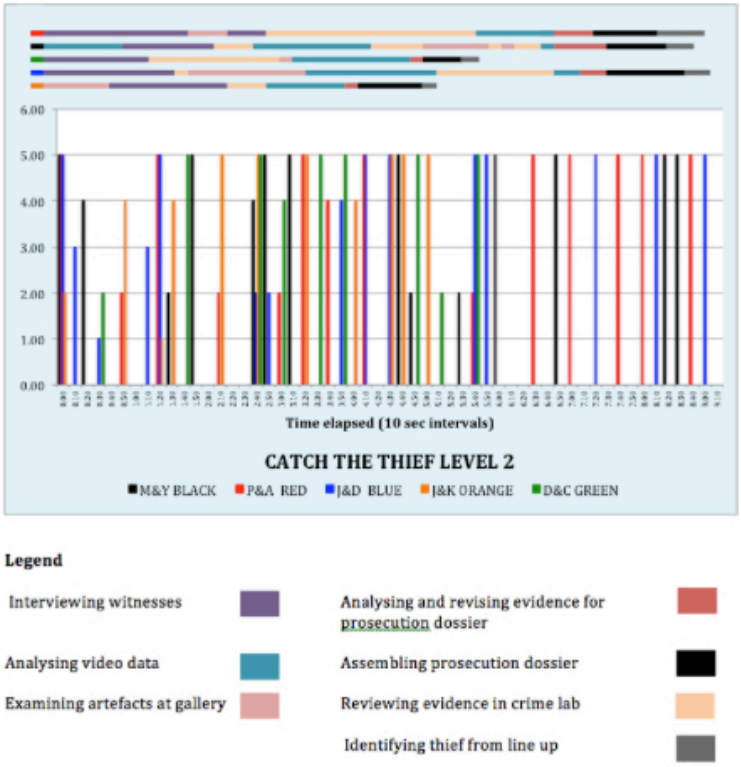
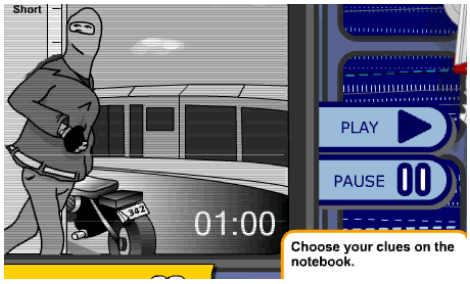
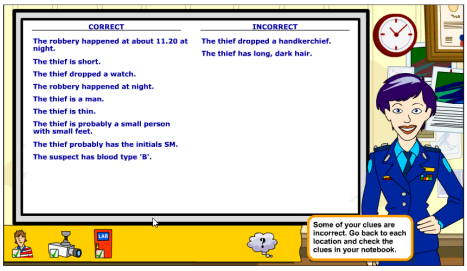


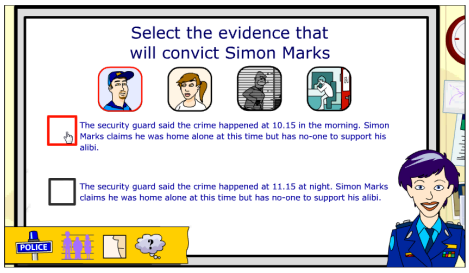
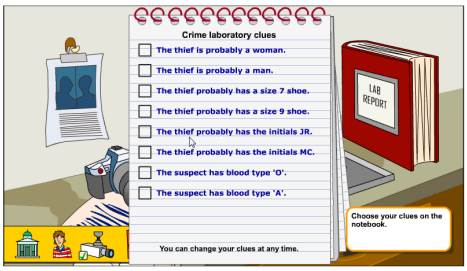
Figure 4: **'Catch the Thief' timeline/level ratings for all pairs**

The timeline charts below (Figures 4 & 5) illustrate the 'thinking level' ratings given to the pairs as they completed the various tasks required by each object (at 10 sec. intervals from commencement). As each pair progressed at different rates, coloured bands have been used at the top of each chart to indicate approximately how long they spent engaged in each activity. These activities are explained in

the 'object action and description' column of the data summary tables (Tables 3 & 4), along with a thumbnail image associated with the activity and samples of recorded audio and/or explanation of observed video interaction. These interactions have been given approximate time logs that relate to the time spans indicated by the bands at the top of the charts, and thinking level ratings (e.g., L2), as represented by each chart's bars. An additional rating (L0) has been added to some comments made by the students in the 'Bushfire' object. While they did not meet the level criteria laid out in the descriptors, they were included because they provided useful insights into the strategies and approaches some pairs applied in dealing with the object's content. In some examples they illustrate clearly the level of disengagement some felt with the content and the way it was presented, and how they managed to bypass it to complete tasks more quickly.

	Object action and description	Thumbnail image	Sample Recorded Interaction
	Interviewing witnesses (security guard and Robyn Wallace). Students listened to oral reports from eye-witnesses to the crime in the gallery (what did you see? What did the person look like? Do you remember what the person was wearing?) They checked off clues provided by the witnesses in their clue notebook for this venue. Not all clues were relevant. Some students interviewed witnesses individually and entered details in the clue notebook, while others did this collectively. Students could revisit the gallery to revise or re-record clues as required, by reselecting from bottom menu.		"OK, so he said it happened at night… it was dark… write that down" (J&D, 0.30) (J&D used pencil and paper to record clues, as well as notebook checklist).)(L5) "So… let's see… she said they were quite short… go back to the start and write everything down… get a piece of paper and a pencil… we need to check… have a look at the camera (CCTV)… we need to see if she's right…" (P&A, 1.18, L5) "The woman said he was wearing a balaclava (Y). What's a balaclava? (M). Something you put on your head, I think (Y). We need check… get the dictionary (M)" (M&Y, 1.46, L5) "We have to ask them questions… that's what we have to do" (D&C, 0.33, L2)

	Analysing video data Students were able to access CCTV video of the suspect 'getting away'. Typically, this provided information on time of day or night, the height of suspects, mode of transportation (and sometimes identification details), clothing worn etc. Students checked off clues in their notebook for this venue. Not all clues were relevant. Students could pause or replay video as required.		"Replay the camera J, I'm not sure about the time… I think they had 11 something, but that cant be right…" (J&K, 4.38, L5). "Pause… pause the thing (video). Let's see… it must be a woman 'cos (sic) she's short… (P). But you can have short men too so don't be too sure… and it's hard to tell if they're fat 'cos of the coat (A) (P&A, 6.27, L5). "I don't think we've got that right. Check the number plate again…" (J&D, 3.48, L4)
	Examining artefacts in the gallery Students could examine artefacts in the gallery that provided pop up information panes about the artist, year of production etc. This information was a 'red herring' as it provided no clues helpful in solving the crime. One pair (J&D) spent considerable time examining artefacts and appeared confused about their relevance.		"… who's Ned… Kel…Kelly? (P). I dunno (sic) (A). I don't know either… and what d'we (sic) have to do with these things (gallery artefacts)? (P) I think we're s'posed (sic) to look at them" (A). (P&A, 2.08, L2). "Click on the paintings (J). (Reads some of description). D'ya think they have something to do with it? Don't know… maybe click on the vase thing on the floor… could be a clue… that's how we got the others" (D). (J&D, 4.38-4.45, L2)
	Analysing and revising evidence If students have incorrectly recorded any clues from the lab, security video or witnesses, their selection appears in the right hand column. Students must decide which venue notebook the incorrect clue comes from and go back to that notebook and revise their decision.		"We got some wrong. Go back and check what he dropped outside… we have to look at the video again (D). Yeah… and we should check the lab too… there was something in there, eh… that bracelet thing had some letters on it" (C) (D&C, 4.54, L4). "D'ya remember the shoe size… what was it again… 7 or 8? (M). I think it was 7… but is that small? It only says small feet… it

			doesn't tell us what size" (Y) (M&Y, 6.46, L5) "Did you see something about blood type… where's the blood type? We didn't get it. Go back to the glass… where he got cut" (J&K, 3.58, L4)
	Assembling prosecution dossier Students are required to collate evidence collected to assist the prosecution case. At the police station, they are prompted to select from two scenarios based on evidence from each venue. If they select the incorrect scenario they must revisit the venue to check their evidence. The object does not allow them to immediately select the other scenario.		"(J. reads description of first scenario aloud) It was at night… so that one can't be right. What does the other one say (begins to read second scenario). Night… it did happen at night, so… (ticks checkbox)" (J&K, 4.55, L5). "We need to work out which one's the most right" (D&C, 5.08, L2). "She's lying (Joanne Reynolds – suspect)… the time thingy had 1, but the shopkeeper said it was 12…" (J&D, 8.08, L5)
	Reviewing evidence in the crime lab The crime lab provides forensic evidence. Students examine each exhibit for possible relevance. Notes are available in the lab report book, but wordy format discourages use. Only one pair (D&C) carefully reviewed the lab book. Others spent time in the lab, but didn't scrutinise lab report in depth.		"We have to look for clues here… click on the things" (exhibits) (P&A, 2.58, L2). "No, we need to read the lab book… (pause…) look… see, blood type O… and it must be a woman 'cos it says the hairdresser only has women… you know, the card we found… it's ***all*** in here" (D&C 1.44, L5). "To JR from PT (referring to initials on bracelet)… Joanne Reynolds… JR… go back to the video and see what they dropped…" (J&K, 2.38, L5).
	Identifying criminal from suspect line up Students match their evidence to the range of suspects in the 'line up'. Each suspect has a description corresponding to available clues. If students do not identify		"She's got B blood but not the right shoes… she's got 8s and in the lab book it said 7, didn't it?" (D&C, 5.44, L5). "You can't tell by the hair, 'cos they had that thing on their head (balaclava). But it says she has a

	correctly, they must revisit their dossier at the police station.		motorbike… and… um… 342, the numbers match… (referring to number plate) (P&A, 8.36, L5).

Table 3: 'Catch the Thief': Description of object task, thumbnail and sample interaction

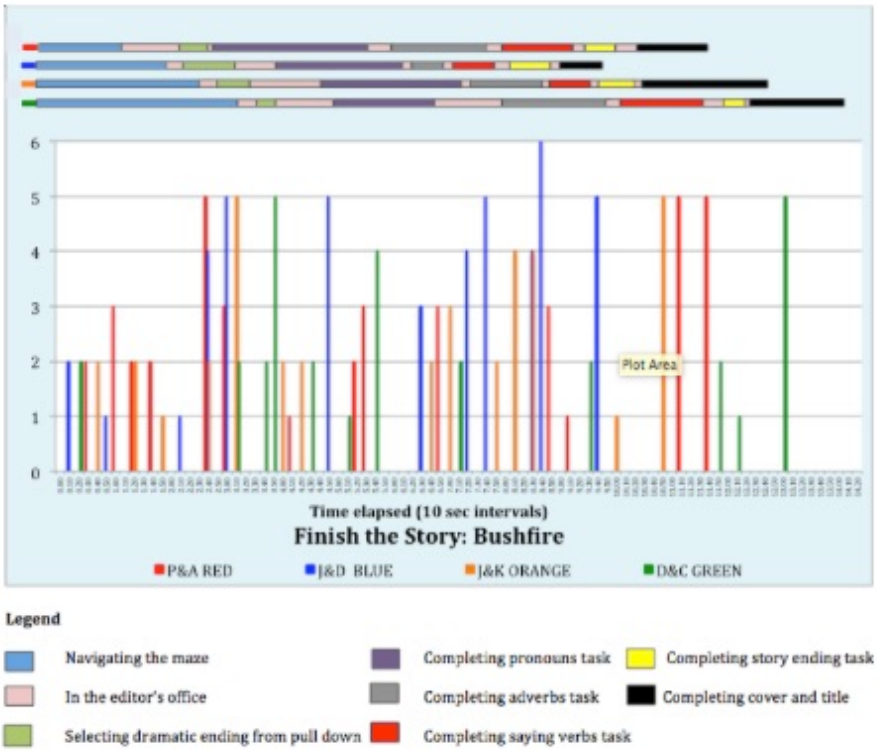
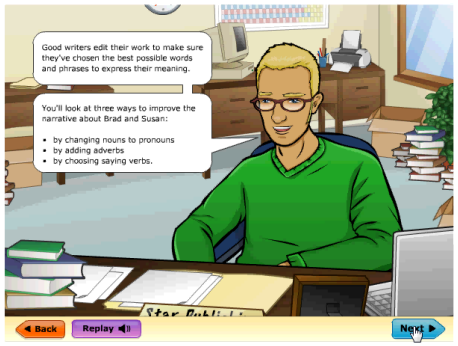
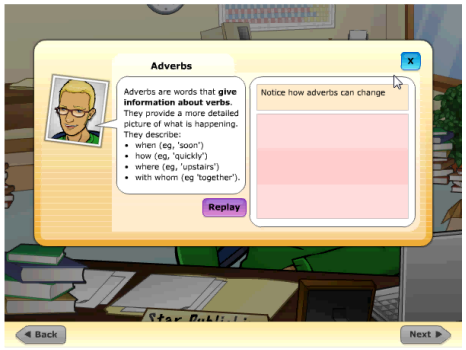
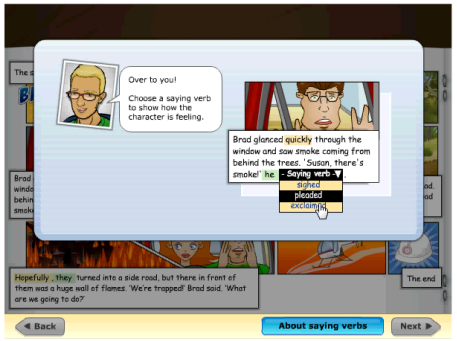


Figure 5. **'Finish the Story: Bushfire'. Timeline/level ratings for all pairs**

	Object action and description	Thumbnail image	Sample recorded interaction
	Navigating the maze Students 'drove' the vehicle through the maze avoiding the fires to get to the editor's office. This was the first task for all pairs upon entering the object and was set by the object's design. The time it took pairs to navigate this depended largely upon their keyboard coordination skills.		"… are we doing this right? (J) Who knows…! I think we have to dodge the fires… to get where we need to go (K)" (J&K, 0.42, L2) "It says here we have to help them escape the fire. You need to drive carefully, C" (D&C, 0.22, L2) "Remember what the arrows do… you gotta (sic) let it go if you want it to stop…" (J&D, 0.08, L1) "OK, so we've gotta drive to the finish. You any good at driving, A? (P&A, 0.26, L2)
	In the editor's office Students visited the editor's office on regular occasions to get instructions for the next part of their 'assignment'. All pairs accessed this part in sequence, as it was set by the object's design. After the first couple of visits, time spent here diminished significantly for most pairs (see timelines). Text heavy instructions and formal content design seemed to trigger disengagement.		"… this seems really hard (J). Na… just go next… can't be bothered. We managed last time" (D). (J&D, 2.08, L1) "We have to improve the comic… that's what he's told us" (P&A, 1.38, L2) "Swap the words… just swap the words… blah blah blah… (referring to editor's explanation) (D&C, 3.14, L2). "Just go next… (pause approx. 10 sec). Oh… we need to see what makes the most sense" (referring to story ending) (J&K, 2.42, L2)

	Selecting a dramatic ending from options Students are able to select from three options an ending to the story. All nine pairs reviewed the options before selecting. Some discussed what they considered to be the 'best' option and why (n=4), while remainder appeared to chose randomly ("this one will do").		"They wouldn't hide in a cave, 'cos they could be cut off… and the car would burn. Use the helicopter one…" (J&D, 2.56, L5) "Which one's best…? (J) Choose 1 (K). (reveals helicopter). No… how's it going to land? They need to find shelter – try 2… oh… a cave… (pause) and (presses 3)… a car. The cave'll (sic) do" (J) (J&K, 3.08, L5) "The helicopter's best. They need to get away… (P&A, 2.37, L5)
	Completing the pronouns task Editor introduces personal pronouns as a means of linking sentences in a narrative. Students have to select the 'About Pronouns' button before the 'Next' transition becomes active. All did this, but only three pairs provided evidence of interaction with the information in an effort to understand pronouns. In the next screen, students select correct pronoun from pull down list. Three pairs provided indication of engagement with text to determine best option. Five pairs guessed or selected through elimination. The strategy for one pair was undetermined.		"Blah… blah… blah. Don't replay it ('About Pronouns' information)… no… no… just hit Next" (J&D, 4.26, L0). (After pressing 'About Pronouns' button) "Who cares… don't need to know about that… we get it…" (D&C, 5.12, L1). "Him and Brad… (laughs). 'They'… no, doesn't sound right… must be 'She'… yeah… 'She' and Brad… (J&D, 4.48, L5). "What did we have to do again?(A) (flicks back to 'About Pronouns' – didn't read). Just guess! (P) (selects 'They' followed by 'She'). (P&A, 3.20, L0) "Who… who turned a bend in the road…and saw more smoke and flames… um… let's see… must be 'They'… there's two of them" (J&K, 6.58, L3)

	Completing the adverbs task The editor invites students to improve the story by using adverbs. They are required to select the 'About Adverbs' button before moving on to the revision phase. All pairs did this because they had no option, but only 3 provided any indication of interacting with the explanatory text. In the task, four pairs provided indication of engagement with text to determine the best option. Three pairs tried each option until the correct one was selected. The strategy for two pairs was undetermined.		"I can't be bothered listening to him (editor about adverbs)… just go on" (P&A, 5.50, L0) "Adverbs… which one makes it sound best… d'ya think… try the list… (pull down options)" (P&A, 6.46, L3). "We'd better read it… (after choosing incorrectly first attempt) (pause)… it must be 'Then'… the others don't make sense… (J&K, 7.48-8.08, L2-4). "Just guess till we get it right…" (options eliminated until correct one discovered) (D&C, 8.20, L0). "Brad glanced 'how' (J)… 'quickly'! (D) through the window…"(J) (J&D, 6.27, L3).
	Completing the saying verbs task After visiting the editor's office again, students are required to choose 'saying verbs' to describe how the characters speak. One pair paused briefly on 'About Saying Verbs' screen. Eight pairs immediately closed this window. Three pairs provided indication of some engagement with text to determine best option. Four pairs selected by elimination or guessing. The strategy for two pairs was undetermined.		"Brad glanced quickly through the window and saw smoke… Susan, there's smoke he… (reading text).. can't be 'Sighed'… that's boring and we're supposed to make it exciting… 'Pleaded'… (laughs). 'Exclaimed!' That's more like it… (J&D, 7.37, L5). "Not another one… just guess again… how many more do we have to do?" (P&A, 8.08, L0). They proceed to select options in order until correct one selected. "doo… doo… doo (singing) 'Reported'.. no that's not it… (J)… oh… 'Cried' try that (K)… yeah, good guess! (J) (J&K, 9.15, L0)

	Completing the story ending After completing the improvements, students are presented with a final version of their story, and invited to compose a conclusion. All nine pairs accessed this screen (dictated by the object's design). Four pairs developed content (of variable quality). Five pairs bypassed this screen and the one following it (text-only version of story) without adding content.		" Just hit next... (goes to text story page)... OK... (pause)... (presses 'Next' and goes to cover page)... Oh look! (starts composing title). (P&A, 9.50, L0) "Who gives...? (J). What are we gonna (sic) write here? 'Luckily the helicopter came just in time before they melted away' (laughs)" (J&D, 8.38, L6) "Just write anything... (C) (D writes 'theres a firer engen hiray!') That'll do!" (D). (D&C, 12.10, L1) "Oh, what are we gonna (sic) do? I know... (types 'run out and commet suicide. Great work Brad. Lt's go!) (J&K, 9.55, L1)

Table 4: 'Finish the Story: Bushfire'. Description of object task, thumbnail and sample interaction

Discussion

In interpreting the results it needs to be remembered that the two objects selected were of very different designs for very different purposes. 'Catch the Thief' with its flat, menu-driven design allowed students to develop their own pathways through the information and clues, assembling and recording them in any order using whatever system they preferred. They were also able to retrace their steps to check clues they may have missed or incorrectly interpreted, or replay evidence from the video, eyewitnesses or the crime lab. Active fields in the content of the object required student interaction to gather evidence, and they could record outcomes from this in the detective's notebook to be collated later when forming the prosecution dossier. Clever design meant that students were unable to guess or use trial and error to discover correct combinations. Instead, once an initial incorrect response had been lodged, alternative fields became inactive and a prompt was given to go back and check on clues at the various venues before assembling them again at the police station. The presentation of evidence in different formats (oral—eyewitnesses; visual—video and other venue visual clues; written—the crime lab report) required students to interpret, synthesise, compare, contrast and evaluate different data to identify patterns that could be used to build a case against different suspects, most of whom matched, in some way, more than one piece of evidence.

There was little doubt that pairs found the theme of the object engaging; that is, what they were required to do and the choices open to them regarding how they could go about it. This was clearly evident in the recorded comments, the universal level of enthusiasm they displayed towards catching the criminals and their repeated use of the object. The way the object was designed required their active cognitive engagement on every screen, and this in turn triggered significant discussion between students as they debated the merits of the evidence and developed strategies and approaches to collating it for their prosecution dossier. Good examples of this are included in Table 3, where students are required to analyse and revise evidence (D&C, M&Y, J&K) and D&C's comments when reviewing evidence in the crime lab.

In the timeline data, there is a loose clustering effect and spiking in the thinking ratings around activities where students were required to evaluate and collate evidence at each of the crime scene venues. This is also visible when they were assembling the prosecution dossier, with the discussion and screen interaction of most pairs regularly indicating thinking at level 4 (analysis) and level 5 (evaluation). At these points, interaction typically indicated high levels of reflective analysis and re-analysis and revisiting of data, as students debated the relevance of the clues presented to them in building a case against the suspects. Some aspects of the design of this object supported these processes. Built-in structural scaffolds such as button deactivation and verbal and visual prompts required students to revisit crime scene venues. They were unable to progress by guessing or trial and error, as once they had made an incorrect accusation or compiled inaccurate evidence, the option of selecting a different combination before rechecking was disabled.

The presentation and design of clues also encouraged students to evaluate and analyse, often by presenting only a small part of a larger clue that they needed to logically link to other parts. A good example of this was a business card dropped at one of the crime scenes *possibly* by the suspect, indicating a hair appointment at a 'Salon for Women'. Students needed to link this clue to a small (but size unspecified) footprint found at the crime scene to work out that the suspect was most likely a short female. They were also required to be critical in their appraisal of possible clues, as some elements of the object that gave the appearance of being clues were actually 'red herrings'. This particularly applied to artefacts in the gallery, some of which contained information unrelated to solving the crime. Examples of the effect of this on two pairs can be seen in Table 3, 'Examining artefacts in the gallery'. While interaction with these ultimately did not affect a successful outcome, for some pairs it prolonged the period required to solve the crime (e.g., J&D).

Another interesting feature of 'Catch the Thief' was its blending of oral, visual (static and video) and textual information in its presentation of clues and instructions. Students repeatedly accessed video and audio information, these appearing to be their preferred means of gathering and interpreting data contained in the object. Interestingly, the virtual lab report book that contained excellent summaries of forensic evidence that could have helped shortcut the process of a successful conviction, was seldom used. While several pairs 'opened' the book, only one (D&C) bothered to read its contents in any depth. In their case, doing so enabled them to match the missing blood type to the suspect line-up, thereby narrowing considerably the range of possible candidates. Reactions from others who accessed the book suggested a reluctance to engage with the pages of text it contained. Instead, they preferred to persevere with revisiting the video/graphical and audio information until they had gathered sufficient evidence to make a reasonable deduction. The general tendency of

students to ignore large bodies of text was also reflected in their interactions with the second object, 'Finish the Story: Bushfire'.

The 'Bushfire' object was of a completely different design to 'Catch the Thief' and intended to serve a different purpose. In place of the menu-driven interface, 'Bushfire' followed a linear pathway that the students couldn't change. While the time pairs spent on each component of the object varied, their pathway through them didn't, as this was set by the object itself. Perhaps not unexpectedly, the introductory maze activity stimulated the most student enthusiasm, although its relevance to the learning purpose of the object was unclear. For some pairs (e.g., D&C) navigating the maze consumed the most time of all the object's components due to their poor driving skills. Upon completing the maze students arrived at the editor's office and were verbally briefed on their task of improving a bushfire story through the use of different parts of speech. These included using pronouns, adverbs and saying verbs, and adding a dramatic beginning and ending to the pre-written story. Of the six pairs graphed, only two initially spent enough time listening to the editor's instructions to understand what was required (see Table 4, P&A and J&K, 'In the editor's office'). The others visited the editor for no more than a few seconds after realising they could not progress to the next screen until they did so. As students were required to revisit the editor's office to get the next series of instructions after completing each part of the assignment, this pattern of interaction was repeated, although as can be seen by the timeline, the duration of visits diminished rapidly towards the end.

The primary means of engaging with content in this object was via option selections from pull-down menus. With the exception of selecting and editing a dramatic ending (Table 4, 'Selecting a dramatic ending' and 'Completing the story ending') and the cover selection and title task ('Completing cover and title'), students were able to select from a range of provided options for replacing the parts of speech. As recorded on the graphs, generally student thinking level ratings spiked at four and above on components of the object that required them to debate, negotiate and develop content for themselves, rather than simply respond to a series of options the object offered. While the quality of the content they generated was at best variable, evidence was recorded of thinking, indicating at least some level of deliberation in their decision-making. Examples of this are recorded in the 'Selecting a dramatic ending', 'Completing story ending' and 'Cover and title' cells in Table 4.

However, it would be fair to conclude that other components of the object did not attract the same level of thought or deliberation. Preceding each task was a short tutorial provided by the editor that introduced the part of speech the exercises that followed would explore (e.g., 'About pronouns'). The content of these text-heavy windows with audio overlay was largely ignored by all pairs, but they were obliged to at least visit them as the object locked until they did. For most pairs interaction with these tutorials comprised an 'entry and exit click' lasting no more than a couple of seconds (for this reason, this has been included as part of the 'In the editor's office' code). Once they had negotiated the tutorial, the object presented them with windows similar to that in 'Completing the saying verbs' (Table 4), where they could select from an array of parts of speech options to improve their story. Interestingly, despite ignoring the tutorial, three of the six pairs initially made some effort to work out the most appropriate response from the list of options (e.g., J&D—pronouns, saying verbs; P&A—pronouns), although for two of these this effort was short-lived. Only one pair (J&D) showed any level of persistence by making anything more than a token effort to work out best options for each

exercise. As illustrated by the excerpts in Table 4, by far the most prevalent strategy applied was guessing or process of elimination. As each replaceable word had only three alternative options, it did not take pairs long to discover which one was correct, meaning they could then progress to the next screen. With the measured exception of J&D, this process gathered momentum as the pairs worked through the other examples, as they became increasingly disengaged with the heavy text content and repetitive structure. For two pairs, interaction with the object became almost game-like towards the end (J&K and P&A—saying verbs).

Examining the graph for 'Bushfire' reveals a predominance of lower level thinking (recall/remembering and understanding). This is consistent with recorded discourse, and reflects the inflexible way students were required to interact with the object. Generally, they were locked into a *passive response mode* by the design, structure and content of the object—needing only to comply with the object's linear design in a way that somehow satisfied its requirements. How they did this varied little. As the object's design followed a predictable pattern, the students knew how to respond to each screen before they actually got there, and with the exception of J&D, they spent little or no time reading the story to contextualise their word selection. All they needed to do was simply work their way down the list until the correct word was discovered (e.g., Table 4: 'In the editor's office: Completing the saying verbs' task). The object placed no parameters around how often they could guess, and made no suggestion to read the surrounding text to determine more accurately a correct response, if errors were made. The text-heavy presentation and relatively unstimulating nature of content, combined with the response characteristic described above, meant it was easy for students to disengage cognitively with this object while still progressing towards its conclusion—which they appeared very keen to do. The only pair who displayed any level of cognitive fortitude was J&D. At times they seemed prepared to make a genuine effort to work out the best solution (eg., Table 4: 'Dramatic ending' & 'Completing the saying verbs'), while at other times they too appeared disengaged (eg., Table 4: 'In the editor's office'). Overall, however, it was clear from students' responses to this object that it was quite ineffective in delivering its intended goal of teaching about parts of speech.

While it would be tempting to dismiss 'Bushfire' and perhaps objects of similar purpose and structure, it must be remembered that it was purposely designed for a focused learning outcome—and that outcome was *specific knowledge* of parts of speech. In some ways its quite closed design 'funnelled' learners towards a predetermined outcome consistent with its objective but delivered it in a way that really required little cognitive engagement on their behalf—if they chose not to. Apart from purpose, a stark difference between this object and 'Catch the Thief' was its lack of cognitive challenge presented in a way that engaged the students. Put simply, students didn't have to *really think* to achieve a successful outcome, and even in those small parts where they could be creative in generating their own content (the ending and cover and title), most displayed little more than token interest, as judged by the nature of their contributions and recorded discourse.

Summary and conclusion

Some may criticise this study by perhaps accusing it of trying to compare apples with oranges. However, it is not its intention to do so. The study's primary purpose was to identify features of object

design that stimulated different forms and levels of thinking, and to draw some implications from this for teachers' use of objects for different learning purposes. Acknowledging limitations such as object and student numbers and selection, it does offer significant insights into how differently designed objects serve different learning purposes (some better than others), and how teachers need to be mindful of these in making smarter choices about object selection and use.

The study yielded visible evidence that if the design, structure and content of objects did not engage students by demanding their thoughtful and active participation to meet interesting and stimulating challenges, their learning value quickly diminished. This had a lot to do with how the object *interpreted an approach* to achieving its goal, as reflected in its structure and embedded features. Features such as the open-ended challenges associated with collating evidence for the prosecution dossier or synthesising data from different sources in the detective's notebook in 'Catch the Thief' naturally demanded thinking of a higher order than, for example, the relatively closed task of selecting an appropriate adverb or pronoun from a list, as in 'Bushfire'.

Regardless, in reviewing the SnagIt data the inescapable impression was that 'Bushfire' could have done a lot more to engage students had it adopted a more open-ended, perhaps less linear and behaviourist/rote-oriented design. It was apparent from the outset that its text-heavy, formulaic and pre-determined design effectively 'turned kids off' after the maze task (which, incidentally, appeared to have little to do with the object's learning goal). There was little challenge for students, and they had no choice or control in how they interacted with the content. They were merely required to respond on cue when prompted, and they could do this reasonably successfully without having to give it much thought. There were also no interaction parameters or learning scaffolds built into the object that could limit student guessing or systems present to detect when this was happening and offer advice or guidance.

The study suggests *digitally smart* teachers should pay close attention when choosing learning objects to ensure that their structure, design and interpretation of how learning concepts are best developed (i.e., pedagogical elements)—and not simply their learning focus—will adequately support their students' learning goals. It shows that simply placing students in front of a screen and assuming learning will occur, without due consideration being given to how the digital content they are interacting with is presented to them—and whether this will thoughtfully engage them or not, is flawed. Teachers would be well advised to think very carefully about pedagogical assumptions embedded in objects, in making smart decisions about their use with students.

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Appendix A

The list of digital learning objects and URLs accessed by the class

Space Rescue: Planet Thor (TLF L390) (http://www.tbc.school.nz/elearning/localsites/Belts/datas/LV5868/li_001_qantm_001_release/index.html)

Finish the Story: Bushfire (TLF L 1275) (http://streaming.lawley.wa.edu.au/students/TLF/DVD/los/L1275/index.html)

Catch a Thief: Level 1 (TLF L387) (http://www.tbc.school.nz/elearning/localsites/Belts/datas/LV5761/li_001_qantm_004_release/index.html)

Catch a Thief: Level 2 (TLF L388) (http://www.tbc.school.nz/elearning/localsites/Belts/datas/LV5764/li_001_qantm_005_release/index.html)

Celebrity Garbage: Zac Bronski (TLF L1703 (http://splash.abc.net.au/res/i/L1703/index.html)

Celebrity Garbage: Cal Cavino (TLF L1175) (http://splash.abc.net.au/res/i/L1175/index.html)

Show and Tell: Here Boy! (TLF L1280) (http://splash.abc.net.au/res/i/L1280/index.html)

Show and Tell: Eerie Encounter (TLF L1281) (http://splash.abc.net.au/res/i/L1281/index.html)

Timeline: Nhu Minh's Story (TLF L 1282) (http://streaming.lawley.wa.edu.au/students/TLF/DVD/los/L1282/)

Chapter 4: Assessment digital smarts: Using short text assignment formats for enhancing student learning

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Abstract

Lecturers and course designers need to be smart about assignment design. This is particularly so when time constraints of lecturer workload and students' other commitments impact on teaching and learning coverage of objectives in tertiary courses, By reconsidering assignment formats with a focus on assessment as another opportunity for learning, course designers and lecturers may be able to take advantage of affordances of technology and maximise student engagement with assignments for learning. This study describes some short text assignment types and reports on a case study using a survey of student perceptions of these formats in a third year fully online degree course. Students expressed approval of the variety and opportunities for creativity in these assignments and found them useful for their own learning and for future application in their contexts.

Keywords: assessment, online learning, tertiary, digital technologies, student experience

Introduction

This chapter defines the use of 'digital smarts' as when lecturers and students use the affordances of digital technologies to work smarter. By smarter here I mean making best use of time and efforts for greatest outcomes. In this case, lecturers in particular might work smarter in design of assessment. As new approaches are being sought in tertiary education contexts to increase the manageability of assessment and ensure standards of learning for greater numbers of students, increased awareness of potential assessment options for effective use of lecturer and student time increases our choice in design decisions.

There have been significant changes in the tertiary education environment since the 1990s with a turn to economic determinism by western governments also influencing the education sector. The focus on strengthening the national economy in a global environment has resulted in an emphasis on efficiently meeting 'market' demands. In the United Kingdom (UK), "central government policy since the 1980s towards public services in the UK has been dominated by neo-liberal ideals about the perceived superiority of the free market as a means of providing public services most economically, effectively and efficiently" (Mather, Worrall, & Seifert, 2007, p. 109). In New Zealand, researchers have found that tertiary educators work in an increasingly competitive climate for public funding and research grants. There has also been an increase in numbers and diversity of students through more

relaxed access provisions, and increasing administrative demands, such as data collection and compliance costs (Paewai, Meyer, & Houston, 2007). Fewer academic staff are undertaking more and more work. With fewer lecturers staffing tertiary institutions, lecturers are teaching more students, working harder and working for longer (Mather et al., 2007). Mather et al. (2007) found that reforms in the tertiary sector underpinned by the notion of market forces have led to the "intensification and extensification" (p. 109) of lecturers' work.

Evidence can be found in Mather et al.'s study (2007) that despite government and institution talk about raising quality, financial efficiencies are proving more of a priority in the implementation of policy. These authors found that the redesign of work practices that have moved the lecturing profession away from a craft system of production where lecturers, as subject specialists, had more autonomy over what was taught, towards a factory system of production where standardization in the form of modularization has taken place and subject specialists are expected to teach outside their specialism simply to fill up their timetables in order to keep costs down. (p. 122)

Recognition of new requirements for flexibility in a digital era is another factor contributing to lecturer workload. For example, Ryan, Tynan, Lamont-Mills and Hinton's (2012) Australian study on tertiary institutions' workload models proposed the development of models that acknowledge "the greater number of tasks associated with a blended pedagogy" (p. 10). Calculating workload is an issue in itself for universities with variations in what is valued. There are also variations in course type, learning design, class sizes, pedagogy and provision of support. Recognition of the increased number and types of tasks and the impact of new digital methods on lecturers' time and experience of their work in workload models is often challenging. For more on workload issues, see Stephen Bright's chapter in this book.

Lecturers must respond to changes in their work environment and expectations. However, Mather et al., (2007) showed that lecturers are struggling to cope with increased workload demands and that individual and collective acts of lecturer resistance have been ineffective in influencing these changes, resulting in increased feelings of alienation. Research also suggests that lecturers are prepared to put in time and effort beyond their institution's contractual demands to maintain the quality of their work. For example, in Lazarsfeld Jensen and Morgan's (2009) Western Australian study, all of the academics surveyed and interviewed worked during their weekends. This work is largely hidden. Lecturers in that study saw this hidden work as important for maintaining and improving teaching quality: "It was work academics felt was essential to meet their own standards of scholarship" (Lazarsfeld Jensen & Morgan, 2009, p. 63).

Workload issues have impacted on the intensity of lecturer workload, stress levels and negotiating work life–home life expectations (Chalmers, 1998) because the stakes are high. One example is the increased use of student appraisal data for staff evaluation and promotion (Barrow & Grant, 2012). In this context it is understandable that in seeking to work smarter not harder, lecturers involved in online course design consider alternatives for assessment in order to make the process more manageable and to enhance learning. Given demands on lecturer, and student, time using assessment digital smarts is being efficient with time while having more impact on learning.

The increased diversity in tertiary student populations has implications for demands on student time and on student expectations of the institution. Literature (such as Crisp, 2009; Mason & Rennie, 2008; Prensky, 2001) highlights the changing nature of tertiary students' use of information communication technologies and the greater diversity of cultures, prior experiences and age ranges.

This diversity also includes an increasing range of competing demands for student focus, such as work and family commitments. There is also evidence that students have changing expectations of their institution regarding their study. Younger generations of tertiary students in particular are growing up in a society of constant rapid change, particularly in relation to the integration of digital and mobile devices into most aspects of life. Crisp (2009) presciently noted that "students will be expecting some form of interactivity and control over their use of the internet for learning and assessment" (p. xi). The technologies we use change how we think, how we learn and inevitably what we think and what we learn (Mason & Rennie, 2008; Prensky, 2001). Students with different cultural backgrounds and upbringings also bring variations in concepts of teaching and learning, understandings of the role of lecturers and learners and attitudes to class practices such as peer assessment (Mason & Rennie, 2008; Palloff & Pratt, 2003).

Global education arrangements between countries and institutions see more international students studying on western education campuses. In England, Ireland, the United States, Canada, Australia and New Zealand, international students, and ethnic Chinese students in particular, have become an increasingly significant presence. In New Zealand for example, Ministry of Education statistics for 2008/2009 identified 95,537 international students enrolled for study. Chinese student enrolments comprised the highest number in these figures (22,917, 24%). Such figures continue to feature, even though overall international student numbers in New Zealand universities have fallen since 2004 despite ongoing growth in the global market for international students. International university student numbers fell 5.2% (980 students) in 2012 with the Chinese being New Zealand's most important international education market (Education New Zealand, 2013). English-speaking universities generally have strong commitment to internationalisation and partnering with institutions in a variety of markets. In the increasingly high stakes, diverse and challenging environment of tertiary education for both lecturers and students, attention to assessment design can be one way of mitigating the impact of some of these forces.

Assessment

Given the complexity of demands in the tertiary environment for both lecturers and the diverse student population, how can assessment be designed to effectively accommodate everyone's needs to ensure relevant teaching and learning outcomes?

Assessment is complex because it serves multiple needs with one of these needs being further student learning. Carless (2007) explains that "one of the core problems is that assessment … is about grading and about learning" (p. 11). Crisp (2009) also comments that assessments serve more than one purpose, suggesting that formal assignments "must encourage learning, provide feedback on learning to both the student and the lecturer and they need to document competency and skill development as well as allow students to be graded or ranked" (p. 1).

Assessment, therefore, aligns what is taught and what is important to be learned. Thus, assessment information should stimulate further learning (Earl, 2003). Traditionally tertiary educators have tended "to rely on a narrow range of assessment methods such as exams, tests, and essays" (Spiller, 2011, p. 11). For that reason, it seems obvious that assessment becomes less stimulating for both student and marker if the same things are done over and over again. When the same assignment format persists, fatigue is likely, especially for the marker. Gibbs and Simpson (2004–05) argue that

the design of assessment should, in the first instance, "support worthwhile learning" (p. 3). To this end these authors present 10 influences of assessment on the volume, focus and quality of study, and the third one of these refers to assessment tasks needing to be productive learning activities.

Students' experiences of assessments are not separate from the learning experience (Earl & Giles, 2011; Mason & Rennie, 2008) for, as Boud and Associates (2010) suggested, assessment "is one of the most significant influences on students' experience of higher education and all that they gain from it" (p. 1). The concept of 'assessment *as* learning' highlights the learning potential of an assignment. This concept focuses on students being involved in decision-making and reflection on their assessments (Earl, 2003). The assessment as learning concept underscores the point that students should be valued participants in their learning, and should anticipate receiving and acting on constructive feedback and feedforward. An ideal is that they can identify their own learning gaps and solve many of their learning needs by themselves, with peer help or with lecturer assistance.

All assessment implicates some kind of student learning (Mason & Rennie, 2008). Carless (2007) is even more specific when he emphasises that the most crucial aspects of assessment tasks is that they are learning tasks through his term "learning-oriented assessment". Boud and Associates' (2010) view resonates with that as they argue that "assessment tasks should be significant learning activities in themselves" (p. 2). Carless, Joughin and Mok (2006) position efficient assessment as occurring when the two functions of assessment overlap substantially. These two functions are (a) evaluation of student achievement for grading (or certification); and (b) learning.

There are calls for a reconsideration of assessment design in higher education for a number of reasons. Boud and Falchikov (2006), for example, highlighted that reconsidering assessment design in higher education is important not only for immediate learning requirements but also for "preparing students for the learning they will engage in throughout their lives" (p. 411). Assessment design for both immediate and life learning purposes, they proposed, should not be over-prescriptive but allow students to develop confidence in their own judgement. An example that might meet this requirement is when students exercise choice and decision-making over the development of their assignment responses and products to meet the assessment brief.

Boud and Falchikov also promote students' consideration of context (perhaps developing assignment responses for an identified audience, for example) and that tasks reflect professional practice activities and also foster reflexivity (for example, students using their own experience to consider points made in literature and vice versa). Boud and Falchikov (2006) also suggest that assessment design to meet both immediate and longer term learning requirements provides an opportunity for students to appropriate assessment activities for their own ends, including being able to use submitted assignments or products in future work lives.

Applying this notion of assessment as further opportunities for student learning to tertiary online courses may increase the relevance, usefulness and manageability of assignments for students. Kendle and Northcote's (2000) criteria to guide e-assessment design include the authenticity of the nature of the task (for more on authentic assignment tasks see Torrance, 1994), communication incorporated in tasks, a degree of student choice, encouragement of the appropriate and discriminatory use of online resources, and examination present viewpoints. Crisp (2009) specifically advocates for assignments to encourage students to interact with real world tools: "make use of new opportunities for students to access resources or use interactive tools in order to construct their response"
(p. 56). These authors are asking assessment designers to consider the process students use to develop

assignment as well as the submitted response. This study focuses on assessment design considerations of student processes and assignment products in a particular online course.

Study context: Student assignment work in my online courses

The assignments in this course were designed to provide students with another learning task and a genuine opportunity for decision-making, and exercising responsibility in assessment. The aim was to increase the investment students had in assessment beyond requirements for a passing grade to more intrinsic motivations from learning relevance and usefulness. Use of a variety of formats over the number of assignments asked students to represent learning in different ways in order to capture the diversity of student strengths and provide a range of opportunities for them to demonstrate what they know and can do.

As online courses work well in module formats (Cong & Earl, 2011) so assessment as well as content tends to also be modularised. Content modularisation creates boundaries of content for both lecturers and students. A sense of a 'fresh start' when the next module begins is not uncommon and heralds another stage in the learning and the trajectory of the course. Modularisation also enables some ease in managing the quantity of online asynchronous discussion posts and helps maintain the quality of posted messages. It does so through new discussions in new sections. Modularising assignments also allows for a variety of formats to stimulate student interest and provide opportunities to demonstrate different strengths. The decision to design an assessment with a number of smaller components was for similar reasons. These include

- supporting students in using and/or developing effective time management
- providing students with a 'fresh start' sense with the closure of one module and the start of the next
- spreading the load so that students experiencing difficulties in one module still had other opportunities to achieve in the course
- allowing for a variety of assignments so that those with different strengths and interests had opportunities to show what they knew and could do
- enabling greater online marking ease for lecturers.

I use the term *short text formats* to refer to the types of assignments I use in my fully online courses, defining *short text formats* as assessment submissions of 800 words or less. For example, these assignments may include abstracts, posters, pamphlets, presentations, scenario planning, poems, reviews and letters (such as to a newspaper editor, the Ministry of Education, an individual, institution or company). Such assignments require students to present a variety of perspectives (for example, a single or multiple perspectives), an argument, synthesis or evaluation of specific information. Success in assignments with such limited word counts requires a demonstration of academic skills, mastery of content (knowledge, understanding and skills), and a recognition of how to target particular audiences.

Having students identify target audiences for their context and circumstances foreshadows authentic lifelong uses, and this links to the idea of motivation, deliberately providing opportunities for student choice and increasing relevance to students' prior experiences, interests and professional contexts. Previous work (Cong & Earl, 2011; Earl, 2012) raised a question about the extent to which students appreciated choices. However, deliberately including choices was a factor in this study offering students variety in their assignment work and counters the potential for plagiarism that occurs when assignments are of the standard essay type and on the same topics each year.

The use of digital technologies increases format options so that students can leverage their different strengths and interests to excel and use their creativity in achieving the requirements of the tasks. Students do not get tasks that might mean I am distracted by the technical aspects of the digital product they create. Care and effort evident in students' work is required, but impressive technical skills, unless an aspect of the marking criteria, can detract from the content. They may bias assessment towards assigning higher grades than would be otherwise warranted. If technical or presentation aspects are a requirement, then this is made clear in the assignment instructions and assessment criteria. The four assignments in this study, no matter the format they were presented, were assessed using the following criteria:

- Communication of content to identified audience
- High standard of writing (clarity in structure, flow, surface features etc)
- Link between theory and practice
- Critical thinking—analysis and synthesis, apparent level of understanding
- Evidence of thoughtful selection and integration (use) of references from a variety of sources.

Sometimes students have opportunities to share clean copies of their assignment work with their peers after marking, and this study context was no different, where they could share their Best Websites article (see below for details). This opportunity is voluntary but has benefits in increasing the audience for students' hard work, gaining positive peer recognition. For the lecturer, the benefit in this sharing is that it provides peers with comparative models that ultimately help them make sense of their assessment descriptive and evaluative feedback.

The assignments

The assignments of interest were designed to encourage students to use their prior experiences and knowledge, seek additional material, exercise choice and make use of the affordances of technology. In one case, this was about access to further resources, software exploration and creation of specific products (magazine article, report and animation).

The Self-evaluation assignment (reflection and evaluation)

The Self-evaluation assignment required students to review and evaluate their participation and contribution in the online discussion by responding to questions targeting aspects of purposeful

community of inquiry and online presence. Students had previously been given formative and ungraded feedback after their first discussion as early guidance on expectations.

The Best Websites for … assignment (magazine article)

In the style of Joanne Troutner's (2006) article "Best websites for virtual learning", the task required students to select a subject/curriculum area that interested them (for example, science, social studies, mathematics, visual art, written language, Spanish), then locate, evaluate and review the best websites for their choice, developing an article for an audience they had identified. Given that the majority of students in this paper were involved in initial teacher education, the target audience they selected was often New Zealand teachers or students at levels or contexts useful for their future careers as teachers. Their article needed to include screen shots and be formatted in columns after Troutner's model.

The Report on Trends assignment (report)

The Report on Trends assignment required students to review the trends identified in the previous three years *Horizon Reports*. The annual *Horizon Reports* are a collaboration between the New Media Consortium (NMC) and the EDUCAUSE Learning Initiative (ELI). Every year since 2004, these reports have identified and described six areas of emerging technology likely to have a significant impact on teaching, learning or creative expression in higher education within three adoption horizons: a year or less, two to three years, and four to five years. Each section of the report provides live Web links to examples and additional readings. After reviewing these reports, students developed their own report on a selected emerging technology to signal its relevance and impact on the New Zealand context and schools, identifying possible views of interested parties. Finally, they added a personal response including implications for their own professional practice.

The Conversation about an eEducation Myth assignment (3 minute animated movie & script)

Using an animated video-creating website, students developed a script and animation creating a 3 minute conversation between two or more characters that addressed one of the following myths about eLearning:

1. Online courses require less time than traditional face-to-face classes (as teacher or learner)
2. Online teachers are always online
3. Online courses have no sense of community
4. Online courses are all about reading and doing assignments.

Students were also required to submit an introduction including an explanation for the choice of myth and the scene and characters, plus the script and a link to the animation. At the time of the study, students were using Xtranormal to create the animated videos (Xtranormal now no longer exists).

The case study context

The University of Waikato was the first university in New Zealand to connect to the Internet and programmes have been offered online since 1996. The Faculty of Education has a national reputation for pre-service and in-service teacher education. The course that was centre stage of my study reported here looks at aspects of eEducation and is called 'Introduction to eEducation' (PROF310). It is an optional course introducing undergraduate students to online teaching, learning, research and technologies. Most students are generally in the primary teacher education degree programme. The class sizes are generally relatively small. In 2012, the time of this study, there were 21 students. All class interaction takes place in Moodle, the learning management system used at the University of Waikato. Most of the activity is asynchronous and the course content and activity is divided into modules of 3 weeks (see Figure 1). Assignment work is aligned to each module and worth a percentage of the final grade (see Figure 1).

PROF310	Topic	Assessment	% of Final Grade
Module 1	Introduction to distance education and online learning	Self-evaluation of discussion (500 words)	10%
Module 2	Needs and opportunities for eLearners	Best Websites (2-page magazine article)	25%
Module 3	Teaching in distance, flexible and online environments	Report on Trend (using *Horizon Reports*) 800 words	30%
Module 4	Implications for teachers, institutions and the future	Conversation about a Myth (animated movie using Xtranormal™)	35%

Figure 1: **Module information for PROF310, 2012**

In a pilot study (Earl, 2012), I proposed that one benefit of shorter word count assignment formats is that these submissions would be easier to read online. I expected that this would be more manageable for markers and reduce feedback time to students. In a later article (Earl, 2013), I focused on student perceptions of assessment design and feedback. The question reported on here is, what were students' perceptions about these types of assignments regarding learning, usefulness and enjoyment?

A small case study (Yin, 2014) using a survey to gather participant responses was carried out in 2012. This case study highlighted the context dependent nature of the research and students' perceptions of the phenomena (Denzin & Lincoln, 1994), which were four types of short text assignments, and supports Yin's (2014) argument that "the boundaries between phenomenon and context may not be clearly evident" (p. 16). The survey elicited student responses to each of the

assignments. There was potential risk in me losing or compromising a critical stance (see Walsham, 2006) because I was also the lecturer of the course. On the other hand, being both researcher and lecturer enabled a more informed interpretation of the survey responses.

Student survey

SurveyMonkey (www.surveymonkey.com) provided the platform for surveying students at the end of the course, and after completion of all assignment work. The survey had two sections using a mixture of rating and short answer questions targeting opinions of the assessments. Students were asked to rank the assignments according to the degree they *liked*, *learned from* and found them *useful*. The four assignments were rated out of 5 with 1 as the highest rating. The second section asked students to identify what the pluses, minuses and issues were for each assignment when considering their experience of both process and product. Each of these sections offered options to make further comments. The survey was promoted as part of the university's routine appraisal processes, where responses to such anonymous surveys are collated and analysed by the centre responsible for course appraisal processes before being returned to lecturers.

Findings and discussion: student perceptions of assignment work

There were no dropouts in this course and no students failed. The final results ranged from 53% to 86%. Thirteen students answered the survey, a response rate of 62%. Overall satisfaction with the quality of the course was given the highest possible rating, 1/5 by 92.3% (12) of respondents.

Next, I summarise the responses to each assignment and then look at each focus: the degree to which students *liked*, *learned from* and found *useful* each assignment. The overall following comment summarises student impressions of the assignments in this case: *Assignments were a fair judge of learning with each being so different*.

The **Self-evaluation task** did not generally rate very highly. Only 58.4% of participants gave this assignment a rating of 1 or 2 out of 5 when asked how they *liked* the assignment. Only 40% said they *learned from* this assignment by rating it 1 or 2 out of 5 and only 40% said they found it *useful* (also by rating this assignment 1 or 2 out of 5).

The **Best Websites article** (2 sides of an A4 page) was *liked* by 83.3% (10 rated it 1/5 for this aspect). This assignment also rated highly for *learned from* with 80% of respondents giving it a rating of 1/5, and 70% rated this assignment's *usefulness* at 1/5. All respondents gave this assignment either a 1 or 2 out of 5 for *liked*.

Only 33.3% of students rated their liking for the **Report on Trend** at a 1/5, with two-thirds (66.6%) giving it a 1 or 2 out of 5. However, 60% *learned from* this assignment, giving a rating of 1/5 for this aspect, and the same number found it *useful*. About 80% rated the trend report assignment as either 1 or 2 out of 5 for these aspects. The report was the most conventional of the assignments in this course.

The **Conversation** animation task was *liked* by 58.3% of respondents with a rating of 1/5, while 50% rated *learned from* and *usefulness* at 1/5. Combining ratings of 1/5 and 2/5, 83.3% *liked* this assignment and 70% *learned from* and found it *useful*.

Generally the ratings for each assignment were accompanied by 2–4 more negative student responses. These comments focused on suggestions that the assignment guidelines provided in the course outline were not clear enough. This response can be taken into account when I review the guidelines.

Student perceptions of how the assignments were liked

Looking specifically at student perceptions of how they liked the assignments the Best Websites assignment again rated the highest and the Self-evaluation the lowest (see Figure 4).

Module/Assignment Rating: Liked	1 % (high)	2 %	3 %	4 %	5 % (low)
1: Self-evaluation of your discussion contributions (10%)	16.7%	41.7	16.7	25	0
2: Best Websites for… (magazine article) (25%)	83.3	16.7	0	0	0
3: Report on Trend in recent *Horizon Reports.* (30%)	33.3	33.3	16.7	16.7	0
4: Conversation on eEducation Myth (3 minute script and animation) (35%)	58.3	25	16.7	0	0

Figure 4: **Student ratings when asked how they liked the assignment.**

The opportunity and the incentive for students that is provided by assessment requirements to try something new can provide rewards for students in terms of engagement and enjoyment. Students commented that the Conversation assignment was 'Enjoyable' and 'Fun fun'. Others commented:

- I loved creating my movie. It was fun.
- … fun medium to use to debate topic.
- Excited making movies and using the program and having a resource like this that is easy to use.
- This assignment simply being different was a positive to these students:
- It was a different sort of assignment and I can see how it could be used in a classroom.
- Enjoy it; very different to any other assignment I have done!

However, the Report, a more conventional assignment also received positive comments for the type of assignment it was. For example, one response simply said: 'Liked this style of assignment.'

Student perceptions of their learning from course assignments

Looking specifically at student perceptions that they *learned from* the assignments the **Best Website** assignment rated the highest and the **Self-evaluation** the lowest (see Figure 2).

Module/Assignment	Rating 1 (high) %	2 %	3 %	4 %	5 (low) %
1: Self-evaluation of your discussion contributions (10%)	20	2	4	20	0
2: Best Websites for… (magazine article) (25%)	80	1	1	0	0
3: Report on Trend in recent *Horizon Reports* (30%)	60	3	0	10	0
4: Conversation on eEducation Myth (3 minute script and animation) (35%)	50	2	3	0	0

***Figure 2*: Student ratings when asked how much they learned from undertaking the assignment**

Students gained new awareness and information as a result of the research and development processes of assignment preparation in this course. Comments on the report assignment highlighted the importance of knowledge of specific online resources for themselves and other teachers e.g., '*I am more informed about the trends of technology set to or already impacting on education'* and 'The *Horizon Reports* are *very important for teachers to be aware of'*.

Another student comment highlighted the learning from the development of the conversation animation assignment, identifying learning from 'm*y thought process to produce the clip and the script'*. The transferability of this new knowledge into students' other activities underscored the usefulness of the assignments: '*The assignments were varied and challenging, yet on completion the knowledge learnt was able to be transferred into my classroom activities'*.

Student perceptions of how the assignments were useful

Looking specifically at student perceptions of how *useful* they found the assignments the **Best Websites** assignment again rated the highest and the **Self-evaluation** the lowest (see Figure 3). Comments highlighted both the process and the outcomes of the assignments as being of use.

Rating Module and assignments	1 % (high)	2 %	3 %	4 %	5 % (low)
1: Self-evaluation of your discussion contributions (10%)	20	20	30	20	10
2: Best Websites for… (magazine article) (25%)	70	10	20	0	0

3: Report on Trend in recent *Horizon Reports* (30%)	60	30	0	10	0
4: Conversation on eEducation Myth (3 minute script and animation) (35%)	50	20	30	0	0

Figure 3: **Student ratings when asked how useful they found the assignment**

Comments such as '*I located some really good websites that I will use' and 'That it can actually be used when we go teaching'* received regarding the Best Websites assignment emphasise the usefulness of familiarity with web content.

Familiarity with particular software (Xtranormal™ in the case of the Conversation animation assignment) was also highlighted as useful in student comments: '*Xtranormal movie making was beneficial and have already shared this knowledge, have thought of ways to incorporate into future lessons.*' As the majority of the class in this study are initial teacher education students the usefulness for teaching and learning in their own classrooms was mentioned in many of the comments such as '*Just what you could do with students using this site'* and '*How I can use it in lessons. I am going to purchase the educator account so I can use it in my classrooms'*. One student even commented on the usefulness of the idea of '*using an online movie making site to present an assignment'*.

Future usefulness of the submitted assignment product was a key point in student comments on the positives of the Best Websites assignment such as *'I have created a great resource to use with my learners and a template for further development'* and '*I learnt how to use publisher and now have an amazing resource (mine and that of others) that will reduce the amount of time needed searching through many websites for resource'*.

Although the product of the Self-evaluation assignment was not mentioned in responses as useful, the process required by this assignment prompt was acknowledged in student comments as useful. Comments such as, '*Made me think of my expectations of the course*', '*It allowed me to self reflect on my own contributions*' and '*I was able to see where I needed to improve*' indicate that consideration of their participation and contributions in discussion to date was useful in that this reflection benefited their approach to discussion participation during the rest of the course.

One student comment highlighted the link between assignments being useful and being liked:

> Enjoyed the article writing [Best Website assignment] and once again able to share with cohorts, great idea for assignments for my students. The articles, extra readings were relevant and informative, once again I have been able to share. Of particular interest is the Horizon report. I used this for informing my CATA class on e-learning and technologies. A really enjoyable course.

Overall student responses to the four short text assignments in this course highlighted student appreciation of the variety and opportunity for creativity in the design of assessment for this course.

One comment highlighted in particular the influence that having variety and the opportunity for creativity in assignments had on this student's experience of learning: '*Creativity of the different types of assignments. Having variety in assignments rather than doing the same old assignments typical of courses makes for more exciting, engaging and meaningful learning*.'

It seems that students in this case would consider these assessment activities examples of Boud and Associates' (2010) and Carless's (2007) assessment tasks that are opportunities for further learning. In the Best Websites article development they explored the relevance and usefulness of a number of websites on a particular subject for use in their professional work. In the Report assignment students became familiar with the *Horizon Reports*, an annually produced online information resource. In the Conversation animation assignment students' learned animated movie making using Xtranormal™. These are examples of students being directed to make use of the affordances of technology to further their learning through the assessment design.

The results from this study also indicate that students can distinguish between assignments they liked and assignments they learned from. The Self-evaluation and Report on Trend assignments were rated more highly for *learned from* or *useful* than for *liking*; even when students didn't enjoy the assignments, they still appreciated their value. And the inverse was true for the two other assignments: both Best Websites and Conversation animation were rated lower for *learned from* or *useful* than for liking; students again clearly delineated between fun and function. Gibbs and Simpson (2004-05) also found research support for the view that students can distinguish between what will result in worthwhile learning and what an assessment requires. The students in this study demonstrated they could evaluate the worth of an assignment for an appreciation of the process of development, preparation and completion of the assignment, as well as satisfaction with the product achieved. The product being useful now or in the future was also a key factor for these students. Student awareness of a self-chosen target audience, and intentionally developing the content and presentation of the assignment for this audience, seems to add an extra dimension of meaning to an assignment over and above the marker as audience.

To accommodate diverse student groups (in experience, prior knowledge and culture), Spiller (2011) suggests that courses include a range of assessment tasks broad enough for cultural references, interests and examples to be used by individual students. This course specifically had four different types of assessment with a choice of context, content focus and audience specifically in the Best Websites article and the Conversation animation assignments.

Students appreciate a variety of assignment formats, particularly when formats include an opportunity for creativity (personal flair and input, decision-making and responsibility). Adding an element of creativity to assignments also gives students increased choice and responsibility for decisions in constructing their assignment response. Some respondents commented that more clarity around assignment instructions in the paper outline would be an improvement. These comments may reflect some students' lack of comfort with taking more responsibility for choices within assessment. The types of things that students had to decide for themselves included who would be the target audience for their submission, how many websites to review in their article in the space they had, and what information to include in a limited time, space or word count. There were also graphic design decisions as part of publishing in the case of the Report and the Best Websites article.

The Best Websites assignment rated the most highly across the board (consistent with course appraisal comments from previous years). This assignment was the only one where a forum space was

opened for students to share their assignments after the processes of marking and feedback were completed. Ten students volunteered to share a clean or modified copy of their assignment for others to make use of. I didn't predict this might be an influencing factor for students' ratings when developing the questions in this study but the opportunity to share may have contributed to students' positive ratings of this assignment in particular.

The findings of this study highlight aspects of assignment design that are appreciated by students, providing an informative basis for further research. They indicate that a larger more detailed study would be worthwhile. This case is likely to vary from cases in other studies because it was undertaken with undergraduate students from a 12-week fully online course with one lecturer who determined the curriculum and assessments. Online courses vary considerably in learning management systems, learning design and lecturer capability and pedagogy. Courses also vary in the degree of curriculum and assessment regulation, the role of the marker, required timeframe for return of marked assignments, and the format and content of returned feedback. Whatever the nature and parameters of an online course, findings in this study could encourage lecturers to consider their options for assessment design in order to provide opportunities for furthering student learning, student choice and exercising creativity.

Concluding comments

Changing expectations of lecturers and students in the tertiary environment including use of mobile devices and increased use of standards in a global marketplace for education means lecturers and students are now operating in a different world and responding with changes to the way teaching and learning is conducted. With time constraints felt by everyone, maximising learning through assessment design can have significant benefits. The benefits for students can be in engagement with a variety of assignments, the opportunity to put more of their own experience and culture into an assignment as well as furthering their learning in relevant and appropriate ways for course requirements and for their futures.

This chapter describes examples of short text assignments used in a fully online course. The assignments in this study required students to explore online material (Best Websites article and Report on Trend), specific software (for publishing and animation), their own understandings (all assignments) and their contribution to class (Self-evaluation of discussion). Students were surveyed for their perceptions of how they *liked*, *learned from* and found *useful* each of the four assignments. Findings from this study are consistent with literature that argues that the assessment experience itself can promote valued learning. Students could differentiate assignments they learned from, found useful and liked in their ratings. Findings in this study also suggest that the focus for students when rating short text assignments seems to be an appreciation of a variety of formats, the opportunity for creativity and the learning and usefulness of activities and products for purposes beyond their study in this course.

The examples of short text assignment formats in this study were well received by students, providing opportunities as learning experiences and making use of the affordances of technology. It would seem consideration of short text assignment formats might have benefits for both lecturers and students in online courses. With greater awareness can come greater choice and this is true when designing effective assessment. Being digitally smart within the challenging tertiary education context

means continuing to explore assessment design options in order to enhance what students' value in their experience of learning.

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Chapter 5: Legacies of learning: Negotiating guidelines for online discussion

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Abstract

This study involves students in constructing a community resource or legacy for future learners to use. In this instance, the resource takes the form of a set of guidelines for Asynchronous Online Discussion (AOD). Working within Moodle, teacher education students negotiated and revised sets of AOD guidelines for use in their own class, and to provide as a legacy for a future class. Data were generated over two semesters by consecutive cohorts of students. The findings highlight some key expectations that students set for peers when learning through AOD, such as a preference for accurate and responsive postings. It is also apparent that students appreciate and value the opportunity to negotiate guidelines. In terms of digital smarts, this study promotes effective use of AOD as an accessible means of engaging students in dialogue and deep learning. It is smart to negotiate guidelines for AOD with students so that expectations are clear, student perspectives are respected and opportunities to contribute to others' learning are provided.

Keywords: Asynchronous Online Discussion, student expectations, student perspectives, initial teacher education, zone of proximal development

Introduction: Three key concepts

This chapter explores the development of legacies of learning in the form of guidelines for online discussion, developed through a smart process of negotiation with teacher education students. The underpinning concepts are Asynchronous Online Discussion (AOD), legacies of learning and the notion of digital smarts.

A mainstay of online learning, AOD is used not only in teacher education distance programmes but also in online courses in a range of disciplines, across a range of contexts. AOD is also referred to as Computer Mediated Conferencing (CMC; Gunawardena & Zittle, 1997), web-based conferencing (Angeli, Valanides, & Bonk, 2003), Electronic Discussion (ED; Ferdig & Roehler, 2003), and Threaded Discussion/Conversation (Welser, Gleave, Fisher, & Smith, 2007). These discussions occur in an Internet-enabled environment without the need for discussion participants to be present in the same physical location or at the same time. In my study described here, participants are students and teachers engaged in discussions for learning purposes. Accordingly, each discussion is a formally constituted, topic-centred conversation established in the

context of Moodle, which is a specific learning environment using a web-based message board (Locke & Daly, 2007).

There is nothing new about AOD but it persists as a core means of instruction within an online class, functioning as a tutorial opportunity, a support network and ideally a community of learners where teachers and students build knowledge and understandings. Alongside AOD, key concepts pertinent to this chapter are the notion of legacies of learning, and the continuation of the digital smarts theme. Looking firstly at legacies, the concept stems from the moment when a learner asks questions like "How can I articulate my learning and understanding in a way that could be useful to others?" or "What can I contribute to inform the learning of those who come after me?"

Legacies are a way of sharing learning from experience and summing up advice to guide one's peers. For example, having unravelled some of the complexities of AOD to arrive at a set of guidelines, it is helpful to provide these protocols as a starting point for others who may be new to learning through AOD.

My interpretation of the digital smarts theme coalesces around the notion of learning from the past in order to inform future practice while constantly evolving new understandings. Smart ideas are often simple and proven effective in a given context, and lessons can be drawn from these to focus future directions. Smart ideas are adaptive. Having taught for 20 years now, with 13 years of online teaching experience, I have learned that it is important to be agile in order to be fresh for each class. This does not mean reinventing the wheel every year, but rather drawing upon past experience to inform current practice while being responsive to each new group of students. My goal is to carry out joint inquiry with students, enlisting student input and acknowledging the value and power of student voice. Pooling our expertise, we negotiate and generate understandings around how best to approach our online work together. Negotiation is followed by trialling our ideas and then reflecting and regenerating new ideas. In the instance related here, we applied our digital smarts to negotiating guidelines for AOD as legacies for learning.

Why is AOD a smart choice?

The smart use of AOD is underscored by the advantages and possibilities for action or 'affordances' of an asynchronous and text-based approach to discussion. Collison, Elbaum, Haavind and Tinker (2000) sum up the advantages of AOD well:

> Text-based asynchronous electronic communication is well suited for goal-oriented dialogue and learning environments. No one is left out of a fast-moving conversation or is silenced because he or she is not called upon in the classroom. The reverse is also true, in that the excuse of running out of time as the bell rings is no longer available to participants who are hoping to pass by simply attending class regularly. The act of committing thought to print impresses upon the participant a need for both reflection and clarity. And absence from dialogue, or shallow interaction, shows up quite clearly in threaded text formats. (p. 9)

As the above quote suggests, four key AOD advantages include that

- no one is left out or silenced—*inclusivity*

- class time is extended—*flexibility*
- the writing process is valued—*textual communication*
- reflection and depth are promoted—*deep learning.*

AOD is digitally smart because it is relatively low-tech and accessible to learners yet gives rise to significant affordances for learning. The realisation of these affordances depends in turn on smart guidelines for AOD.

Why negotiate guidelines with students?

We cannot assume that students intuitively know how to contribute to AOD. Students may not enter tertiary programmes with the communicative competence needed for engaging in academic online discussion, as distinct from chatting on FaceBook. It is smart to provide guidance in the form of direct and explicit instruction about how to participate effectively in learning-oriented discussion.

While teachers/lecturers might devise guidelines for students, there is value in a more democratic approach. Involving students in co-constructing guidelines for AOD communicates interest in, and respect for, students' contributions. This is a smart step toward sharing power with students and enabling them to give voice to decision-making about learning processes. As such, negotiating guidelines for AOD is a purposeful task, particularly as the guidelines are for current *and* future classes. The notion of making a contribution to others' learning is particularly relevant for teacher education students since students who create a resource for future learners are in effect moving towards their teaching position, connecting learning to teaching.

It is important for students to co-construct guidelines so that they convey their expectations directly to their peers as partners in online discussion. Students may be talking past each other if they assume common understandings that are not in fact commonly understood (Metge & Kinloch, 1984). Negotiating guidelines provides an opportunity to generate common understandings as foundations for learning together as colleagues.

It is smart to negotiate discussion guidelines with students for the benefit of their learning and the learning of students in the future.

Participation, transparency and guidance in the co-construction of AOD

Smart research related to AOD (e.g., Preece, 2000; Salmon, 2003, 2011) inspires exploration of human/social dimensions of AOD, valuing the perspectives of students as participants in AOD and seeking a basis for evolving guidelines to inform pedagogy.

Weimer (2002) asserts the need to involve learners actively in decision-making about their learning, values student input and recognises their ultimate responsibility for their learning. Bender (2003) also advocates that students be "involved participants in their learning process … lead[ing] to a shared teaching and learning experience" (p. 191). There is a great deal of other support for this view of students' participatory voice, on democratic, ethical, pedagogical and pragmatic grounds (Brookfield & Preskill, 2005; Sharpe, Beetham, & de Freitas, 2010).

In terms of pre-service teacher preparation, Loughran (2006) argues that student teachers need to not only learn what is taught but also integrate and learn about the way it is being taught. As Loughran (2006) explains, there is a need to make the tacit knowledge of teaching explicit, since

> if students of teaching are to genuinely "see into teaching", then they require access to the thoughts and actions that shape such practice; they need to be able to see and hear the pedagogical reasoning that underpins the teaching that they are experiencing. (p. 5)

In order to make the tacit explicit, teacher educators need to work smarter to ensure the basis of decision-making is shared with student teachers to enable them to understand underpinning pedagogical reasoning. One way to make such reasoning explicit is to closely involve students with decisions about learning protocols. It is therefore smart to negotiate and co-construct guidelines for practice so they begin to understand pedagogical reasoning underpinning the online discussions. It is the process of negotiating guidelines that supports making pedagogical reasoning explicit.

In this vein, Preece's (2000) notion of a framework for socially evolving, participatory development of guidelines is congruent with constructivist theorising of educational endeavours. That is, smart guidelines need not be rigid or static. They can develop and grow over time as participants co-construct ways of working. Smart guidelines provide a starting point and can operate as "liberating constraints", balancing flexibility with clear frameworks as part of responsive course design (McGrath, Mackey, & Davis, 2008, p. 615).

Like Preece (2000), others argue for AOD guides in the form of clear expectations, rules and training (Bonk & Dennen, 2003; Bonk & King, 1998). However, Bonk (2004) refers to 'roles and guidelines' for staff on one hand, but to 'expectations and rules' for students on the other. Bonk (2004) considers it vital "that the instructor provide expectations for online students" (p. 99), as well as "provide rules for interaction" (p. 100). This positions students as having to be compliant rather than having agency. In initial teacher education, this is counter-productive to making pedagogical reasoning explicit. A smarter approach is to ascertain students' expectations rather than imposing them, and to "modify expectations collaboratively with students", as Fauske and Wade (2003, p. 148) suggest. Smarter still is to share students' expectations with a subsequent cohort as a community resource and digital legacy.

This approach is inspired by and builds upon Brookfield and Preskill's (2005) use of letters from previous students. Each cohort of students can be invited to produce "letters from online successors", where students write 'exit' letters at the end of their online class, making suggestions for how the next cohort of students might best contribute online (Brookfield & Preskill, 2005, p. 244). In this way, the students leave a legacy or set of footprints as "a pathway for others taking future courses to find" (Salmon, 2002, p. 43). In addition, this work with students is compatible with Scardamalia and Bereiter's (2003) concept of knowledge building, and in keeping with the work of Collis and Moonen (2007) in relation to "the contributing student" (p. 19; also November, 2012), whereby students generate learning materials that are then used and updated by students in subsequent cycles of the course. Similarly, James' (2009) "online generational" approach (p. 94) involves classes sharing their work online each semester, and accessing the work of previous generations while writing for future generations. The goal is to enable students "to drive aspects of their educational experience, shape their involvement within it, and seek higher purpose by making educational contributions that

benefit others" (November, 2012, p. 14). Through these processes, knowledge creation and innovation become pervasive. Holmes and Gardner (2006) characterise the approach as "communal constructivism", whereby "the learners involved deliberately contribute their own learning to a community resource base for the benefit of their peers and future learners" (p. 11). The attention to students' voices, perspectives and experiences is in keeping with a phenomenographic approach, supportive of a distributed leadership model, where students learn to lead by leading learning. This is appealing in a teacher education context in particular, since the opportunity to influence the learning of others is compatible with the space the students seek to move to as teachers in their own right (Ellsworth, 1997).

AOD as situated practice

Increasingly, the interactive and interpersonal elements of learning online are emphasised over and above the delivery of content. For example, Ally (2008) defines online learning both in terms of learners interacting with content and with other learners, and a means of obtaining support as students construct meaning and engage in deep learning. The roots of this definition lie with social constructivist perspectives of learning, whereby learners interact to make meaning within specific situations and contexts. This view of online learning is compatible with the negotiation of discussion guidelines as a situated practice.

A social constructivist perspective essentially recognises the salience of human agency, highlighting students' active participation in AOD. As Beetham (2007) reminds us, learners are "actors, not factors, in the learning situation" (p. 32). Hence the need for students to be closely involved in key decisions about learning processes and protocols for participation in AOD.

The notion that all learners are active participants is central to social constructivism, which is the view of learning underpinning AOD in much of the literature. This emphasises interaction, communication, collaboration and community (Hammond, 2005). According to this perspective, the knowledge constructed by learners is socially, not just individually, constructed (Vygotsky, 1978), and the role of language and communication during learning is highlighted. A key tenet of Vygotskian social constructivism is the Zone of Proximal Development (ZPD). This concept can be linked with Bruner's (1990) concept of scaffolding, and Rogoff's (1990) apprenticeship or guided participation. Together, these provide a helpful way of looking at interaction within AOD.

Vygotsky (1978) defined ZPD as the distance between the level of independent problem-solving and the level of potential development when the learner is guided by a teacher or peers. There is evidence of ZPD in action within AOD when students work collaboratively to promote their learning; for example, during an online discussion when a problem is set in the form of a discussion topic. In such a scenario, students work through the problem, collaborating to identify sub-problems and suggesting solutions. Throughout such a discussion, cognitive processes become more explicit as students brainstorm ideas and strategies, building on each other's ideas. During this process teachers intervene to provoke thinking and meaning making. As a result of scaffolding within this context, the problems that students can cope with independently compared with that which can be accomplished with guidance or collaboration represent the zone of proximal development in action. As students increase their knowledge and skills through this social interaction, scaffolding and problem-solving, their ZPD alters.

Through careful structuring of discussion problems, teachers apprentice students through the use of authentic learning experiences and timely exposure to specific cultural practices (Bonk & King, 1998). In an online discussion, such cultural practices include the genre of language used, netiquette practices and visual tools like emoticons. Students' development and learning thus occurs through well-designed, guided participation in the social activity of the discussion (Rogoff, 1990). Together, students support and stretch each others' understanding of, and skill in using, these tools of culture. As Rogoff (1990) points out, the social interactions students engage in provide guidance, support, direction, challenge and impetus for development while being carefully facilitated.

Study context

Conducted in an initial teacher education context across two semesters in one year, this study examined the negotiation of discussion guidelines by two consecutive classes. Both classes were online electives (optional papers) within the Bachelor of Teaching degree programme, catering mainly for students studying to become primary teachers. The Semester A class had 40 students enrolled, with 28 students in the Semester B class.

The initial discussion guidelines were distilled from my doctoral studies (Forbes, 2012), [eBook format: hyperlink to initial discussion guidelines and to my thesis in Waikato Research Commons], which involved an ethno-phenomenographic study of participants' experiences and perspectives with AOD. Based upon focus groups and interviews with students and staff participants, I constructed the guidelines. These were subject to member-checking during the data generation phase of the thesis, and were shared with the wider university community. A key understanding and caveat, however, is that no single set of guidelines is definitive and suitable to every group and context. The intention is that each class have input into tailoring discussion guidelines to their learning needs. With this in mind, I introduced the initial discussion guidelines to a Semester A class and negotiated amendments with students during the course of the semester in order to derive a revised set of guidelines as a community resource. The revised guidelines became the class legacy and in turn were presented to the subsequent class (Semester B) as initial discussion guidelines, so that there was further evidence of the value to students. The Semester B class provided a check on the emerging findings from the Semester A students' discussions and feedback. This in turn enabled the operation of the ZPD to be evaluated.

Objectives

Having derived a set of initial guidelines for AOD in initial teacher education, the intention was to involve students in testing and renegotiating new guidelines to pass on as a legacy to fellow learners. The objectives of this study were to:

- Work with students in each of my classes to establish shared understandings and explicit expectations, formulating the guidelines for discussion in association with the students.
- Ensure that guidelines stipulate netiquette and lay a foundation for respectful and responsive communication.
- Ensure that guidelines take into account suggestions from students in previous cohorts.

- Strive to make the tacit explicit so that the work of teaching and discussion is demystified as far as possible, and students are involved in decision-making.

Methodology and research design

The research sits within a qualitative interpretive paradigm, aligned with a constructivist ontological and epistemological standpoint, where realities are local, specific, social and experiential and where knowledge is situated (Punch, 2009).

As mentioned, my doctoral research (Forbes, 2012) involved a series of focus groups and semi-structured interviews with students and staff, leading to an initial set of AOD guidelines based upon participant perspectives. In the current study, these initial guidelines (refer to Appendix 2) were proposed as a starting point for students in a Semester A online class to consider, trial, critique and revise. Students were asked: How helpful are these? What should we change? They were prompted to think about the purpose, expectations, assessment and suggestions relating to AOD. A discussion forum was established in Moodle for the purpose of inviting student comment and suggestions for change. Unlike the regular coursework discussions, the forum for negotiating discussion guidelines allowed students to post without their username appearing in the discussion, affording a degree of anonymity. Students were invited to propose changes, to argue, present counter-arguments, reformulate proposals, and to either reach a consensus via discussion or to vote on proposed changes to the AOD guidelines. Based upon this process, a second version of the AOD guidelines was produced, followed by the opportunity for a further revision towards the end of the semester. The latter effectively became the class legacy and was then proposed to the next class (Semester B) as a set of initial AOD guidelines, whereupon the process was repeated.

Each class was also asked to evaluate their participation in the process of negotiating discussion guidelines via an anonymous feedback tool in Moodle: How helpful were the initial discussion guidelines? Which changes did you suggest? How useful or otherwise was this process? How might the negotiation of guidelines be improved? Similar questions were also asked in the anonymous paper appraisals at the end of semester. The study received ethical approval at university level and students participated on a voluntary basis.

Findings: Student suggestions

Semester A: Accuracy and responsiveness

Student suggestions in Semester A highlighted two themes related to 1. Accuracy and length of postings in discussion, and 2. Responsiveness to discussion and to other participants. Each of these themes is illustrated and discussed below.

1. Accuracy and posting length

Semester A students highlighted a preference for correct punctuation, grammar and spelling in discussion posts. For example, the first student commented:

> *I would like to propose that a guideline be added asking that capital letters and correct grammar be used in all posts.*

Subsequently, other students entered the negotiation forum to express agreement with the initial proposal, adding rationale and making links to the professional/classroom context. For example:

> *I agree we need to get in the habit of using correct spelling and grammar, we are soon going to be teachers ourselves, we need to set an example and not be lazy.*

> *It really all boils down to the same thing—if you were in the classroom you would not use slang to answer a question. So I propose that appropriate language and correct grammar be used. So: Language and grammar appropriate to the classroom setting?*

In addition to these fresh suggestions about the accuracy of postings, students also affirmed the existing guideline related to the length of posts, and reinforced the need for peers to adhere to the 150 word maximum limit for contributions.

> *I would like to see discussion lengths kept to the 150 word target*

It is an interesting pattern that the Semester A class insisted on accuracy in postings, asserting the need for peers to check spelling, grammar and other written features. In doing so, the class set out to clarify expectations pertaining to the language of AOD. The hybrid character of this language has created much confusion and debate as literature characterises the language of AOD as neither spoken nor written but somewhere in between, like "say-writing" (Wegerif, 1998, p. 40) or "written talk" (Locke & Daly, 2007, p. 122). To be sure, this is a frequently mentioned point with respect to the language of AOD (e.g., Collis & Moonen, 2007; Locke & Daly, 2007). AOD has some of the informality of speech even though it is objectively typewritten text. Nevertheless, in most cases, the language of AOD is less formal than an essay or professional written communication (Collis & Moonen, 2007), and is characterised by Wegerif (1998) as "a casual and spoken style using the written medium" (p. 40). That the linguistic style of AOD is neither oral nor written, while reflecting aspects of both, has led some commentators to suggest that the language of AOD constitutes a new genre with its own unique form and function or purpose: a cybergenre (Bregman & Haythornthwaite, 2003). This is not to imply that all cybergenres are uniform, since the language of synchronous chat ("netspeak", Thurlow, Lengel, & Tomic, 2004) or that of social networking ("netlingo"', Thurlow et al., 2004) also differs markedly from AOD in an academic and professional context. This is the point made by the students in the Semester A class, as they reinforced the need for accurate written language, congruent with their emerging identities as teachers.

What is important here is that the expectations are clear and that participants understand how to communicate using the (negotiated) language of AOD, in order to make best use of the discussion for learning and teaching. A *relational* view of AOD looks to the ways human participants can act to enrich their online communication (Kehrwald, 2008). Participants have to figure out the language in order to express themselves and work effectively with others, a process that Pegrum (2009) refers to as "participatory literacy" (p. 38), knowing how to contribute. In this context, part of the effect is to enculturate student teachers into the teaching profession, since peer pressure in relation to language

reinforces the expectation that teachers are able to write and spell accurately, and this is part of the professional identity teacher education students aspire to (Ellsworth, 1997).

In addition, the students in this study (Semester A) reinforced the guidelines relating to brevity, allowing space for other voices. A succinct response is less dominant in the conversational space of the forum, allowing room for others' interpretations of the topic and inviting others' responses in turn. The literature occasionally makes mention of brevity as part of netiquette (e.g., Lehman & Conciecao, 2010), and Wegerif (1998) provides useful insight into the reluctance of participants to follow lengthy messages, since a long and carefully prepared posting invites a similarly crafted and considered response, which can discourage respondents due to time constraints.

2. Responsiveness – to topic and flow, to others by name

Students commented on the need to respond to other postings and participants in each discussion. For example:

> *I would like the guidelines to include a reminder at the beginning of each discussion for all participants to read the post above or the one above that and comment on it so as not to feel ignored. Sometimes in discussions you feel totally invisible!!!*

The need to acknowledge others was therefore a key theme, along with the need to relate postings carefully to the discussion topic:

> *Extending the response to be more specific to the thread and topic could maybe work as some people just come on and chuck something in as it is compulsory instead of acknowledging the people above them as you would in a classroom setting. Perhaps reminding them of the 'virtual classroom' would make it better understood.*

As the comment above suggests, students again expressed mindfulness of discussion behaviours appropriate to a classroom context, just as they did with the theme of accuracy.

> *... tricky to resolve but I think it [the guideline] should stop people just coming in and answering your first question even when we may have moved on, if you're too slow and it's moved on I think unless you have a real issue you need to move on too, if this was a classroom debate and you weren't there, you missed it!*

The students therefore emphasised the need to ensure contributions were relevant to the discussion topic and flow, and responsive to peers, avoiding ignoring or repeating prior comments. A response provides feedback to the student who uttered the original comment. In this way, responsiveness is key to formative interaction in AOD. In AOD, participants receive feedback when another person responds to their contribution within the discussion, and particularly when the response serves to affirm, challenge or build on the earlier posting.

Responsiveness as a characteristic occurred when students explicitly acknowledged, connected and built on previous utterances rather than ignoring or repeating them. This is in keeping

with the recognition within the literature that posting messages does not equate with discussion, and that a direct reference to previous comments is needed to sustain community (Brookfield & Preskill, 2005; Dennen & Wieland, 2007; Kehrwald, 2008). Indeed, in Markel's (2001) view, the online response is social currency, or in Yates' (1996) terms, the online equivalent to "gaining the floor" (p. 208). Without a response, participants can feel excluded, inadequate and as if they are speaking into a vacuum (Murphy & Coleman, 2004). In effect, the response signals listening, which is a sign of respect, regard, and an incentive to continue to contribute to the discussion and in turn to the community.

Part of responsiveness is the practice of addressing others by name when responding. This direct social acknowledgement communicates social presence by personalising the interaction, signalling active listening. The importance of personal acknowledgement as part of the relational character of communication is reinforced by Dennen and Wieland (2007) and Lehman and Conceicao (2010) among others. Care must be taken, however, to ensure that personalisation doesn't lead to excluding others by not using names in a specific exchanges. Exclusion can be avoided by acknowledging more than one class member in a single message, weaving and synthesising ideas, and concluding a message with a message inviting the wider group to respond.

These findings challenge the work of some studies defending students' rights to read discussions without contributing actively (e.g. Gulati, 2008; Seddon, Postlethwaite, & Lee, 2010). On the other hand, other literature reinforces the kinds of mutual obligations that hold community together due to generalised reciprocity. This is where students respond to others in the expectation that someone in the group will respond in turn (e.g., Hew, Cheung, & Ng, 2010). Beyond this, Brookfield and Preskill (2005) suggest that students and teachers share responsibility for the group's learning, so that students are more likely to regard their contributions as important to the group as a whole. Sharing the teaching is worthy of cultivating, particularly in teacher education, where student teachers can practise teaching, leading and moving toward their role as teachers. This can occur via active participation in AOD, and involvement in negotiating guidelines and generating a legacy for a future class.

Student evaluations from the Semester A class indicated that the students found the initial guidelines helpful and easy to understand and follow. The emphases on word length of postings, and use of correct spelling and grammar were affirmed. With regard to the negotiation process, one student commented: "It helped us to feel that we had a voice an opinion and that our thoughts mattered" (A, anonymous feedback tool).

In a similar vein, the course appraisals for the Semester A class indicated that students regarded the guidelines as "helpful", "fair", "reasonable", "easy to follow", "informative and valuable as a check list". Each of these descriptors was used within student appraisal comments.

The guidelines were regarded as useful, flexible and fair by the students who completed the appraisal (58% completion rate).

> *The discussion guidelines were extremely useful as a way to not only assess my own learning, but to make sure I was meeting the requirements in discussion.*
>
> *Excellent guidelines. Love how we had the ability to adjust and re-evaluate them ourselves.*

The discussion guidelines are fair and they take into consideration students role in communication with others.

I like that [we had] the opportunity to make changes to the discussion guidelines, although I thought they were fine to begin with, some minor changes were highlighted that I personally found enhanced the discussions.

Incorporating student suggestions: Generating a legacy

In response to the suggestions made by students in Semester A, revisions to the discussion guidelines included reminders to:

- check punctuation, grammar and spelling is accurate and appropriate to our classroom
- respond to others in the discussion, building on ideas. Aim to ensure that others are acknowledged directly
- connect with the topic and thread of the discussion. Either follow and extend the thread, or introduce a new direction. In either case, alter the title/subject of your contribution accordingly.

These amendments represent the legacy of the Semester A class, to be passed forward to the subsequent class in Semester B.

Semester B: Respect

In the following semester, the next class started with Semester A's legacy presented as initial discussion guidelines. This time around, students again affirmed the initial discussion guidelines, emphasising particular aspects that particularly resonated with them, and suggesting adjustments. Key issues raised by students here included the need for respect and openness, where dissonance is invited and professionalism is valued. For example, the first student entering the forum commented:

Looking at the discussion guidelines it appears that nearly all eventualities relating to online dialogue have been pretty well covered. One thing that comes to mind (which is covered in the guidelines) is about taking things personally, which can happen so easily when you are not face to face with a protagonist. With this in mind I think that possibly there should be reiteration about safety in the online environment, especially relating to respecting others points of views even when not necessarily agreeing with them. Justification of your response in this situation becomes crucial to backing up your stance—but justification that is backed by professional discourse. Has anyone got any other thoughts that they might like to add or modify this idea?

This opening comment was met with agreement from peers and a consensus that part of tact and diplomacy is not only what is said but also how it is said, leading to further discussion of the use of

emoticons and signals to the group when one is playing devil's advocate. For example, students commented:

> *I think it all depends on a student's maturity when you are presented with points of view that are different than your own. The guidelines say, 'It is easy to misinterpret tone and intention online. Use emoticons purposefully in order to soften and convey a constructive mood.' I think this might be a solution for a lot of misunderstandings and hurt feelings. We are only human after all.*
>
> *It is good personal practice to be 'prepared to shift' otherwise you are not learning alongside your fellow students and not growing personally as a student and educator.*
>
> *We should be allowed to challenge and critique but I don't think that it should be done in a way that causes another person to feel that their opinion is any less. Everyone is entitled to an opinion. By having a differing one you do not have to belittle the person whose views you disagree with. As above, we need to maintain respectful communication.*
>
> *I've had people disagree with me who are merely stating their own opinions. This does not offend me. However, when people go out of their way to make it personal, it makes for a very uncomfortable and unhappy learning environment for everyone.*
>
> *I love reading our discussions as they show so many varied opinions and thoughts, and often give me a better insight into a particular topic or concept. I think that we are all capable of acknowledging someone's opinion, just as we would if we were face to face, and as someone has said previously, we do not need to belittle them if our opinion differs. We need to remember that this online discussion is just like face-to-face, so remembering people have feelings is always a good idea! I find that it is awesome when heaps of different opinions shine through, as it allows me to question my opinion and see it from other people's point of view.*

At a later stage, students re-examined the theme of responsiveness in discussion, this time raising issues around equity and inclusion. One student initiated a thread entitled "moving out of social clicks [*sic*]", with the following contribution:

> *I have noticed that sometimes people only respond to those they know through sub-groups they have formed through various social connections. I would like to propose that students make attempts to respond more often to different people outside of their social clicks and become more inclusive of everyone in their groups, especially those who are not universally connected with a particular*

degree. This would make others feel like their thoughts have been considered and valued and would perhaps boost participation in the discussions and make them more robust.

This opening comment sparked further consideration among peers, who communicated concern for respectful, responsive discussion that is open and inclusive:

I agree with this. Even as someone who is completing their degree alongside many of the others in the group I also have felt (and seen) exclusiveness in the discussions. I'm not sure how this could be avoided however as you can't make someone comment on another's post without valid reason.

Everyone should feel that their contributions have been valued! Perhaps people could try to respond to two different people in every discussion for their two postings per week? This would probably affect the flow of the discussions though.

I agree with this too, I have experienced this as well. It saddens me that people choose to ignore some people's discussions even if the person mentioned his/her name. I think it boils down to etiquette.

The two guidelines that are most relevant to this would be: - Do not post without firstly reading what others have said. This is often perceived as ignorant and disrespectful - Respond to others in the discussion, building on ideas. Aim to ensure that others are acknowledged directly possibly, the second one is the most important and could be altered somehow to state that 'you should attempt to respond to a different person in each contribution, acknowledging their thoughts and opinions'.

Again, the class in Semester B evaluated the initial discussion guidelines as "very helpful", and valued the opportunity to modify these along the way.

Incorporating student suggestions: Generating a legacy

In response to the suggestions made by students in Semester A, revisions to the discussion guidelines included reminders to:

- Be professional. Communicate respectfully. Demonstrate your understanding of cybersafety, netiquette and the underpinning rationale for our discussion. Respect alternative viewpoints, keep an open mind, and be prepared for challenge and change.
- Attempt to respond to different people throughout the discussion so as to be inclusive.

In turn, these amendments became part of the guidelines for the subsequent class in the following year.

In summary, key themes emerging from the students' negotiation of discussion guidelines are the desire for discussion postings to be accurate and succinct, and for AOD to be responsive, inclusive and fundamentally respectful. While at first glance the Semester A concerns about accuracy and length of postings may appear to be focused on surface features of the written communication, there are deeper meanings to explore. Communicating accurately means presenting one's thinking in a careful and professional manner. Keeping posts short entails a thoughtful approach to content, with due consideration of one's audience. Rather than posting a monologue, shorter posts invite a response from others, by leaving space for further comment. As such, the themes coalesce around the notion of respectful and responsive communication. These insights constitute the legacy of learning in this study.

Conclusion

This small study's (n=68) findings suggest that students can contribute to their own learning, that of their peers, and those who follow later through negotiating protocols for online discussion. Technology enables ongoing participation while also allowing students to abstain or withdraw by choice and with a degree of anonymity. Benefits to students include the privilege of choice, empowerment and insight into pedagogical processes. For staff, the process of negotiation enables both continuity and fresh input since one semester informs the next but every class takes a different approach.

Challenges revolve around student engagement since not all students choose to participate. A further issue is how central or peripheral the negotiation of a community resource is to the class and coursework at hand. In this study, as a research activity, the negotiations were separated from assessment and course-related requirements. Arguably, however, in order to encourage and give credit for participation in negotiation, a closer connection with coursework was needed.

In terms of digital smarts, it is sensible to promote effective use of AOD as an accessible means of engaging students in dialogue and deep learning. It is smart to negotiate expectations with respect to language and ways of relating in order to determine the space of difference or how participants in AOD may be talking past each other. Where expectations are unclear, the space between participants is arguably akin to a *void*, characterised by persistent misunderstanding. However, where the expectations are disclosed, negotiated and shared, the space might be converted to a *zone* (for proximal development; Vygotsky, 1978), a pedagogical space, promoting growth in understanding (Ellsworth, 1997). For teacher education students, insight into pedagogical reasoning constitutes key learning, and the opportunity to contribute to others' learning is an authentic challenge.

I acknowledge the small-scale, situated nature of this study involving two classes in a single year within one teacher education programme in one university. Recommendations made by these participants, and how they view discussion, are not directly generalisable to other cohorts or populations. All of the knowledge is partial, provisional and open to revision in new contexts. Nevertheless, the suggestions made here raise questions for others, in terms of the extent to which these findings might have wider application. This is open for testing, and these findings might be

regarded as a 'letter from online successors' (Brookfield & Preskill, 2005), or as footprints picking out a pathway for others to find as they make their own way through AOD (Salmon, 2002). Future research can replicate this approach with diverse groups of students and teachers to negotiate the function and form of AOD with these groups.

In conclusion, this chapter affirms the value of AOD as a tutorial opportunity and a chance for students to build knowledge and understandings collaboratively. AOD is one area of online learning where it is smart to generate protocols for working together. This process involves drawing upon past experience, negotiating and trialling guidelines, then engaging in evaluation and reflection in order to regenerate new iterations. When articulated for others, the guidelines become legacies *of* learning: a summation of lessons from experience. As the guidelines are shared and used to inform new learning for peers, they become legacies *for* learning: generative of new possibilities.

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Appendices

1. **Initial Discussion Guidelines, Semester A**
2. **Legacy: Revised Discussion Guidelines**

1. Initial Discussion Guidelines, Semester A

Why we have discussion:

In effect, online discussion is parallel to lectures and tutorial sessions on campus. There are three levels of justification for the requirement that you engage in discussion as part of this class.

1. At the individual level, students should engage in discussion in order to learn from and with their peers and lecturers. Ideally, discussion should involve testing out ideas, sharing and building on other peoples' thinking, and gaining feedback and challenge from others' responses to our own thinking. There is very rarely ONE answer to any worthwhile question. Instead, this is about thinking of a higher order, where multiple answers and perspectives are possible.

2. At the community level, firstly students have a responsibility to each other to join a learning community and to learn together, supporting others' learning as well as their own. This is part of teacher education and is very good preparation for becoming a teacher. Students should contribute to online discussion so that they don't let their group members down, and so that comments aren't ignored; and so that help is found when needed.

3. At the wider community level, future teachers must be prepared for teaching in the classroom/school, and for meeting the needs of the children you will work with. Discussion is one element in this preparation, and participation in discussion with colleagues (whether face-to-face or online) should expose future teachers to a range of thinking, perspectives, theory and issues. If students do not engage with this thinking, they may be less prepared for teaching, and less prepared for the professional discussions that will be ongoing throughout your careers.

What you are expected to do in discussion:

- contribute to every discussion, at least twice
- keep each contribution to around150 words max, as a guide
- write in clear paragraphs, for ease of reading
- connect with the discussion theme, and respond to others in the discussion, building on ideas
- share personal experience and perspectives of relevance to the discussion
- use the discussion to clarify understanding, and to engage critically and deeply with the theme, theory and issues
- aim to keep the discussion moving forward

In relation to readings, these should be completed regularly in order to construct familiarity with theory and diverse perspectives. When you refer to readings, you should avoid lengthy direct quotes in discussion. Instead, discuss readings by paraphrasing the key ideas and applying your own thinking to these. When directly using readings in discussion, it is not necessary to use full APA referencing if the reading is known to the class (e.g. it is from the book of readings). In this case it is

fine to use the author's name only. However, if using an original source, that others may be unacquainted with, a full reference should be provided to enable others to track down and follow up the reading if they want to.

What you should avoid doing:

- Please do not avoid discussion, or post once and then disappear. These approaches breach the intent of discussion, indicate lack of regard for our class community and fall short of minimum attendance and participation requirements for this paper
- Similarly, do not double-post (2 consecutive posts, or posts very close together). While this may be necessary when 'life gets in the way', it is not ideal and if everyone did this, there would be no discussion occurring throughout the week, limiting the chances for reflection and response within our community
- Do not post lengthy contributions. Research suggests that your fellow students will not read your posts if they are too long
- Do not post without firstly reading what others have said. This is often perceived as ignorant and disrespectful
- Do not fixate on the personal. Although valued, it is a starting point. Your experiences are one set of possible experiences, and the goal is to begin with these as a starting point while looking more widely beyond the past or here and now
- Do not play it safe, agreeing with all and sundry. This is dull, unimaginative, and does not assist in moving the discussion along. If you agree, say why and justify why your agreement matters
- Please do not take things personally. Don't be quick to take offence, but rather give others the benefit of the doubt. Remember that:
- others may be playing "devil's advocate" and proposing an extreme view in order to prompt thinking, and raise alternative perspectives;
- it is easy to misinterpret tone and intention online. Use emoticons purposefully in order to soften and convey a constructive mood J

What to expect from your lecturers in our online discussions:

Lecturers aim to join in each discussion, meeting similar expectations to the students. In short, we aim to:

- Be there
- Be brief
- Respond
- Share our own stories
- Promote deep and critical thinking (at times, we will play 'Devil's Advocate' in order to probe differing viewpoints)
- Keep the fires burning

Feedback on discussion will be given within the discussion, formatively, so look out for lecturer comments on how the discussion is progressing.

2. Legacy: Revised Discussion Guidelines

Why we have discussion:
In effect, online discussion is parallel to lectures and tutorial sessions on campus.

There are three levels of justification for the requirement that you engage in discussion as part of this class.

1. At the individual level, students should engage in discussion in order to learn from and with their peers and lecturers. Ideally, discussion should involve testing out ideas, sharing and building on other peoples' thinking, and gaining feedback and challenge from others' responses to our own thinking. There is very rarely ONE answer to any worthwhile question. Instead, this is about thinking of a higher order, where multiple answers and perspectives are possible.

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What you are expected to do in discussion:

- Contribute to every discussion, at least twice
- Keep each contribution to around 150 words max, as a guide
- Write in clear paragraphs, for ease of reading
- Check punctuation, grammar and spelling is accurate and appropriate to our classroom
- Respond to others in the discussion, building on ideas. Aim to ensure that others are acknowledged directly. Attempt to respond to different people throughout the discussion so as to be inclusive
- Connect with the topic and thread of the discussion. Either follow and extend the thread, or introduce a new direction. In either case, alter the title/subject of your contribution accordingly
- Share personal experience and perspectives of relevance to the discussion
- Use the discussion to clarify understanding, and to engage critically and deeply with the theme, theory and issues

- Be professional. Communicate respectfully. Demonstrate your understanding of cybersafety, netiquette and the underpinning rationale for our discussion. Respect alternative viewpoints, keep an open mind, and be prepared for challenge and change
- Aim to keep the discussion moving forward

In relation to readings, these should be completed regularly in order to construct familiarity with theory and diverse perspectives. When you refer to readings, you should avoid lengthy direct quotes in discussion. Instead, discuss readings by paraphrasing the key ideas and applying your own thinking to these. When directly using readings in discussion, it is not necessary to use full APA referencing if the reading is known to the class (e.g. it is from the book of readings). In this case it is fine to use the author's name only. However, if using an original source, that others may be unacquainted with, a full reference should be provided to enable others to track down and follow up the reading if they want to.

What you should avoid doing:

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- Do not post lengthy contributions. Research suggests that your fellow students will not read your posts if they are too long
- Do not post without firstly reading what others have said. This is often perceived as ignorant and disrespectful
- Similarly, do not exclude others by responding to the same individuals every time you post
- Do not fixate on the personal. Although valued, it is a starting point. Your experiences are one set of possible experiences, and the goal is to begin with these as a starting point while looking more widely beyond the past or here and now
- Do not play it safe, agreeing with all and sundry. This is dull, unimaginative, and does not assist in moving the discussion along. If you agree, say why and justify why your agreement matters
- Please do not take things personally. Don't be quick to take offence, but rather give others the benefit of the doubt. Remember that:

  a.) others may be playing "devil's advocate" and proposing an extreme view in order to prompt thinking, and raise alternative perspectives;

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- Keep the fires burning

Feedback on discussion will be given within the discussion, formatively, so look out for lecturer comments on how the discussion is progressing.

Chapter 6: Developing digital smarts in initial teacher education: What motivates new teachers to continue using digital technologies for learning?

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Abstract

The *New Zealand Curriculum,* the overarching curriculum document for both primary and secondary education, enshrines an expectation that teachers engage in Teaching as Inquiry. This is seen as linking to both evidence-informed practice and evolving pedagogical content knowledge. In a rapidly developing, complex mobile digital education, the need for teachers to constantly evolve their technological pedagogical content knowledge is pressing. In initial teacher education (ITE), one challenge is how teacher educators support ITE students' development of evidence-informed reflective practices with digital technologies to match their content knowledge. For ITE students, this is heightened because they are growing their pedagogical knowledge concurrently with learning to incorporate digital technologies in lessons, mostly for the first time. ITE students are in the position of working out how to appropriate unfamiliar digital affordances and devices for learning in unfamiliar classrooms of students, in unfamiliar schools, and sometimes teaching unfamiliar content.

The focus of this chapter is, through a qualitative, thematically analysed study of 74 ITE students, an examination of their efforts in this regard via online postings about their practicum experiences as they experimented with digital technologies in secondary school classrooms. The key question for the study was *What do secondary graduate ITE students come to value regarding using digital technologies in learning contexts?* Findings showed these students creatively applied digital technologies to learning contexts, while adapting to differences among schools and their technological constraints or affordances. Findings also suggest that continuance theory can help understand ITE students' decisions about what prompts them to continue using digital technologies for learning, and how continuance theory links to agency, structures and cultural practices.

Keywords: continuance theory, initial teacher education, digital technologies, ICT, pedagogy, learning, digital smarts

Introduction

The potential for digital technologies to support the kind of learning promoted in the *New Zealand Curriculum* (Ministry of Education, 2007) is of interest to teacher education in this country, and

resonates with efforts in other countries where e-learning opportunities are also developing rapidly. This is particularly relevant in preparing teachers for the secondary school sector, where content rather than process has often taken precedence, often resulting in many instances of teacher-centric and student-passive classroom instruction and practices. Also, while there is considerable hype about digital technologies transforming learning, the reality is sometimes quite different. Yapp (2014), for example, summarises the hyperbole around educational silver bullets when he says:

> Every few years there is a claim made that technology X will 'transform' education such as whiteboards, the WWW, podcasts, tablets, VLEs, mobiles and now MOOCs. Indeed claims on technology and its transformational potential can be found around TV, film, radio and other media for over 100 years. (para. 4)

Essentially, he argues that such determinism has consistently overtaken good sense. Sometimes, the hype around the technology completely ignores the purpose of education, which is to teach young people how to think, get on with others, understand how to behave ethically and morally, continue to learn throughout their lives and contribute to the fabric of the society they live in. A digital technology of itself cannot provide this—a point also raised by Khoo and Merry's chapter in this book. Teachers and other significant others, including parents, continue to have a role to play in fostering these kinds of knowledges. The opportunity digital technologies offers is that they open up access to knowledge and information previously not readily available to all. Harnessing this potential is critical for learners who have grown up with ubiquitous access.

And, as Mayes and de Freitas (2013) urge, "there is no escaping the need to adopt a theory of learning" (p. 18) for good pedagogical design. This need is greater than it has been in the past, since digital technologies are changing the face of what it means to have both access to knowledge and information, and have the potential to alter the dynamic of teacher-centric and student-passive classroom practices. There is a trend in what happens when learners, instead of the teacher, use technologies for learning (see for example Wright, 2010a). In 2010a, I noted the trend away from teacher-centric to co-constructive behaviours in classrooms where students were able to use a digital tool/resource. Such alterations of the pedagogical dynamic appeared to occur whether or not it was deliberately designed for. In some cases, the research pointed to a degree of surprise on behalf of the teacher that learners took such a keen interest in helping each other, sharing expertise and taking the learning beyond the lesson. This suggests that harnessing that dynamic by deliberately structuring learning to take advantage of it is increasingly important.

One small New Zealand study I was involved in evaluated a pilot project in which secondary school students were using their own mobile devices to learn with (Wright, 2010b). Through interviewing close to 30 students across three classes, I discovered that these learners were more likely to share content when it was stored on their mobile devices; review it and learn from it; and show their parents. This parental sharing (see also Khoo and Merry's chapter as well as Archard and Archard's—both in early childhood settings) happened much more frequently than if students used traditional exercise books for their work. These learners were also keen to extend using their devices in other subjects. They wanted to be able to review classwork and instruction outside of class time, seamlessly blurring their learning spaces and places. This study's findings suggest shifts in learning practices

provided much more agency for learners than had been previously available and positively influenced students' relationships with their teachers.

This shift links to Pachler, Cook, and Bachmair's (2010) argument that young people exercise considerable levels of agency in their private lives when they use digital tools, so it would seem sensible to bridge this gap with their school practices. This extends Prensky's (2001) descriptive distinctions between the behaviours of digital natives and digital immigrants. In other words, for those born into the digital environment, it is natural to have at one's disposal a digital tool linked to the Internet. It is also natural and usual to to be unafraid of it. However much the metaphor has been misunderstood since it was first described (Prensky, 2011), it still marks a certain distinction between what is natural and comfortable for some, and possibly unnatural and irksome for others. Powering down at the school gate is no longer tenable, and so teachers need to understand what learning can be like for students who are already powered up and, functionally at least, digitally smart. As Thomas asserts,

> The information age has made sophisticated information seeking skills *more* needed by students not less. Prudent information seeking will be mandatory in the twenty-first century, not an optional extra or something relegated to a 'smart' tool or an 'expert' system. (Thomas, 2011, p. 121 of 216)

It would appear, then, that now is the time to address the issue of 'power down' (Prensky, 2001, p. 3). Pachler et al. (2010), for example, describe people leading digital lives in terms of cultural appropriation and structures. Agency relates to the degree to which the user takes charge of the technology and how it is used. Cultural appropriation links to the ways in which users adapt digital technologies to their purposes and practices, perhaps even using a tool in ways not envisioned by the makers, while structures relate to the mechanisms which either help or hinder the practice of agency and cultural appropriation. Schools can also be a help or a hindrance, and Pachler et al (2010) describe the multiplicity of forces acting in and on schools as an 'educational complex', a term designed to indicate something of the myriad tensions, contradictions and complications at play. The integration of ICT tools and affordances for learning within and across schools is part of this complexity and complication.

In education contexts, the role of teachers in structures, agency and cultural practices can also be understood in terms of where their own knowledge and practices are positioned, particularly in relation to their technological, pedagogical and content knowledge. This can be understood as their TPACK status. TPACK arose through Mishra and Koehler (2006) extending Shulman's (1987) PCK (pedagogical content knowledge) framework after examining the disjuncture between PCK and teachers' capabilities with new technologies. In turn, this extends Schon's (1983) view of reflection as a professional development activity. Mishra and Koehler (2006) argued that professional development about using technologies in education had traditionally separated learning about these technologies from teachers' professional contexts. Overall, this professional development consequently failed to translate to educational practices in the classroom that integrated these technologies. The TPACK model argues that teachers' professional skill and knowledge development in terms of proficiently using digital tools is most likely to succeed long term when sited close to their classroom practices. The focus on how these tools can be used in subject, topic, and class-specific ways thus has greater meaning for teachers if they can experiment with their existing practices and insert new ones to

achieve the same learning ends. Classroom practices then become the site of both experimentation and a deliberate reflection on evidence gathered and generated about that practice.

The *New Zealand Curriculum* (Ministry of Education, 2007) suggests that teachers operate most thoughtfully and deliberately when they engage in reflective practices, suggesting it can be fostered through using Teaching as Inquiry as an evidence-informed, robust process. For the purposes of this study, the curriculum document model has been stripped and simplified to better reflect what was possible to achieve in single lessons by novice teachers (the diagram of this stripped model is included under the heading Research Design below). This model is a framework for examining what is done in one's own classroom in order to understand the evidence of the designed/intended and actual practices. In turn, the analysis of, plus reflection on, the evidence informs the design of subsequent learning steps and lesson design, thus developing a spiral of personal professional development about targeted learning. Risk-taking is implied in this: since digital tools change so quickly, it is common for teachers to be using a digital tool for the first time or applying it to a specific learning purpose for the first time. And since each class of students is different, there is little certainty that specific outcomes or intentions that teachers design for will necessarily eventuate. This is why an inquiry process can be so helpful—both teachers and students can contribute to knowledge about how well the resource or affordance suits the learning purpose and the learners. This helps all involved to have an agentic stake in this process.

Teaching as Inquiry is thus a useful framework for teachers to investigate their own practices. This is because Teaching as Inquiry as a process of investigation is flexible and adaptable to circumstance, context, purpose and topic. It can help investigate questions such as, How can teachers be digitally smart? What motivates some teachers to use digital tools for learning purposes, and continue to use them?

Investigating the continued use of digital technologies in classrooms is an under-researched topic. Many articles from 2004-2009, for example, describe initial use of a technological tool/resource. This indicates the newness of the field. And, as I have argued (Wright, 2010b), initial use can mask the Hawthorne Effect at work. In other words, by using something new, the novelty changes how participants respond. It may mean that there is more willingness to consider its use positively rather than critically, and its novelty can be the drawcard to participation rather than its value to practising critical thinking or deepening conceptual knowledge in some way. Finding a way of understanding continued use is therefore timely. Continuance theory is a possible lens for understanding these questions, especially in relation to reflective practices developed through Teaching as Inquiry processes.

Finally, the term 'digital technologies' is used mostly throughout this chapter, since ICT (information communication technologies) is no longer adequate to describe the explosion of mobile, wifi and web-enabled devices, as well as the opportunities cloud computing offers education.

Continuance theory and education

This theory, first applied to business in relation to the Technology Adoption or Acceptance Model, was an information systems theory initially developed by Davis (1989), who identified two key factors which apparently influence users' decisions about their continued use of a technology. These are:

- *Perceived usefulness*: Davis defined this as the extent to which people think that using a particular technological system enhances their job performance
- *Perceived ease-of-use*: This links to the idea of being relatively effortless or straightforward to accomplish or get used to (Davis, 1989).

Bhattacherjee (2001) later considered this model when examining why bank customers and users kept on using specific online tools for banking. He was interested not just in the adoption of the technology but what led to its continued use. He suggested that while continuance theory is characterised by usefulness and ease as key motivations, it nevertheless did not fully explain continued use of the technology as a phenomenon. Bhattacherjee (2001) argues that the intention to continue using a tool also involved affect. In other words, it linked to a positive emotional response. This was usually a sense of satisfaction, perhaps for a job well done. So in industry terms, satisfaction, ease of use and usefulness can predict someone's continued use of a digital tool to achieve some aspect of work. It is, essentially, about getting the job done well, easily and with less effort than before. In turn, this leads to the user of the tool feeling satisfied about doing a good job.

In education, however, even the addition of affect (that is, the experience of an emotional response like satisfaction) isn't enough, for a teacher is never just using a tool for getting a job done. Teachers most likely expect that a tool or technology will enhance learning; perhaps improve a student's chance for having that light bulb moment when deep understanding makes sense; or when new knowledge is finally linked to existing knowledge or concepts; or perhaps, enjoying the learning process through the medium of the tool/technology.

In these kinds of classrooms, students are encouraged to use a variety of resources or tools that help solve learning problems, complete tasks or understand something that would otherwise remain in the abstract. For example, a science concept might be best understood through a simulated animation. This might be an animation algorithm that students can change the variables of—such as the application of forces or electricity circuits. Or a mathematical time series graph can be manipulated to achieve different results. The consequences of those manipulations can become much more visible to learners via digital technology means than a static image in a textbook or a teacher's diagram or workings on the board. Digital tools might also help in contexts where dissections of real animals are not possible, or for geographical mapping, virtual tours of Antarctica, examining volcanoes (for example, through http://www.sciencelearn.org.nz/Contexts/Volcanoes) or the curation and annotation of selected artefacts for later analysis, such as through scoop.it or Pearltrees). In literature, students could experience a virtual tour through The Globe Theatre, while a reading of a novel could be given depth by providing access to different online resources about the social context of the time. These opportunities are especially important for students who do not live in the same country or time period as the setting of a novel.

This preamble is an orientation to the focus and context of this chapter, which is about examining how continuance theory might apply to an initial teacher education cohort who were required to include some digital technology in some way in a lesson while on practicum. This requirement expected them to design a lesson using a purposefully selected digital tool inserted in the learning, wrapped inside a Teaching as Inquiry (expanded on below) framework. This framework gave the intervention a deliberate focus through creating a specific question. It led to deliberately designing a means to collect feedback data from the specific group of learners. In turn, the data were

key to the evidence available for reflection and analysis. This process meant the pre-service teachers experienced and learned from evidence-led reflective practice.

How does 'digital smarts' apply?

The theme of this book is to highlight smart use of digital technologies in education, specifically in a tertiary education context, hence the title *Digital Smarts*. While the term can evoke a range of connotations, in this chapter it refers to the kind of creativity that can occur when teachers link digital technologies to learning in classrooms—even in circumstances where the infrastructure and policies within a school mean there are impediments. 'Smart' can also be like being hurt—we 'smart', for example, when we get pricked or cut. So 'smart' is about the slings and arrows of things going technologically awry, as they can do in classrooms. Being digitally smart also refers to the ways digital technologies have, in the contexts described here, engaged and motivated students to produce better quality in their thinking and the products of their work. And, as Thomas (2011) noted, 'smart' can be applied to a tool itself or refer to learners' (whoever these learners are) cultural appropriation and agency when using digital tools. Teachers, therefore, may simultaneously or serially perform a range of these meanings of enacting digital smartness, for teachers are learners too. This links into our efforts to understand what motivates them to persist in designing learning with and through digital technologies.

This extends continuance theory, implicating teachers' conscious pedagogical actions that occur through deliberate acts of teaching based on their reflections on past practices and consequent decisions for future practices. These principles implicate PCK and what it means to be a reflective practitioner, both of which are addressed next.

Pedagogical content knowledge and reflective practice in education

Timperley, Wilson, Barrar and Fung's (2007) best evidence synthesis that centred on teachers' professional learning suggests that professional, reflective, evidence-informed learning is best situated close to teachers' professional contexts. They argued that this proximity to better understanding practice is likely to initiate, prompt, promote and sustain changes. Closely looking at what teachers and their learners do in specific classroom settings is thus an important part of teachers' professional capability.

If this capability is important for teachers on the job, then it is also important for pre-service teachers to develop for the job. These points link directly to the Teaching as Inquiry framework (addressed later), but also suggest the importance of locating new digital practices in classroom settings and examining their impact on learning.

There are strong suggestions in research literature that when digital technologies and resources are available to teachers to use in lessons, pedagogical practices alter, often in positive, student-centred ways (Ainley, Enger, & Searle, 2009; John & Sutherland, 2006; McLoughlin & Lee, 2008; Somekh, 2008; Wright, 2010b). My e-learning literature review, for example (Wright, 2010b), argues that socially oriented pedagogies support positive learner outcomes, and these tend to arise when digital technologies help students fully engage in learning. Through extended and repeated facilitation of putting the digital tools in the hands of their learners, changes to teachers' pedagogical practices are precipitated. Teachers will repeat these practices when they perceive positive benefits to their learners, particularly when learners themselves respond in positive ways. These benefits or

outcomes might include noticing greater learner engagement, motivation, concentration, willingness to take the learning beyond the lesson, a desire to share expertise with peers, and a desire to produce high quality digital assessment artefacts.

When pre-service teachers experiment with digital technologies in their practicum lessons, they too experience similar effects on learners, judging by the evidence of their reported Moodle postings. Documenting those effects is a crucial part of pre-service teachers' development, and an analysis of their reports of their experiences is central to this chapter. Just as Robinson (2003) argues that examining one's own practices is a professional necessity for teachers in New Zealand, initiating pre-service teachers into such practices is a duty of care for pre-service programmes.

Links between reflecting on pedagogy, content and technology resonate strongly with Mishra and Koehler's (2006) TPACK[8] model. This model adds to Shulman's (1987) pedagogical content knowledge (PCK) framework by extending teachers' knowledge in situ (i.e., their classrooms) as they experiment with digital technologies and deliberately and systematically reflect on this practice (Schon, 1983). Teaching as Inquiry helps with this deliberation.

Mishra and Koehler argue, just as Timperley et al. (2007) suggested about sustained professional development, that teachers' sustained, continued technological uptake is likely to occur through guided classroom experimentation, analysis and reflection, since it also enhances their PCK. Their argument resonates with Penuel and Fishman's (2012) view regarding teachers' curriculum and pedagogical thinking in adopting, designing or adapting resources for learning. As Leiff (2009) asserts, "until participants learn a language of practice, their thoughts about perceived needs in education can be constrained" (p. 127), indicating the importance for teachers to research and deliberately reflect on their own practices.

These ideas form the backdrop of this chapter, setting the scene for an analysis of ITE students' reporting on practices regarding their digital experimentations on practicum. They also, as will be shown later, have connections with continuance theory.

Research design

As mentioned earlier, the question under discussion is: *What do secondary graduate ITE students learn and understand about the value of of ICT tools in learning?* Teaching as Inquiry provided the research frame for the ITE students' tasks. This framework arises from an adaptation of the model in the *New Zealand Curriculum* (Ministry of Education, 2007). The adapted model makes it much easier for a teacher to build a question that directly relates to instances of practice which can be undertaken in one or two lessons. For the purposes of the ITE students' task, this adaptation was necessary to avoid unnecessarily complicating the key focus, given they had limited time in which to undertake the task. The diagram is noted below as Fig. 1.

[8] TPACK: Technological, pedagogical and content knowledge

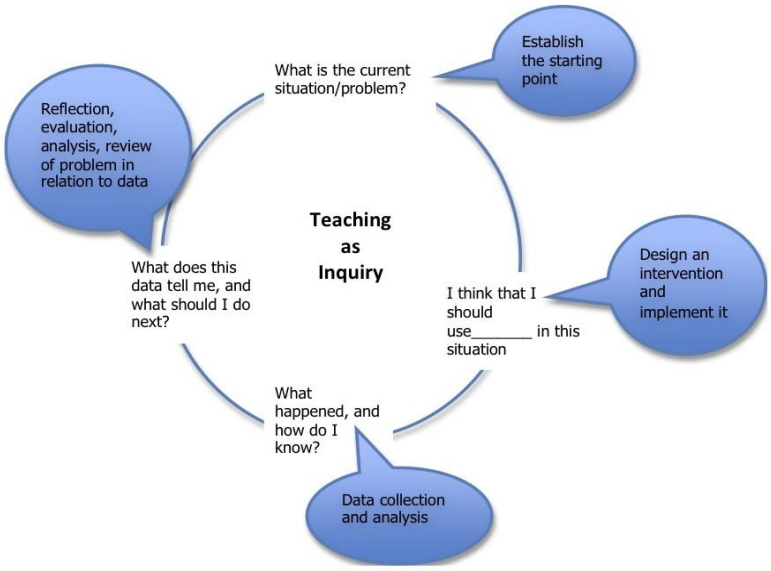

Figure 1: Teaching as Inquiry

While the diagram is shown as a circle, it is intended to *initiate* a spiral of action/research/reflection/action. The ITE students' initial use was mainly of a singular instance in order to practise the process of undertaking an evidence-led self-evaluation of lesson design, learning potential and digital tool use. As long as they addressed all four components and came back to their question in their reported reflections, the pre-service teachers gained experience in a Teaching as Inquiry process that remained true to the spirit of the NZC (Ministry of Education, 2007) model, even if not all of the original component parts were addressed.

Another non-negotiable in the task was to include in their lesson design a method for gathering feedback data from their learners. This ensured they had more than their own observations and assumptions as data in order to post a robust analysis in Moodle, plus it gave them experience in using evidence to inform practice.

And in order to reduce anxiety about the task, the ITE students were provided with hints about what to consider as part of their preparation. These hints included not leaving the task too late in the practicum, keeping good records about the lesson, devising simple ways of documenting their learners' feedback, and providing sample questions to ask their learners. The pre-service teachers were also reminded that it didn't matter if the lesson was successful or not. Instead, what mattered was their ability to analyse what happened, how, and what they made of it in the light of their observations about the lesson coupled with an analysis of their learners' feedback. In order to allow enough distance from the event and their practicum, the due date for completing the postings was two weeks after the practicum ended. The ITE students could, if they chose, post a number of Moodle messages to focus on specific parts of the task, or do it all at once.

Analysis and findings

Analysis

Data analysis took place after the ITE programme had ended, reducing potential ethical issues that could have resulted from the power imbalances of my lecturer/assessor role during the programme. The analysis process consisted of initially categorising data according to tool, subject, year level and purpose within a spreadsheet. This resulted in an easily viewed and manipulable list. By changing sort parameters, various options created different emphases of the data. For example, sorting by tool type as a category made it easier to see the wide variety of appropriations and contexts the pre-service teachers applied them to different purposes, levels and subjects, crossing subject and topic boundaries. See Table 1 for this. Thus, we can label many tools as 'smart', as well as the creativity of the pre-service teachers' appropriation.

Table 1: The range of technologies/tools, year levels, purposes and subjects

DIGITAL TECHNOLOGY	CURRICULUM SUBJECT	YEAR[9] LEVEL (9-13)	TOPIC/ LEARNING PURPOSE
1. AUDIO/VIDEO RECORDING FUNCTIONS			
mobile phone: camera & audio recording functions	dance music PE English	10, 12 & 13	● self- and peer- evaluation of performance/rehearsal
ipad: video recording function	PE	13	● energy systems, ● before/after exercise responses
Facebook and video function on mobile devices	dance Spanish	9 & 10, 12	● on-going pair work on creating short choreographed phrase ● practise certain verb forms/create Spanish identity in Facebook
creating 20 sec video	science	9	● ginger-beer making: role of microorganisms
digital camera	art	10	● animate toy sculptures students have created
peer videoing	PE	11	● functions of the body
video recording device	social studies PE	10	● social issues: create video clip to raise awareness

[9] Year levels in New Zealand schools: years 9-13 indicate the five years of secondary schooling, and an age range from about 13-18.

		10,13	● aerobics—record and analyse sequence ● dance unit: self and peer critique of rehearsal
YouTube clips; video cameras; Facebook	hard materials	11	using and caring for machine tools; Unit Standards 7529 & 7530
YouTube clips	social studies food studies drama biology dance history English photography PE	10 12 12 9 9 12 9 13 11	● Parihaka ● knife sharpening skills ● dramatic techniques revision ● food chains ● identifying dance style techniques ● Vietnam War: contextual understanding of Tet Offensive ● language differences in English accents ● artists models for folio work ● anatomy: bones and muscles
Flip video	health	10	● dangers of being a teen: create own ad about one issue in topic
2. SPECIFIC PROGRAMS OR APPS			
Anatomy Arcade	sports science	11	● bones and muscles identification
Angry birds	art	10	● papier mache unit: idea of bird characteristics and concept of artists model
creating podcasts	classical studies	13	● Virgil's *Aeneid*: read aloud + analysis of passage; shared and used for revision
domo animate	Te Reo (Maori language)	not specified	● sentence structures: creating conversations
fitness apps	PE	10	● large ball unit: developing and implementing coaching session
goanimate	history	12	● perspectives on women's franchise: ability to see multiple perspectives and convey them to others
Inspiration	social studies	10	● systems of government unit: revision for unit test
Language Perfect	Spanish	13	● vocabulary

Prezi	social studies	9	● topic revision
Photoshop	photography	12	● personalised editing processes (actions): editing software and processes to speed this task up for folio boards
specific websites	science	10 10	● weights and forces ● unit on genetics—understanding inheritance traits
specific websites: (a) supermarket online shopping website (b) health & wellbeing sites	PE/health, food & nutrition PE/health, food & nutrition, health, recreation & health	12 12 10 12	● budgeting: costing menus for families ● food planning for high performance athlete + Achievement Standard link ● sexual anatomy: naming of parts ● drug and alcohol effects
Wallwisher	Te Reo English (x3)	10 9, 11, 12	● tenses: post images and verbs ● thematic connection/compare ideas; critical feedback tool; student voice linked to essay writing
Webquest	science	10	● ecological issues/controversial topic
Wikispaces	physics	12	● static electricity: space for sharing information and questions
3. SPREADSHEETS			
Excel	mathematics	10	● statistics: time series graphs
Excel	mathematics	10	● measures of spread in box & whisker graphs: checking if knowledge linked to visualising median, quartiles, understanding data ranges and changes in data
4. ONLINE PROGRAMS OR SIMULATIONS			
Flash animation	science	9	● digestive system
Java applet	physics	10	● waves and sounds
Pinterest	design art	13 13	● collecting design ideas; critical thinking and evaluation ● artists models: influences for own folio

			boards
5. GOOGLE OPTIONS			
Google searches; slide presentation software	social studies	10	• search a particular issue related to 'blood diamonds' trade; learn from each other's presented issue
Google Docs	art	11	• digital media: shared task to share knowledge
online searches	junior health drama sports science social studies drama music health history Food technology science	10 12 13 10 10 11 9 11 11	• drug and alcohol awareness • features of Elizabethan theatre • investigation of health standards • • South America: collaborative task to focus on producing poster about a specific country • Elizabethan theatre: presentation to peers • musical knowledge: specific analysis of one musician's style; musical language; some social history about era • effects of drugs/alcohol on body • Greek mythology: argue a case for replacing Zeus • reports on foods (culture, eating patterns, foods) in 4 countries: Achievement Standard 90958
6. OTHER DIGITAL TECHNOLOGIES			
IWB	mathematics	11	• algebra: factorising
QR codes in worksheet	hard materials	11	• developing a whirligig using engineering materials: how mechanical cams work: Unit Standard 22924, curriculum level 6
text polling (polleverywhere)	art health	10 12	• feedback from students about unit • knowledge about effects of alcohol on body

Findings

Tools/devices

Some tools were used across subjects although often for similar learning purposes. The audio/camera tools on mobile devices, for example, were used in English, dance, physical education and music to develop self-critique in rehearsing movement, speech, composition or characterisation. YouTube clips also had multiple uses: as a resource for understanding specific social studies contexts, such as a topic on Parihaka[10]; as a how-to of learning knife-sharpening skills in food classes; using clips to understand more about contextual influences related to the Tet Offensive in the Vietnam War for history; using anatomy clips to help examine bones and muscles for physical education; or using clips to listen to and identify language differences in English accents. By applying these relatively common tools to specific learning purposes, the pre-service teachers demonstrated creative levels of agency in their appropriation. This appropriation also demonstrated how adaptable for deliberate learning intentions these tools were.

Purposes

The end purposes to which digital tools were appropriated often included having an eye on providing practice contexts for formal assessment tasks. One ITE student, for example, used the program Inspiration to help a Year 10 social studies class better understand and revise content for a unit test on systems of government. Because Inspiration is a tool for graphically organising information, it helped students categorise information to see how parts of the system linked together. In a Food Technology class, the pre-service teacher got learners to develop reports on foods (culture, eating patterns, foods) in four countries. They did this by finding and selecting from browser searches using keywords and strings. Both of these tasks incorporated a literacy focus of one kind or another, demonstrating considerable creativity in adapting the required task to suit their teaching contexts and integrating literacy approaches with available resources. This resourcefulness demonstrated smart use of the technologies.

Students discovered that for learning to be retained over time, the pedagogical design of any lesson has to be sound. One pre-service teacher, for example, wanted students to understand more of the concept about food chains and interdependence. To do so, he used a clip from the movie *The Lion King*. What he realised afterwards was that he did not do the pre-teaching necessary to prime students to actively notice how the information in the clip linked to the concept of food chains. In a later lesson, he found this out when he asked them what they had learned about food chains from the clip. Students had not made this link. Luckily, he discussed this with his associate teacher[11], who pointed out that since the concepts were new to students, they needed some prior explanation in order to make the connections. The pre-service teacher had not accounted for students' ZPD—their zone of proximal development (Vygotsky, 1978)—by checking what their knowledge starting point was before adding to their understanding. Some students were therefore mystified.

[10] Parihaka: see for example http://www.teara.govt.nz/en/maori-prophetic-movements-nga-poropiti/page-4

[11] An Associate Teacher is the term applied to teachers who mentor pre-service teachers in their classes during practicum.

The image below better illustrates this idea of starting point and the role of the teacher in supporting new knowledge development as the 'more knowing other'. Had the ITE student thought more about structuring the learning around clear goals rather than focusing on the clip itself, it is possible that his learners may have more easily been able to link the concept of food chains to something as seemingly unrelated as *The Lion King* clip.

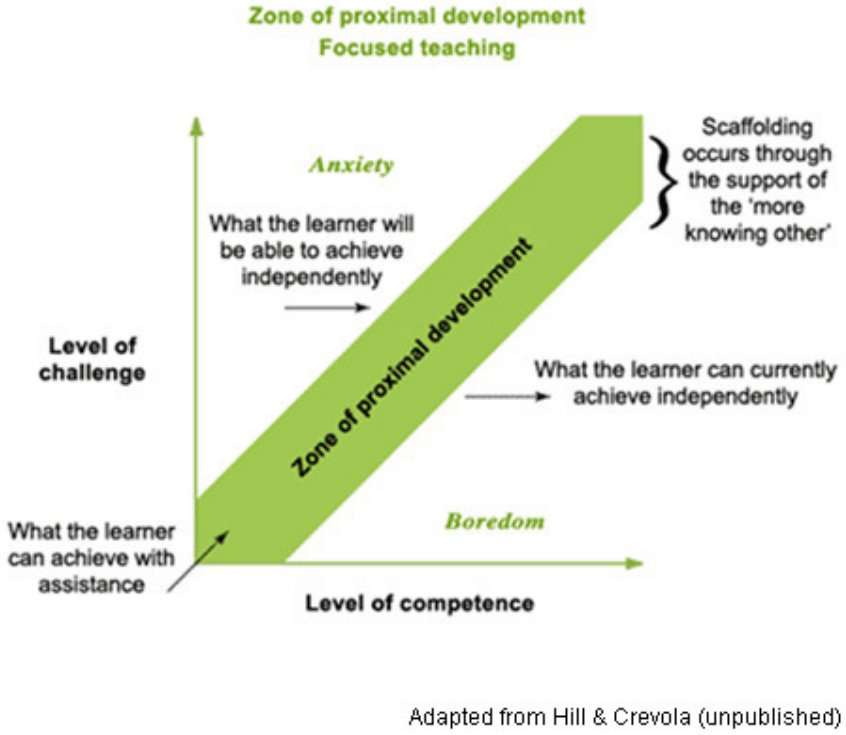

***Figure 2*: Zone of Proximal Development**

Also, by having a Teaching as Inquiry question to investigate while using his chosen resource, he discovered more than he might otherwise have done. He learned that the resource had merit but that the pedagogical organisation and context in which it was used required more thought and re-design than he had originally undertaken. He said on reflection that:

> In future I would develop a worksheet for the students to fill out based on the video. This would get students to reconstruct what they had watched into a form they could understand.… The students had turned off when writing notes … and appeared to be simply getting the notes down, [not] thinking about what they had watched and how that related to the notes they were taking.… perhaps by reinforcing the video clip … long term retention of student engagement could be achieved. (ALS 6/6/12)

Because of this experience, ALS (the pre-service teacher) better understood the role of deliberate pedagogical design in relation to digital resource use. He was not put off—instead he used the experience and the Teaching as Inquiry process to think ahead to better lesson planning when next he incorporated a digital tool of some kind. And while the tool he used was highly teacher-centric and

the copying task was essentially meaningless for his learners, he later understood that this kind of practice was actually counter-productive to learning by reflecting on the evidence he had in front of him.

What the ITE students learned from their learners' feedback

The requirement to collect feedback from their learners had a profound effect on the ITE students. In observing that students were happy to use both school and their own devices in class, one commented that:

> It [the lesson] worked well; students were engaged and interested which makes a huge difference. I would adapt the lesson … to give them a whole lesson for research and writing down their opinion, instead of expecting them to do it simultaneously.… I got them to do this for homework because the [school COW[12]] computers were unreliable... but in hindsight, getting them to complete this in their own time for homework meant they could put more effort into the essay so it turned out to be more positive. [AS[13] 5/6/12]

Another ITE student commented on eliciting her learners' feedback after a lesson in which they filmed themselves then analysed their tennis movements in physical education. She said:

> Reviewing and analysing really helped them recognise their strengths and weaknesses and [they] were easily able to identify areas they needed to work on … and a few other students commented that by completing this activity they have grasped a greater concept of what muscles are used in different movements … by putting these movements into action, they are able to remember it better. [AT 13/9/12]

AT's associate teacher, who observed the lesson, is reported as admitting surprise at the "in depth answers and participation the students put into the task".

Both of these pre-service teachers, as a result of their experiences, their learners' feedback and their associate teacher's responses, were adamant that this increased their determination to continue using digital tools when they began their teaching the following year. They also remarked how important their learners' feedback was to them. One noted that the "students' feedback was really beneficial for me as a teacher as they really reiterated my thinking behind this tool. I am really happy that they saw this as a learning tool." [AT 13/9/12].

In quite a different context, in a physics class about standing waves and the production of sound from musical instruments, the ITE student used a Java applet to demonstrate the concept of 'beating'. She described the introduction of the applet to the class thus:

> This class is normally chatty and not very focused for a year 13 group [year 13 is the final year of secondary school]. This period though, students seemed to be engaged and on task. They were interested in the applet and several wanted the URL for the site. They

[12] COW: Computers on Wheels. A class set of computers moved from class to class

[13] AS, AT and AT2 are the code identifiers I used to refer to specific students in the cohort.

> were also interested in the frequency range of the beating effect.… Students engaged in the frequency calculations and offered suggestions for patterns and relationships. [AS2 3/6/12]

The feedback to AS2 from her learners was also revealing. She reported comments such as: "I now know more than before", "It was very helpful, hearing the sound with the diagram", "The examples through the applet helped to give insight to the topic." These responses helped confirm for this pre-service teacher that while there were aspects of the lesson to develop and adapt, essentially the applet helped with conceptual understanding. Therefore, with adaptations to her pedagogical design, she would use it again, partly because a week after she had used the applet, she checked the extent to which the students had retained the learning and discovered that, indeed, they had remembered key points. And notwithstanding issues of access for students (they were blocked by firewalls, which required some pre-planning to address), she considered that pursuing the use of such tools benefited learners. She intended to persist and pay particular attention to how she scaffolded the learners.

This insight raises a consistent theme emerging from this data: that the pedagogical design of the lesson is as important as the tool and the learning purpose. The ITE students learned this through the feedback from their students. It heightened their awareness of their role in carefully designing learning and choosing appropriate tools for the task. These few examples from the cohort indicate the readiness these ITE students had to persist with digital learning practices. This segues to a focus on continuance theory.

Continuance theory, reflective practices and education

Pachler et al. (2010) discussed the notion of agency when describing how young people appropriated mobile digital devices for their own purposes. The ITE students demonstrated agency in their decision-making: the tools, the lesson design, the class and the learning purpose. They worked within the structures the school provided and found ways to address hindrances (such as firewalls, poor equipment, untrustworthy wifi connection) and obstacles. In doing so, they discovered pleasing degrees of success when class behaviour and levels of concentration changed along with the depth of their learners' conceptual thinking. For example, in a drama class, AM [7/6/12] had provided YouTube clips as resources for examining dramatic techniques in a play. She was impressed by the way these clips 'triggered their thinking' and how they "became more conscious about their use of drama techniques". Consistently, such outcomes positively disposed these pre-service teachers to developing opportunities for incorporating digital tools in future lessons. Allied to this, the pre-service teachers' own reports indicated that if they had *not* been *required* to ask their learners for feedback, they may not have arrived at such a point: the feedback gave them confidence to believe that using these tools was not only smart but necessary for enhanced learning.

In the end, this experimentation led many of the ITE students to know something of the positive value digital technologies can have for their students' learning. Most (approximately 90%) made explicit mention about how important this was in motivating them to pursue developing their expertise and lesson design experimentation with such tools in the future. They were keen to address adverse or restrictive policy decisions in schools so that they could better embed digital technologies in learning. The framework of a Teaching as Inquiry process also had value. It was a common organising tool that linked to the *New Zealand Curriculum* and was a means by which they could

reflect on and evaluate the quality and value of their lesson with a digital tool from not just their own perspective but also that of their learners via the documented evidence they collected.

Conclusion

The task attempted to create an authentic experience in which the pre-service teachers not only designed learning but also designed a method of eliciting feedback from their learners. It showed them one way of evaluating their pedagogical practices when they tried something new—in this case, using a digital technology for learning purposes. This process linked to the curriculum and what it means to provide evidence of practice and mechanisms for self-critique.

Combined, these processes may have influenced the extent to which the ITE students exhibited agency in their lesson design, and it may have influenced how they felt about continuing to use digital technologies for learning. However, the influence of their learners' feedback on their practices with digital tools was profound and was probably a key factor in these pre-service teachers' decisions about the extent to which they would persist with using digital technologies professionally. And so, while ease of use and efficiency were key drivers in earlier business-oriented studies regarding continued use of technologies, they are insufficient reasons for pre-service teachers to want to persist in these educational contexts. So, to be a digitally smart educator, checking the value of the learning with and through digital tools with one's learners is crucial to decisions about persisting with digital technologies in smart learning.

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Chapter 7: Smart or Smarting: Student-library engagement in online distance education

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Abstract

This small-scale mixed methods study used surveys and focus groups to investigate the challenges faced by a cohort of online learners at the University of Waikato when seeking and referencing information for course assessments. The research also investigated the type of library support students value, as well as the barriers to their engagement with library information services. Findings revealed half the cohort reported they seldom used the library or library services during their degree; nearly three quarters of the cohort reported problems finding information; and over three quarters of the cohort did not seek help from the library. However, over three quarters of students reported they engaged with library referencing resources. This chapter makes observations about what it means to be 'digitally smart' in an academic library context, and suggests ways that library information services can be better provided and promoted to an information-saturated and time poor student audience.

Introduction

As the information world has become increasingly digital, students' needs and the ways they access resources have changed. With the development of blended, distance and online learning, library services have evolved in order to better serve the specific needs of these learners. It is no secret that many students find libraries hard to use; many prefer to Google rather than navigate the physical or online resources of their institutional library. That said, librarians frequently encounter exasperated students who say, "I've just spent *ages and ages* on the Internet and I couldn't find anything" and then, after assisting a student to the gold of a library database, frequently hear the lament, "If only I'd known about this last week/semester/year". That is the motivation for this study.

The University of Waikato supports the learning, teaching and research needs of staff and students and serves a population of 12,500, students and 1500 staff (University of Waikato, 2013) with a collection of approximately 1 million physical and 250,000 electronic resources. While there is consistent anecdotal feedback over time from both staff and students about the value of librarian support, little recent research has been conducted at the University of Waikato on the engagement of online distance students with library services.

The University of Waikato offers an applied three year Bachelor of Teaching (Primary) degree which prepares students to become primary school teachers. Students who live remotely undertake the blended or Mixed Media Programme (MMP), which is delivered through multiple channels, including online forums, on-campus block courses and placements in students' local schools. The programme requires students to refer to scholarly literature in formative and summative assessments. Students are expected to source academic information independently as they progress through the degree. For instance, in year two, assessment activities require students to find and use scholarly articles.

The library has supported the MMP programme since its inception in 1997, and this cohort was chosen to explore online distance students' engagement with library services[14] because of this special relationship. Students of the programme are diverse in age, ethnicity, socio-economic background and educational experience. Many have young children and are involved in their local school communities. Early on, the value of having a designated librarian who understands the needs of the MMP students and staff was noted as an essential learner support (Campbell, 1997; Donaghy, McGee, Ussher, & Yates, 2003). This programme specific support continues with designated MMP librarians, a suite of seven tailored tutorials delivered during the on-campus periods, and a virtual reference desk (VeRD) in Moodle. VeRD provides synchronous and asynchronous services to support information finding and referencing needs. It emulates a face-to-face information desk as much as possible, with additional features such as online quizzes, video guides, FAQs and ask-for-help forums. It is a repository for slide presentations and resources co-constructed during the on-campus library tutorials, and is open to any University of Waikato student or staff member.

Digital Smarts & MMP

Digital and information literacy are underpinned by critical thinking and evaluation (The Open University, 2012). To succeed on the MMP programme, students need to develop "digital smarts" which are a composite of both information and digital literacies allied with problem-solving skills and adaptive help-seeking behaviour. Information literacy involves the ability to identify a need for, and to find, critique and use information effectively and ethically (Bundy, 2004), and digital literacy is the ability to navigate electronic environments and harness electronic tools effectively. Students also need problem-solving skills, which involve the application of logic, curiosity, persistence and resilience; and finally, adaptive help-seeking behaviour, which involves not just a willingness to seek help but also requires an awareness of the appropriate places to find that help (Newman, 2002). The development of digital smarts is likely to be an ongoing process which requires deliberate attention by learners, teachers, librarians and learning advisors.

The skills MMP students are expected to demonstrate when completing assignments involve defining the task, locating and selecting suitable resources to cite, and applying the relevant information to the assignment brief (for example, an essay question or research problem). Library

[14] The term library service refers to any resource or service provided by the library including electronic or print materials (and the access to or delivery of); human assistance (face to face, phone, email, instant messaging, online forum); search tools (library catalogue, databases, discovery layer software); guides (e.g., webpages, PDF documents, video, FAQ).

support is often sought throughout this process, from how to identify search terms, how to use electronic databases to retrieve scholarly content, and how to reference. This points to the recognition by some students that there is a gap between the knowledge they possess and the knowledge they need, and that library services can bridge this gap.

Students learning to be teachers must be able to teach their own learners how to find, critique and use information effectively and ethically in order to solve problems and make decisions. Increasingly, these processes involve smart use of digital technologies. Critical and information literacies are therefore vital skills for this increasingly digital environment and educational institutions are key in assisting students to develop these attributes (Brabazon, 2006; Holt, Smissen, & Segrave, 2006; Kwon, 2008; Ramsey, 2008; Zimerman, 2012). As librarians, my colleagues and I seek to provide students with the support necessary to become more digitally smart. But how effective is our support in practice? Do students access the support available, and to what extent do library services meet their needs? When asked to contribute to this project, I welcomed the opportunity to learn more about the experiences of MMP students, specifically to answer these questions.

Literature review

Previous research has examined the concerns for students when seeking and accessing information for academic study, and has outlined issues for learners in making sense of what they find. This includes sources mediated by the academic peer review process or information that is unmediated by such quality assurances. Factors that promote or inhibit use of academic libraries have also been identified, as well as research related to student behaviour when acknowledging the information they use in course assessments. This literature has informed the identification of challenges for learners when seeking and citing information, and factors promoting and inhibiting library use.

Challenges for learners when seeking information

> *Mass amateurization of publishing makes mass amateurization of filtering a forced move*. (Shirky, 2008, p. 98)

There are many indications in the literature of challenges for learners when seeking information for course-related learning. Paradoxically, the Internet (aka the free-web) makes information both more accessible and more obscure. Before the Internet, libraries were the default search engine and quality was assured through the publishing and selection processes. On the free-web where anyone can publish, quality assurance no longer exists. This requires much more vigilance on the part of the reader not just to find, but to sift, select and critique this information, since the library filter does not universally apply.

Research indicates a lack of awareness of the importance of academic publications. Many students fail to select academically appropriate sources (Brabazon, 2006; McClure & Clink, 2009; Tricot & Boubée, 2013). In order to discern and evaluate quality information, students need digital smarts, but do not necessarily know that they need them. The failure to discriminate high quality from low quality information presents problems. Easy access to low quality information has created a Google Effect where university students, having 'Googled' their way through high school, lack the skills to interpret higher-level work (Brabazon, 2006). Ramsey (2008) observes how the net blurs

distinctions between amateur and expert, opinion and evidence. Brabazon (2006) also suggests that the value of individual opinion has been elevated by blogs and wikis, with the result that tertiary educators have to convince students of the value of other people's evidence-informed ideas. She also argues that many students have not been taught how to identify and use scholarly information and emphasizes the need to scaffold literacy and interpretive skills within programmes of study.

Although the embedding of digital smarts and academic skills development is occurring in some courses (Derakhshan & Singh, 2011; Zanin-Yost, 2012), this is not yet common practice (e.g., Gunn, Hearne, & Sibthorpe, 2011). Research by McGuinness (2006) demonstrates that often these skills are not explicitly taught in tertiary education, as many faculty believe students will pick them up over time. Teaching staff may also assume that students already have the skills to filter what they find, regardless of the source (Macauley & Green, 2008), yet library staff are acutely aware that this is often not the case (Ellis & Salisbury, 2004). Writers such as Zimerman (2012) consider the sooner students are disabused of the notion that the free-web provides all, the better for their studies and their professional futures. Students who have become digitally smart realise that much of the scholarly information needed for academic endeavour is available only through proprietary databases to which academic libraries subscribe.

Last stop library? Factors inhibiting library use

Studies of university students' information-searching behaviour reveal a preference for the free-web over library resources. In their study of academic library non or low use, Goodall and Pattern (2011) found that 50% of all undergraduate students did not use any library services during the four years of their study. Mi and Nesta (2006) found that 89% of university students start searches on search engines compared with 2% starting on the library website. Even after tuition, students still find library databases hard to use (Tricot & Boubée, 2013). It appears that convenience, which comprises familiarity, perceived ease of use and physical proximity override all other factors in information-seeking processes (Liu & Yang, 2004; Macauley & Green, 2008; Mi & Nesta, 2006; Oblinger & Oblinger, 2006; Toner, 2008; Tricot & Boubée, 2013). This tendency is not unique to the net generation (Becker, 2009).

Other factors identified in the literature as inhibiting library use were

- lack of familiarity with the library and its resources and the need for support to use the library (Horn, Owen & Currie, 2012; Tricot & Boubée, 2013);
- reluctance to seek help from teachers and librarians (Marshall, Burns, & Briden, 2007; Pellegrino, 2012; Valentine, 1993);
- library anxiety (Kwon, 2008; Mellon, 1986);
- students' assumption that their difficulty finding relevant results indicates that the information they need is not in the library (Brooke, McKinney, & Donoghue, 2013; Horn et al., 2012);
- a limited view of librarians' skill and knowledge (Foster & Gibbons, 2007; Horn et al., 2012); and
- the time and effort required to use the library (Brooke et al., 2013; Matthews, 2013; Zimerman, 2012).

Socio-economic factors are also implicated, as students from lower socio-economic backgrounds tended to demonstrate lower levels of persistence, poorer research skills, less awareness of library services and difficulty in finding relevant results in a search (Horn et al., 2012).

Factors promoting library use

While there is evidence that some students are bypassing the services of their institutional libraries, students who are digitally smart typically access library resources independently and seek support from librarians when necessary. Donaghy et al.'s (2003) study of University of Waikato blended learners noted library use increased as students advanced through their degree. Other studies of distance students found that highly motivated students used library resources (both print and online) more than less motivated students (Horn et al., 2012; Liu & Yang, 2004). The building of interpersonal relationships promotes student library engagement (Becker, 2009; Connaway, Radford & Dickey, 2008; Pellegrino, 2012; Zimerman, 2012). This rapport results from "just in time" user education, which engenders positive feelings towards the library and generates continued use (Becker, 2009; Pellegrino, 2012).

Technology is another significant feature reducing barriers to the library. Vondraceck (2007) found students used online library resources if they knew about them and were patient enough to navigate to them. Becker (2009) considers that the growing complexity of libraries is offset by specialized information sources and discovery tools. These tools provide a Google-like search experience and access to most of the library's print and digital collections through a single search box. Additionally, and of particular use to distance students, screencasts and synchronous online information skills sessions can assist them to access library resources (Brooke et al., 2013). Other factors enabling library use include:

- academic preparedness (Horn et al., 2012; Ismail, 2010);
- digital literacy (Horn et al., 2012);
- feeling connected to the university (Horn et al., 2012); and
- user education to assist students in overcoming the complexities of finding and using information (Kramer, 2010; Ismail, 2010).

Macauley and Green (2008) have noted that library services for distance students are often at the cutting edge, and advise that any institution offering distance learning should engage stakeholders to ensure that curriculum, faculty, library, information technology and other services work together effectively. Librarians have long called for enhancements to information literacy training with Becker (2009), Feekery (2011) and Oakleaf (2010) advocating for faculty and librarian collaboration to provide embedded, cross-curricular information literacy instruction. In their study of distance learners, Brooke et al. (2013) also recommend librarians be present when courses are being planned or discussed. However, the experience of MMP librarians is that embedding opportunities have been ad hoc and dependent on individual relationships between academics and librarians.

Challenges in citation practice

Academic libraries play a key role in providing referencing support to students. They create guides to the main referencing styles used by their institutions; provide answers to 'how do I reference this?' questions, and teach the basic principles of referencing, including the use of referencing software such as Endnote and Zotero. There are three broad issues within the referencing sphere: the discipline of academic writing; plagiarism and academic integrity; and the mechanics of applying a citation style. Anecdotal evidence indicates the latter is the most common type of student referencing query encountered at the University of Waikato Library.

Stagg, Kimmins and Pavlovski (2013) identify that many Australian students were not explicitly taught referencing prior to tertiary education, and did not fully understand the purpose of referencing. This is consistent with anecdotal evidence from the University of Waikato. Learning how to use a citation style is an essential part of academic literacy, and for instruction to be effective it needs to be integrated into courses and taught in the broader context of academic writing (Stagg et al., 2013). As well as getting to grips with inconsistencies within particular referencing styles, students encounter differences in the ways individual lecturers reference. Referencing is time consuming and difficult for many students who struggle to know when and when not to reference, how to incorporate their own voice, and are afraid of plagiarising (Neville, 2010). In addition students encountered difficulty organising and formatting reference lists, managing and referencing quotations, and using electronic and secondary sources, as well as working with different referencing styles across different faculties (Neville, 2010). Lack of formal tuition has also been identified as a factor inhibiting referencing ability which persists to postgraduate level (Lamptey & Atta-Obeng, 2012).

While this review of the literature has identified factors that inhibit and promote library use, as well as the challenges students encounter accessing and citing information, the specific needs of distance initial teacher education students have not been addressed. This study sought to explore the experiences of MMP students in particular, in order to support their digital smarts and academic literacy. Its purpose was to address the following questions in order to improve library practice:

1. What challenges do online learners face when seeking and referencing information?
2. What assists online learners to meet these challenges?
3. How could the library services provided to online learners be enhanced?

Methodology

> *An invitation is defined as an intentional act designed to offer something beneficial for consideration. (Purkey, 1992, p. 9)*

According to invitational theory, developed by educators in the early 1970s (Purkey, 2013), the people, places, policies, programmes and processes of organisations either contribute to or detract from the lives of the people who participate or interact with them. People participate by working for and using the services and products an organisation offers. Invitational theory is underpinned by four assumptions: respect (people are able and responsible); trust (educational relationships should be co-operative); optimism (people have untapped potential); and intentionality (being intentionally inviting and offering something beneficial) (Purkey & Novak, 1999). In terms of invitational theory, library services for distance students should strive to support their participation by creating a supportive

environment based on the assumption that they will trust that the services will benefit them. We are optimistic that students can overcome their library challenges as they progress through their degree and develop trust that library services will meet their learning needs.

This study is interpretive as it seeks to understand human experience by attempting to see the world through the eyes of the student participants (Cohen, Manion, Morrison, & Bell, 2011). It is the "understandings and perceptions" of the students that are of interest in this research (Berg, 2004, p. 7). The students, as potential and actual library users, are in a position to provide feedback that can inform the improvement of library services. Thus there is an evaluative and developmental element to the research intent.

In terms of research design, data were generated by mixed methods. I wanted to find out both quantitative information (what library resources students use and how often they use them) and qualitative information (what challenges students face when seeking information). Mixed methods research acknowledges that the world is both qualitative and quantitative, and seeks to harness the strengths that both approaches offer (Cohen et al., 2011; Creswell, Shope, Plano Clark, & Green, 2006). It is pragmatically driven in the sense that "what works to answer the research question is the most useful approach to investigation" (Cohen et al., 2011, p. 23), and, as such, the research questions drive the methods of research.

With reference to the qualitative data, thematic analysis was used to identify themes that were significant to the research question (Braun & Clarke, 2006). This was iterative, as some codes became main themes while others were discarded as I moved between the data, refining coding and themes.

Method

To investigate the experiences of students in the MMP programme, I created a questionnaire to elicit both qualitative and quantitative responses as the primary source of data. The questionnaire comprised five closed and six open questions and took 15–20 minutes to complete. It was administered by a non-library staff member during a library class tutorial. Three of the closed questions asked students to rate multiple items on a four-point scale (never, seldom, usually, always). The questionnaire was supplemented by a focus group discussion and an interview with one student who was unable to attend the focus group. Data gathering took place between September and November 2012. Students were asked questions about where they sourced information, the challenges they had in finding this information, where and how often they sought help with their problems, and what (if anything) prevented them using library services. They were also asked to explain what they did about referencing, and where they sought help. Lastly, they were asked whether library services could be improved.

The six focus group volunteers were drawn from Year 3 MMP students. These discussions took place during their on-campus time. Both the focus group and one-to-one interview took approximately one hour. They were semi-structured and used the open questions from the survey to guide the discussion. All data gathering for the study took place at the University of Waikato, and was approved by the Faculty of Education Research Ethics Committee.

The cohort

Access to participants was obtained through my role as a librarian at the Education Library at the University of Waikato, part of which is to provide information services and information literacy

education to MMP students. Students from all years of the programme were asked to participate voluntarily in the survey. Of the 186 members of the target cohort, 176 (95%) completed the survey (see Table 1).

Table 1: Survey participants by gender and year of study

	Female	Male	Total
Year 1	51	5	56
Year 2	56	4	60
Year 3	40	6	46
Year 4	13	1	14
TOTAL	160	16	176

Analysis

For each of the six open-ended questions, responses were initially coded into broad patterns and items of significance. Smaller codes were later discarded, while others were incorporated into other themes. These preliminary themes were then refined into broader themes. Where it served to better illustrate the results, the main categories and the frequency of responses in relation to these categories were presented quantitatively as graphs.

When analysing the five closed questions, the categories Never and Seldom were combined, as were Usually and Always and the responses were described as percentages and numbers with results rounded to whole numbers.

Once the data from the surveys had been collated and analysed, the focus group interview and the one-to-one interview were transcribed. Themes that had been previously identified were coded and the transcripts were analysed to seek additional themes that had not emerged previously. The transcripts also provided richer and deeper insights into students' experiences.

Findings

The research questions have been used as a guide to group findings in order to inform library practice. Themes developed during qualitative analysis and results of quantitative analysis have been supplemented with quotations from participants to provide a richer understanding of MMP students' experiences finding and referencing information.

Current library use by MMP students

Almost half the cohort reported frequent library use (see Figure 1). When separated into year groups the data reveals more information about student-library engagement (see Figure 2). Consistent with previous research, library use increased with level of study (Brooke et al., 2013; Donaghy et al., 2003)

with the exception of Year 4 students, who tended to use library services slightly less than Year 3 students. Informal discussions with teachers of some Year 1 papers revealed there are assignments which require students to independently source information, but many Year 1 papers require students to source information from their prescribed texts only. This may explain data which shows they use the library least. There is also an expectation that students will increasingly engage in independent scholarly research as their studies progress.

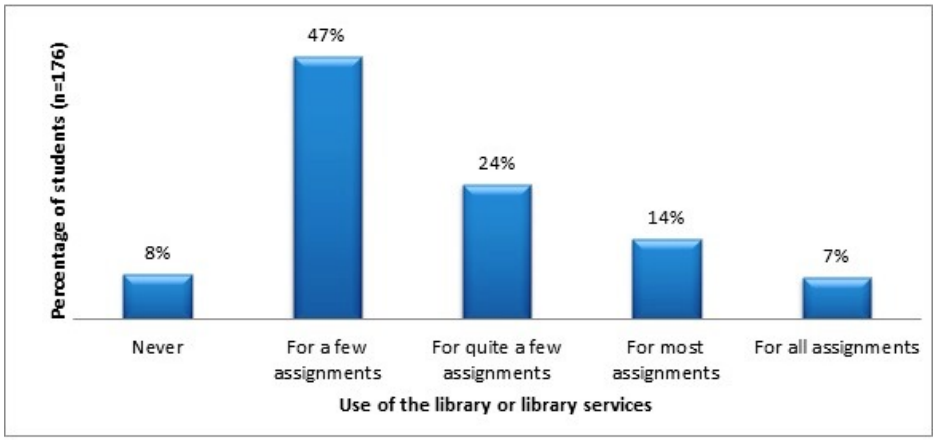

Figure 1: Frequency of library usage during degree study (n=176)

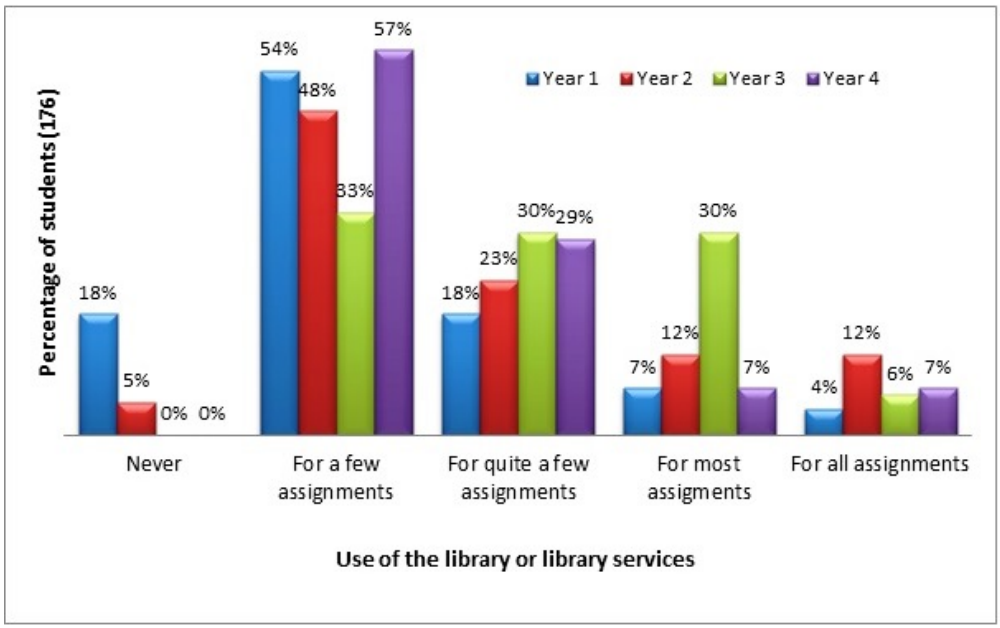

Figure 2: Frequency of library usage during degree study by year of study (n=176)

As mentioned in the literature, university students are more likely to bypass library resources and go straight to the free-web (Macauley & Green, 2008; Mi & Nesta, 2006; Oblinger & Oblinger, 2006;

Toner 2005). This is borne out in the findings from this study. Of the options provided in the questionnaire, these were the ones most frequently used by students:

- Course readings 98%
- Set text 84%
- Google 65%
- Library Search (a tool which provides a Google-like search experience) 53%
- Library databases 52%
- Google Scholar 30%
- Wikipedia 6%

When searching online 65% of students used Google while only 30% used Google Scholar and only 6% used Wikipedia. After prescribed readings, Google was the most frequently used information resource, but it is heartening to note that over half were also frequently using library resources.

Challenges MMP students face when seeking information

Just under 70% of students reported challenges relating to finding information (see Figure 3).

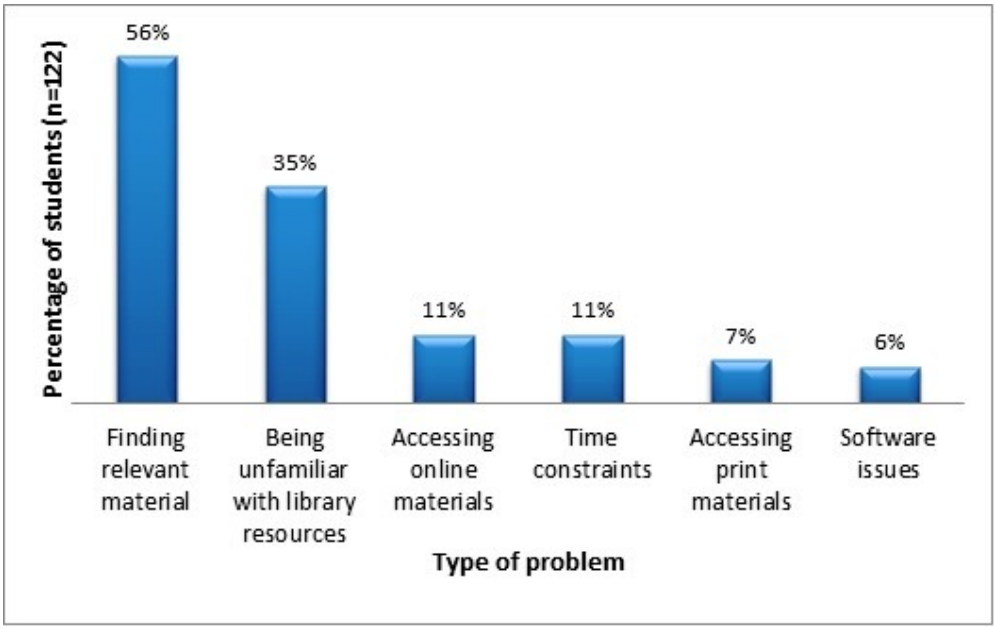

Figure 3: Problems encountered when seeking information for discussions or assignments

The two most significant difficulties were finding relevant material, identifying key words and refining searches (56%); and being unfamiliar with library resources, which involves knowing where to look for information and how to use the particular resource effectively (35%). Students reported:

> There are too many options / results from a search on the net or on the library search. I have tried to refine the search but I haven't yet found it helpful. (Year One)
>
> [Being] unable to access journals or articles online i.e. usually required to sign up to something or pay?? (Year One)

Anecdotal evidence suggests that those who struggle when seeking information lack the interpretive skills to determine relevance, and do not know how to amend searches to find relevant material. Three quarters of the cohort reported not seeking help from the library, which is consistent with other research (Brooke et al., 2013; Pellegrino, 2010; Vondraceck, 2007). While this is perplexing, given the targeted support on offer, it fits with Newman's (2002) observations regarding students' need to develop adaptive help-seeking behaviour, which is an important aspect of being digitally smart.

Challenges MMP students face when seeking information using the library

Students were asked what prevented them from using the library. Just over one third of participants responded (n=63) (see Figure 4). The reasons they gave included:

- lack of confidence or know-how,
- distance from the physical university library,
- librarian availability,
- the time needed to learn or re-learn library resources,
- the time required to source items, and
- the time required to receive physical items by post.

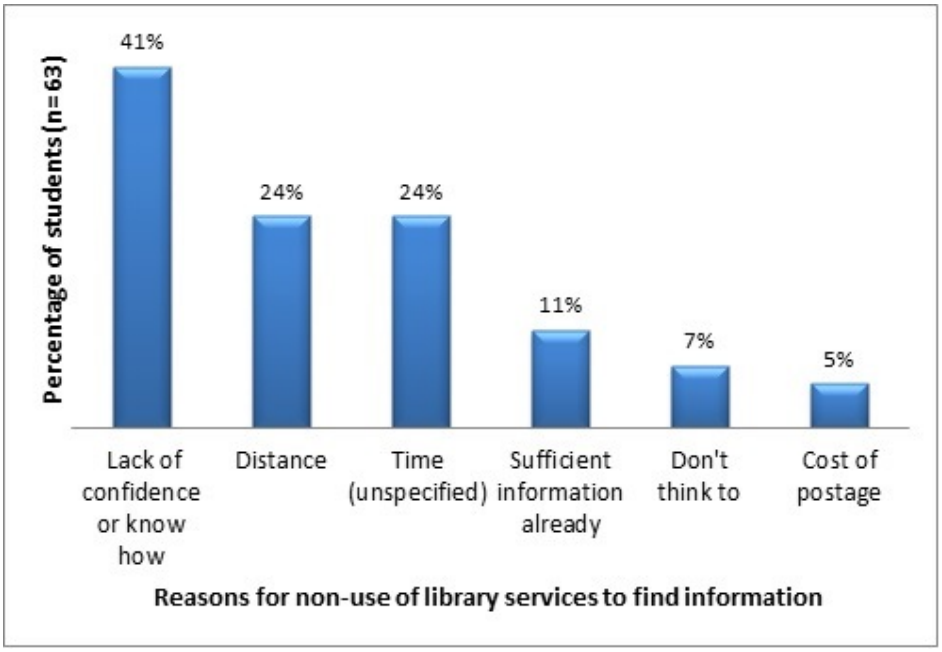

Figure 4: Reasons for non-use of the library for information for discussions and assignments

Some of these issues were consistent with findings in the literature, specifically, lack of confidence, know-how or familiarity with library resources (Becker, 2009; Mi & Nesta, 2006; Zimerman, 2012) and the cost in terms of time required to learn or relearn how to use library resources (Matthews, 2013).

Lack of familiarity and practice using library resources despite having been introduced to them in library tutorials was also cited by students, and is consistent with Ismail's (2010) observation that difficulties often persist despite students having received explicit instruction on how to use library resources.

> Because I don't use it often (i.e. weekly) I tend to forget the process and then spend a little time working out how to find a book … and then order it.… I recognise it is my issue rather than the system. (Year One)

> Remembering which education databases to use and the terms they use - * or ? etc. (Year Three)

> I don't know how to work the library website. I always forget after the on-campus sessions. (Year Three)

> When searching through the library it is hard to know the search words that will help you find what you actually need. (Year Three)

> Narrowing search fields—takes time I do not have. (Year Three)

The findings also suggest that students were prepared to forgo more relevant material from the university library (either print or electronic) for the certainty, comfort and convenience of visiting a physical library closer to home:

> I'm not organised enough to order books online and then send them back. I live in [name of city], and although the [local] library is nowhere near as good in terms of supply, I use it a lot. (Year One)

Of less significance (11% or fewer respondents) were problems related to the availability of or access to online materials, the time required to find relevant materials, the need for assistance outside of library opening times, and a last minute approach to accessing resources, which is consistent with Brooke et al. (2013). Students expressed a desire for the right information to be available instantly with minimal effort, and reported sacrificing information quality for convenience as they managed competing pressures of work, family and study.

> Online material (electronic books) not included in topic matter. (Year One)

> Time consuming downloading and skim reading to see if suitable despite abstract. (Year Two)

> I usually leave things until the last minute or the weekend so librarians are not available. I make do with what I can find. (Year One)
>
> If I hit a barrier while trying to find an item online I'll give up on that item. (Year Three Focus Group)
>
> We have so much else going on. I finish work, I have 2 or 3 hours to study and get my assignments done. I don't want to have to ask questions on how to find stuff, I don't have time for that. I'd rather get less marks for my assignment for not having as many readings. (Year Three)

Challenges online learners face when referencing information

Just under three quarters (70.5%, n=124) of participants reported problems with referencing, indicating that crediting sources is as difficult as finding them. Three themes were identified related to the requirement to use the American Psychological Association (APA) referencing style in assignments. They were formatting, referencing electronic resources, and referencing in general.

Formatting

In line with Gill (2009), students commented extensively about aspects of formatting, identifying three particular concerns. The first was the different formatting requirements for each type of source (journals, books, chapters in edited books, books of readings, webpages, etc); the second was the inconsistent use of APA in the table of contents of print books of course readings; and the third relates to individual lecturers' preferences and interpretations of APA style.

Students expected that the information cited in course materials would be correctly formatted in APA, and were frustrated when there was inconsistency between what was modelled and what was expected. Variations in understandings and interpretations of APA have a cost in terms of the energy and time students spend getting it 'right', particularly if they experience that there is 'no right way'. One student lamented:

> Not knowing what the RIGHT way of APA is because each lecturer likes it a different way. (Year Four)

Comments also indicated that students sometimes lost marks for incorrect referencing, although others suggested this was not a significant issue:

> Be pedantic as you lose marks for this being incorrect. (Year One)
>
> Realising referencing is worth so few marks. (Year Three)

Referencing electronic resources

Students had particular difficulty with electronic resources. Just over 14% (n=25) specifically mentioned challenges both in identifying the correct format and in determining required citation details:

> I'm not sure how to reference websites. I don't know where to find information that is needed e.g. date of website, author. (Year One)

Referencing in general

Previous research indicates that students find crediting sources time consuming and difficult (Neville, 2010). Just over 14% (n=25) found the general concept of APA referencing was a challenge. Their comments related to being unsure of the rules, forgetting what to do, and generally not understanding the level of detail required. One student commented:

> The whole process was daunting!! We need to be more spoonfed!! Provide us with a tutorial that applies the knowledge (in text referencing etc). (Year Two)

This acknowledgement of a lack of formal tuition is consistent with Lamptey and Atta-Obeng's (2012) research. Conversely, despite a lack of formal instruction other students did find their way to assistance:

> I have been able to find what I need from VeRD or by asking the lecturer. (Year One)

For some students the ability to reference information correctly in APA influenced the information selected:

> Sometimes I will avoid putting in something really good because I can't figure out how to reference it. (Year Three Focus Group)

To a much lesser extent, students mentioned issues related to referencing software, the time and effort required, and knowing where to seek help. Referencing problems were addressed through seeking help from peers, seeking help from librarians and lecturers, and using the library APA guides.

Factors that assist online learners to meet challenges when seeking and referencing information

Survey and focus group comments indicate students sought help from their peers, with immediate and complete answers being highly valued. The social networking site Facebook was mentioned by only two survey respondents as a place where students sought help; however, the focus group interview revealed that students frequently asked referencing questions there.

> A lot of referencing questions happen on Facebook. (Year Three)

> Have you got a reference for this? Yip. Bang. There it is and then you put it in your assignment. (Year Three)

Students reported feeling more comfortable asking questions of their lecturers because of their connection with them. Immediacy and expediency also influenced the help-seeking behaviour of some students.

> Usually I'm doing it at 2.30 am so there's no one to ask, so that's why I Google it. (Year Three)
>
> I'd rather get less marks for the assignment and get it done than ask a question and wait for the answer. (Year Three)

Of the students who sought library help (25%), the online resources, which are available 24/7 and require no student-librarian interaction, were used most. The FAQ and print guides were used more than the 'ask for help' forums and video guides. Resources which required human contact (both synchronous and asynchronous) were used least, with only 15% of students using email, instant messaging or the phone to seek library help (see Figures 5 and 6).

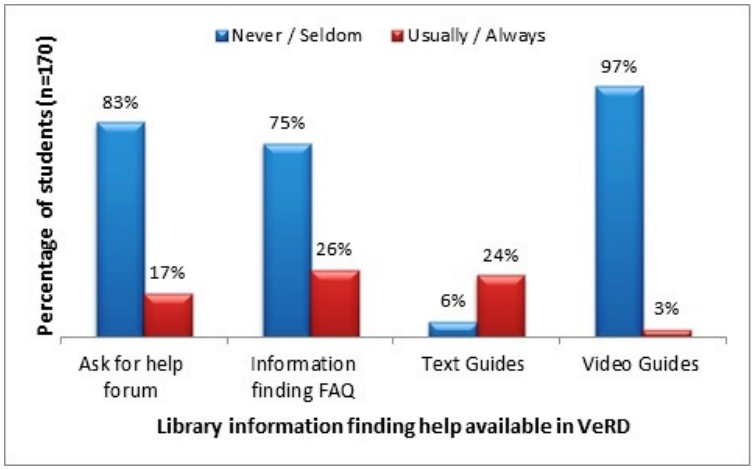

Figure 5: Student help-seeking methods using VeRD (n=170)

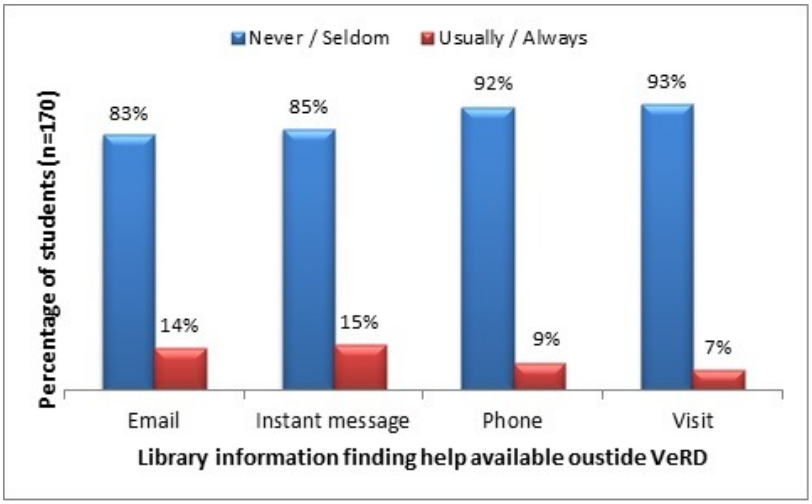

Figure 6: Student help-seeking methods outside VeRD (n=170)

The most popular referencing resources were the APA Quick Guide (84%), Online APA Guide (42%) and the FAQ (35%) :

> You just Google APA and the first item that comes up is the Library's APA guides. (Year Three Focus Group)

Some responses indicated a high level of satisfaction with library support for finding and referencing information:

> I find the directions for APA very clear and Library Search is great. (Year One)
>
> I feel you [library staff] are always approachable. Have always gotten quick feedback. (Year Two)
>
> I have found the new system user-friendly, easy to navigate around and video tutorials and screen shots very beneficial. (Year Three)
>
> I think you guys are great! Always approachable and willing to help :-). (Year Three)
>
> I have found all parts of VeRD to be easy to access and answer all problems I have had. (Year Four)

Take my advice, I'm not using it!

When asked what advice they would give to new students about finding and referencing information it is noteworthy that the majority of the 124 respondents advised students to seek help from and to use the library (see Figure 7)

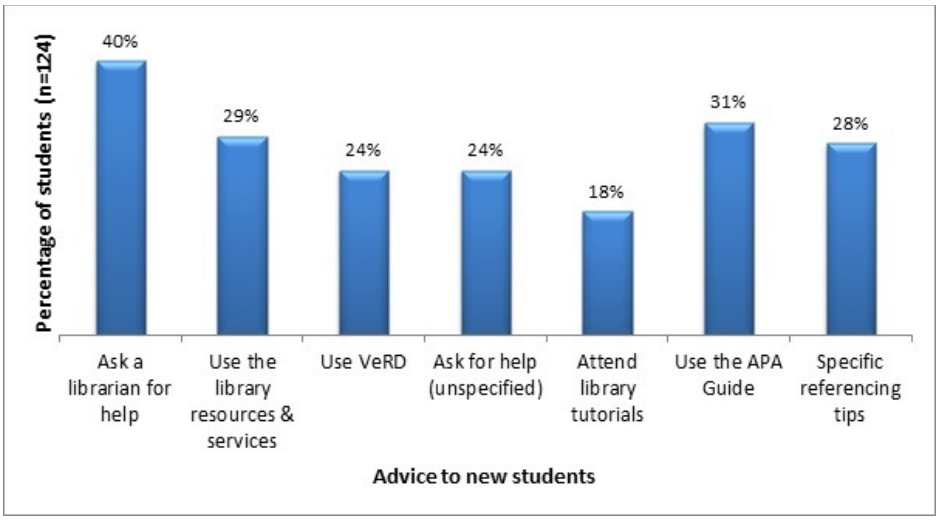

Figure 7: Advice for new students about finding and referencing information for assignments (n=124)

Focus group participants recommended that new students use library services and commented that their lecturers wanted them to use the library to access recommended readings:

> Take your time and try and learn, cos I wish I had in the beginning and then I wouldn't have gotten off track, trying to find other articles that were easier but weren't right. (Year Three)

Students who reported not using the library or library services at all (n= 14) did in fact seek library help for referencing, and seven of these self-identified 'non-users' would recommend that new students use library referencing resources or ask the library for referencing help. This suggests that the referencing guides and help are not perceived by some as library services.

Factors prohibiting students seeking help from the library

While equal numbers of students (69.5% and 70.5% respectively) commented about information-finding problems and referencing problems, the majority reported they did not seek library help (see Figures 5 to 8). Comments from the focus group gave insight into students' reluctance to seek help from library staff, such as feeling embarrassed, not wanting to be a nuisance, not knowing how to ask, and the importance of relationships.

Recommendations to enhance library services for online learners

Students were asked how librarians could improve the help offered. Of the respondents to this question (n=82), 42 (51%) indicated that they were extremely happy with existing library services (most of these respondents had indicated that they were frequent library users). Slightly fewer respondents suggested improvements (n=36, 44%), including:

- more easily navigable library resources;
- a tutorial in APA referencing; and
- longer library tutorials to allow more time to get to grips with the content.

Implications

Invitational theory is based on respect, optimism, intentionality and trust (Purkey, 1992). The findings of this study indicate that most MMP students had high levels of trust and respect for the library and librarians, which was reflected in their willingness to participate in this study. However this trust and willingness to engage appeared to dissipate when students were off campus and did not translate into sustained problem-solving or adaptive help-seeking behaviours when seeking and using information. Personal relationships have been identified as a factor influencing library use (Connaway et al., 2008; Kwon, 2008; Pellegrino 2012; Zimerman 2012). It is understandable that the two or three times a year MMP students attend workshops with librarians is not sufficient to develop connectedness, and that for many, librarians are simply 'out of sight, out of mind'.

While students engaging in an online programme may be assumed to possess the information literacy, digital literacy, problem-solving skills and adaptive help-seeking behaviours associated with digital smarts, this study has identified areas where further development is needed. The majority of students (69.5%) found it difficult to find relevant information, irrespective of whether they used Google or the library, and many lacked the skills and confidence to use the library effectively, although improvements were apparent in later years of study. For most students (70.5%), correctly acknowledging sources using the APA referencing style proved problematic despite making high use of the library's print APA guide. A majority of students did not seek help from the library for their information seeking and referencing needs, and 50% claimed to rarely use the library, which compares favourably to Toner's (2008) research that found 70% of distance students did not use the library.

To address these issues, the following strategies are recommended:

Build a bridge to the library

To promote adaptive help-seeking behaviour we need to capture the hearts and minds of our non or low users by challenging outdated notions about the library. This can be achieved by connecting with them personally, supporting them to develop information literacy, and building a bridge between the free web and the library.

Make the horse thirsty

It is not enough to point students in the direction of quality information and expect them to use it. We also need to make the horse thirsty through the scaffolded development of critical thinking, which teaches learners how to engage intelligently and discerningly with information wherever they find it, and why it is important to do so. This will require working with faculty to better embed critical, digital and information literacies as key competencies across the curriculum, particularly when courses are being planned or reviewed.

Wag the tail not the dog

Finally, the disproportionate amount of time spent on the minutiae of the APA referencing style could be addressed by teaching APA to first year students and promoting the use of citation generators and referencing software, as well as the video tutorials to accompany them. Furthermore, to address inconsistencies between papers, librarians could work with faculty to develop a more uniform interpretation of APA, and offer a "quality control check" across the books of course readings to ensure they are accurately referenced. Given the heartache that referencing seems to cause for so many students, this is certainly something that academics and librarians involved in course design need to consider.

Limitations of the study

This study investigated the experiences of a specific cohort of distance students from an initial teacher education programme. As such, it does not attempt to represent the experiences of students from other disciplines, or the perspectives of academic staff involved in the programme. The research did not seek demographic data such as age, ethnicity or prior level of education, nor did it attempt to assess how students determine the relevance of the information found. While this data would have allowed a deeper analysis, it was beyond the scope of the time and resources available. These limitations could be addressed in future research.

Conclusion

This study endeavoured to find out what challenges MMP students encountered when seeking information and referencing sources during their initial teacher education. Despite designated librarian support, on campus tutorials and ongoing online access to support services, nearly three quarters had problems finding information and referencing it throughout their degree. Half the cohort seldom used the library to find information; and the majority did not seek help from the library 'help services' despite their apparent awareness that this help was available and their recommendation that other students use it. Lack of confidence, skill and time, combined with distance from the physical library and a reluctance to seek help, were principal factors in low student-library engagement. Many participants therefore demonstrated a lack of digital smarts—in particular, they lacked problem-solving strategies and adaptive help-seeking behaviour. There were many "shoulda woulda coulda" moments in the findings, which were exemplified by the advice which the majority of students gave but did not take: use the library and seek help in order to use it.

Although half of the MMP students who participated in this study had highly positive things to say about the library, it is clear that as librarians we need to build on this sentiment, so that 100% of them use our services to gain the support they need to engage with relevant quality sources that will lead to better educational outcomes. The library strives to be intentionally invitational and to create an environment that assists (invites) students to make use of our resources and services in order to thrive as learners. Based on the findings of this study, there is more work to be done. Three main ideas have emerged from this research which could be used to develop interventions: build a bridge to the library, make the horse thirsty, and wag the tail not the dog. If educational institutions are to assist learners to develop digital critical and information literacies, faculty and librarians must partner to capture the hearts and minds of these students to assist them in developing digital smarts in order to become effective 21st century learners.

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Chapter 8: Building transnational, cross-cultural skills through an online, open reviewed journal

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Abstract

This chapter presents a case for ongoing discussion of ways in which digitally smart communication can help to build research skills in a globally linked world. It is based on a small cohort of submitters to an online journal of education which uses an open reviewing process and multiple iterations to encourage the development of papers of publishable quality in the journal. As the journal attracts papers that use Living Educational Theory, this is the theoretical underpinning for the methodology of the chapter. I, as author, am a reviewer for the journal and on its Development Board so I do not claim to be a disinterested party. Rather, I seek to show from a limited sample of successful submitters how research skills and an investigative community can be developed despite differences in geographical location and culture, and how this work is compatible with my Living Theory orientation. The chapter aims to provoke further investigation of this issue.

The theory of connectivism is referred to in investigating whether such differences affected the usefulness of the reviews to the authors. Feedback from those who agreed to participate indicates that the transnational, cross-cultural differences had no negative impact on authors' ability to shape their papers for publication. They indicated that the process had been most worthwhile and that open digital reviewing had been a valuable process in which to be engaged. The paper concludes with some thoughts on the benefits of open reviewing versus the more traditional closed reviewing in the building of researchers' skills and confidence, and seeks to promote ongoing investigation of this process.

Keywords: open reviewing, Living Theory, connectivism, cross-cultural, transnational, research skills development

Introduction

Digital developments worldwide are affecting diverse areas of practice, not least in education. Many people work in areas where digital communication is the norm. Some of us

struggle to adjust our practice and to make use of emerging technologies. Some of us are also pressured to produce research that is based on our practice. For all of those reasons, I accepted the challenge to contribute to *Digital Smarts*. I am an experienced peer reviewer for a number of publications and on the editorial board of three journals also. The online journal which is the subject of the current chapter focuses mainly on the higher education context. It uses a transparent, open reviewing process to assist authors to achieve the journal's publication standards. All this happens electronically, so the process was an ideal subject for a digital smarts chapter.

What does digital smarts mean in this context?

I see 'digital smarts' as the use of digital technology in a critical, self-reflective way to improve, enhance and disseminate understanding in a field of practice—in this case, a particular higher education focus: the development of transnational, cross-cultural[15] research skills. I was alerted to a possible dearth of research in cross-cultural aspects of transnational work through attending a workshop that included a colleague, Kerry Earl (contributor to this book), who shared a paper covering this matter (Zawicki-Richter, 2011).

While I have been an 'early adopter' (Sharpe, Benfield, Roberts, & Francis, 2006)[16] of some digital technologies, I do not always find new applications easy to grasp, and sometimes struggle with aspects of technology. However, I have always been a compulsive collaborator and, I suppose, an adaptive help-seeker (Steed & Poskitt, 2010). One of my aims is to promote the development of others as well as myself. So my work as a peer reviewer for the *Educational Journal of Living Theories* (EJOLTS—see www.ejolts.net) came to mind. This journal uses an open online reviewing process (described later), as is commensurate with the theoretical approach encouraged.

A short description of Living Theories is appropriate here. The term 'Living Theory' was initially coined by Jack Whitehead to counteract the belief that the disciplines-based approach to education, prevalent in the late 1960s and early 1970s, could explain how individuals influenced their own and each other's learning. (See https://www.youtube.com/watch?v=VoCwS89m1jo for an account of Whitehead explaining this development). Whitehead quoted Allender and Allender (2008), who stated that "the belief that educational research trumps practice, historically and still, is one of the major obstacles" (Whitehead, 2008, p. 105) to teachers having their expertise recognised. Whitehead (2008) defines living theory as

> an explanation produced by an individual for their educational influence in their own learning, in the learning of others and in the learning of the social formation in which they live and work. (p. 104)

It is these kinds of explanations about learning and practice that are encouraged in EJOLTS contributions, which are read by an international audience. The journal presents, critiques and further

[15] I am using these terms to describe work that transcends both national and cultural boundaries, that encourages connection across countries and between people from different groups, be they ethnic, religious, socio-economic or 'other' to oneself.

[16] The term 'early adopter' was initially used in marketing by Rogers, but has been extensively applied to the information technology area by a range of authors. Sharpe et al. (2006) look at several of these papers.

develops robust research from those investigating their educational philosophies and practice through using an iterative, totally transparent review process. Far from conforming to positivist notions of 'objectivity', it challenges authors to clearly state their values and beliefs, and to show how they are working to ensure harmony between these through what they practise. The 'I' is very much part of the writing process. This theoretical approach underpins this chapter's methodology, as it resonates with my own desire both to promote equitable treatment for all cultures and peoples, and to subject my own practice to scrutiny and improvement. To what extent, I wondered, might comments from journal reviewers, including me, help people from different countries, cultures and fields of practice to develop research skills as they undergo the open reviewing process that EJOLTS uses? How might this process be an opportunity for growth? To what extent might feedback from very different reviewers affect that growth? These questions framed my investigation for this chapter.

Theoretical underpinnings and literature review

Living Theory is the yardstick by which my writing should be measured. In other words, to what extent am I demonstrating synchronicity between my claimed values (i.e., wanting to promote transnational and cross-cultural equity) and the work I undertake in my life, evidenced by this small example from my reviewing practice? I recognise the perils of generalising from small samples, so this chapter is intended to provoke further discussion rather than to claim 'success' from engagement with a tiny, although culturally and nationally diverse, group. I hope it challenges practices that I perceive as restrictive rather than expansive (closed, rather than open, reviewing). While not the main thrust of the chapter, I claim that the openness of the EJOLTS reviewing process is supportive of the development of transnational and cross-cultural research skills.

One of the joys of working collaboratively, including developing a book such as this, is that all those involved can be challenged to investigate and adapt/adopt emerging theories and methodologies. Hence, I was challenged by Dianne Forbes, one of the co-editors, to look at connectivism as an emerging educational theory in an attempt to revise learning theories in a digital age. Digital technologies make this not only possible but rapid and responsive. I investigated connectivism initially via a regularly cited author in the field, George Siemens. His "Connectivism: A Learning Theory for the Digital Age" article appeared on elearnspace.org in December 2004, from whence I accessed it on 12 March 2013. Siemens (2004) describes connectivism as

> the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements—not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing. (Connectivism section, para. 1)

Interested readers can access a video of Siemens speaking at The University of Waikato on this matter at http://coursecast.its.waikato.ac.nz/Panopto/Pages/Viewer/Default.aspx?id=054becac-8e61-4da5-88df-ba3696cfa429 (accessed June 10, 2014).

A tenet of connectivism is that learning can occur outside of individuals (the space between?); it can develop in organisations and through virtual communities such as that of EJOLTS. It therefore lends itself well for use as a tool to investigate communication that transcends national and cultural boundaries. As Kop and Hill (2008) stated in their investigation of connectivism and online learning,

> Online networks might be open and may facilitate connections, but local culture and values cannot be incorporated all that easily as the online networks are global, with diverse participants, each bringing his or her own ideas and background to the fore. (Teaching in a Connected Environment section, para. 3)

Their work indicated how online networks, following the principles of connectivism, are able to transcend local culture and values, building diverse knowledge through the collaboration and influence of individuals' ideas.

One of the principles of connectivism is that connections must be nurtured and maintained to facilitate continual learning; that decision-making is itself a learning process; that "choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality" (Siemens, 2004, Connectivism section, para. 3) So within EJOLTS, community is fostered through open processes in which reviewers and editors seek not just to maintain standards but to encourage growth and extend authors' knowledge and awareness of their own knowledge and skills. The national and cultural lenses of both authors and reviewers affect their approach, but the multiple iterations in EJOLTS, where each knows the other's identity, allow for queries, challenges and responses in a way that is far less likely in a closed reviewing process, where issues of nationality and cultural and educational biases are hidden. Authors' comments in reply, and indeed via their feedback sought for this paper, facilitate the journal's growth as well as the editors' and reviewers' knowledge. This exemplifies the idea of a 'shifting reality'.

EJOLTS is therefore developing a repository of (a) stories of research processes, including successes and failures; (b) a shared belief in the Living Theories process of investigation (see below); and (c) leveraging Internet affordances to provide international feedback to the submitter of each paper. Because this feedback is public, it is possible for research skills to develop and extend way beyond the original contributor, as will become evident from the respondents contributing to this chapter. Simultaneously, the Living Theories approach is reworked, extended and applied in transnational, cross-cultural contexts that test applicability and possibly shift knowledge. It is, perhaps, indicative of the strength of EJOLTS' virtual community that none of my respondents chose to remain anonymous, despite me offering them that option as part of the ethics protocols of the Faculty of Education, The University of Waikato. These participants consented to contribute their perspectives both for this chapter and in the interests of further strengthening EJOLTS' work.

In his seminal work on the development of Communities of Practice (COPs), Wenger (1998) described the need for people in such communities to work towards alignment of purposes, needs, methods and criteria in order to invest energy, find common ground, ethically wield power and authority, convince, inspire and unite community members, define visions and aspirations, propose stories of identity, devise methods that are usable across boundaries, and create boundary practices that reconcile diverging perspectives. I argue that EJOLTS has worked in a 'digitally smart' way to build such a community of practice. Even though contributors to the journal (editors, peer reviewers

and submitting authors) practise in diverse countries and cultures, they seek common ground. Involvement in the Educational Journal of Living Theories helps us to story our identity. This enables the crossing of cultural, geographic and educational boundaries without misusing power and authority. It is not uncommon for those submitting to more traditional journals to find their work summarily dismissed by 'blind reviewers' who may not understand the contexts from which the authors come, nor the importance of their work to their own communities. EJOLTS operates an open reviewing system that honours both the author and the reviewer, allowing both to engage in professional discussion about the development of individuals' publications.

Living Theories requires rigorous explanations by individuals for their educational influence in their own and others' learning. One form of this rigour is provided through making the processes transparent. As Whitehead (2008) observes, "A living theory methodology explains how the enquiry was carried out in the generation of a living theory" (p. 107). The "processes of validation", that is, the means by which the writer and critics can tell whether the work is consistent with the author's claimed values and practices, must also be included. Whitehead claims the use of a process of "democratic evaluation" demonstrates this consistency. "I submit my explanations of educational influence to a validation group of peers with a request that they help me to strengthen the comprehensibility, truthfulness, rightness and authenticity of the explanation" (Whitehead, 2008, p. 108). It is this kind of feedback to writers that EJOLTS strives to provide.

The responses of my research participants in this chapter demonstrate that this process is largely successful as several reported having their thinking stretched and revisiting what counts as appropriate evidence of their values and practices through the open reviewing process. As McNiff and Whitehead (2011) explain:

> A living theory perspective places the individual practitioner at the heart of their own educational enquiry. Individuals undertake their research with a view to generating their personal living educational theory, which would be an account containing the descriptions and explanations of practice that individuals offer as they address the question, "How do I improve my practice?" (Whitehead, 1989). It is the responsibility of the individual researcher to explain how they hold themselves accountable for their potential influence in the learning of others. (pp. 43–44)

But, and this is particularly pertinent in a book on smart use of digital technologies, EJOLTS encourages multi-media possibilities that enable writers to show how they are enacting the values and practices that they claim in their writing. In this, they are seeking to include a wider range of appropriate forms of evidence to address Whitehead's claim that "the forms of representation that dominate printed text-based media cannot express adequately, in the standards of judgment and explanatory principles of academic texts, the embodied values we use to give meaning and purpose to our lives in education" (Whitehead, 2008, p. 113). I also seek to bring about more equitable research options for people across nations and cultures (see Bruce Ferguson, 2008). Hence YouTube clips, photographs and sound files are embedded in many of the papers submitted to EJOLTS—for example, the link to Whitehead's video added earlier.

Context of study

Why did I decide, in a chapter for a book on digitally smart actions, to investigate EJOLTS' reviewing processes and their impact? I had been interested since my first involvement in EJOLTS in issues such as cross-cultural skills development and the possibilities and challenges inherent in facilitating these in a digital age. Consistent with my claim to be working in a Living Theory way, in January, 2010, I posted this question on the EJOLTS Development Forum:

> During 2008 and 2009, I was requested to provide EJOLTS reviewer feedback for writers from three very different countries. My questions to myself, which I suspect I shall be asking throughout my life, revolve around issues such as: what aspects of my own cultural background (white New Zealander of UK/European background) affect the way I respond to others' practice and writing? How fair and valid does this make my work with them, and my feedback to them? The saying "The goldfish does not see the water" is indicative of my feelings about these issues. How can I best consider my own biases, reflect on these, build on the strengths of what is good, and discard or control what is not helpful when I interact with people from other backgrounds?
>
> There have been times in my educational practice when I have been challenged on my assumptions, behaviour and ways of interacting with colleagues and students. These challenges, while sometimes painful, have been most helpful in confronting me with the 'water' that I hadn't paid attention to before. Those challenges have made me a lot more tentative about previously taken-for-granted aspects of educational and research practice. What I would love to hear discussed on this development team list is how others have worked cross-culturally, how you have been challenged, and what strategies you have developed to build strong positive relationships with those you interact with. I'd warmly welcome your suggestions for improving my own practice!

My query received responses from editors Drs Jack Whitehead (UK) and Branko Bognar (Croatia). The latter wrote:

> *Dear Pip, your question about cross-cultural co-operation is very important particularly for our journal..... Namely, although I am eager that EJOLTS become respectable international journal, I am much more eager that it allows practitioners from different countries (particularly less developed) to present their stories in the way which maybe won't be completely in accordance with all requirements of Western academic community, but which would be genuine, warm and inspirational. (http://ejolts.net/moodle/mod/forum/discuss.php?d=33, 15 August 2009") [reposted 23/10/10]*

Branko confirmed that he was aware of situations faced by authors from non-Western countries in accessing the literature and writing this up in ways that are taken for granted by those writing in English-speaking countries. This short example provides evidence of seeking ways to improve both my own practice and also offering opportunities for people from countries and cultures who may have alternative (but equally important) knowledge to share through publication.

Objectives of study

In January 2012 I gained ethical approval through my own University and from the EJOLTS editorial board to investigate the issue, under the title "Open reviewing in e-journals: Can it build supportive transnational skills and community?" My objectives in this study were to carry out a small but systematic investigation that would provide some answers to the above question for the EJOLTS community but hopefully also in ways that would be helpful to a wider audience. I sought in this way to continue my investigation into whether and how my own and others' ways of being, conducting and reviewing research were perceived as supportive, intrusive or colonising by the recipients of our feedback. I also wished to contribute to the ongoing development of EJOLTS, a journal that I believe occupies a special niche in terms of its transnational, cross-cultural and multi-media emphases. The opportunity to do this work for a book on digital smarts, to share the ongoing research with my colleagues at the University and to gain feedback as it progressed was also valued.

Methodology

Living Theories research is avowedly transparent and representative of the authors' values. Hence, in this research I have sought to be as transparent as possible and to open my practice to disconfirming evidence. The following methodology description, I hope, demonstrates these values. I invited eight people, chosen on the basis of my connection to them in a capacity of being a designated reviewer or that I had contributed ideas to their submitted papers as part of the open review process.[17] They could respond anonymously via Prof. Moira Laidlaw, one of the EJOLTS editors, choosing to participate or not. Four of the eight I approached responded to this invitation, agreeing to participate without anonymity. I had been a designated reviewer for three of these authors and an open reviewer for the fourth.

In EJOLTS, submitters can peruse peer reviewers' bio briefs, and select one by name if they wish. The Editorial Board selects a separate reviewer, bearing the submitter's practice area in mind. The open, transparent reviewing process also enables anybody who is a subscriber to EJOLTS to contribute ideas—a digitally smart way of expanding the feedback to the author. Submitters can therefore receive a variety of very diverse feedback on initial and subsequent drafts of their papers, all of it in plain view. This continue until the paper is either accepted for publication, or withdrawn. Very few choose the latter option.

Once the participants agreed, I emailed them a questionnaire and the results appear below. I am most grateful to Sigrid Gj□tterud from Norway; Sara Salyers from the UK; Jacqueline Delong from Canada (Jackie subsequently); and Hatice Inan from Turkey for their willingness to respond to this research. In response to feedback from an external reviewer, I can acknowledge that two of these authors were relatively new to writing research papers, while the other two are already-published authors. An additional aspect to the research, suggested early on by this book's editors was able to be ethically cleared. This meant I could send the completed questionnaires (unedited and named) to the

[17] One external reviewer suggested that inviting only successful submitters could be seen as biased, and that I should have included others who were not successful. However, there are remarkably few of these, as the journal seeks to support authors through to publication and is highly successful in this endeavour. Additionally, I had no access to the details of the few who withdrew.

EJOLTS editorial panel to support ongoing development of the journal without having to wait for this book to be published. Dr Margaret Farren, representing the editorial panel, replied that they had found the feedback helpful. As a result, they intended to seek additional reviewers; to check the ongoing availability of existing reviewers; to monitor turnaround time more closely; to place word restrictions on paper length so that reviewers are less likely to turn down invitations to review (for example, some papers in the past had been up to 16,000 words); to encourage readers to consider submitting articles of their own, and support others to do likewise; to seek accreditation of the journal in databases that would enable the status to be raised through application to Scopus and Web of Science; and to meet with an online publisher to publish the journal. This feedback to the EJOLTS editors and their response to it, although additional to the research as originally designed, demonstrates the benefits of sharing the work with the Digital Smarts authorial/editorial group as it progressed.

Findings

At the outset, as I have stressed previously, I acknowledge that this is a very small sample and that generalisable claims cannot be made on the basis of our work. However, as I sought to investigate the gap that Zawicki-Richter (2011) identified in research on transnational, cross-cultural work, it both provides some ideas that might provoke wider investigation, and demonstrates that digital publications can be helpful in this regard. Bolding is used below to indicate the main point of each question, rather than appending these to the chapter.

All respondents, regardless of their previous publishing experience, agreed that they would rate their experience of submitting their paper to EJOLTS as 1 = extremely satisfied to 5 = extremely unsatisfied. The number of submissions of successive versions of their paper varied from 2 to 5. There appeared to be no specific identifiable reason for papers to need multiple iterations, with two iterations being cited by both non-English-as-first-language respondents and also the one who cited five iterations. Of the respondents whose first language was English, one submitted two iterations and the other three.

I asked if they had selected a specific reviewer, an option noted earlier, to complement the reviewer assigned by the EJOLTS editors. In this regard, one person selected a reviewer who she knew would understand her field since they had corresponded already (Sara). Another selected a reviewer whose background looked similar. However, this reviewer was tardy in responding, and she felt he didn't really give constructive feedback. The other two did not nominate a specific reviewer, going with the two allocated by the editorial board. No reviewers were from the authors' own countries; one said both were from their part of the world (Hatice) while Sigris indicated that one of her reviewers was from a similar country. For the other two, reviewers were from quite different parts of the world. Readers can see that this is a vastly different process from the 'normal' blind-reviewing that happens for most journals. Submitters to these journals do not know who the reviewers are and cannot engage in dialogue with them. Multiple iterations of an article are often not encouraged by some journals.

Considering that this chapter investigates whether the open reviewing process is an effective way of building transnational, cross-cultural research skills, how helpful did these respondents find their feedback from different reviewers? Sigrid included an excerpt from the feedback she responded to on her first draft (to me as reviewer):

> Thank you for your encouraging feedback—I very much look forward to revising the paper after this! You enlightened the question of what it really is to live with contradiction with one's values. I need to think about that again.

Sigrid said that the article had been written early in her PhD process and the submission of it and feedback from Dr Jack Whitehead, Prof. Moira Laidlaw and me proved to be

> extremely important. I would say this feedback was crucial for my understanding of analysis and it helped me to realize the value of my data in a new way. I was also encouraged to more solidly underpin my points by a more thorough literature review…this was all very useful (crucial) in my further work on my thesis.

Hatice stated that she

> …found e-feedback great because I was reading e-feedbacks on other papers and got some ideas for mine. Also I was happy to see all my reviewers seeing each other's feedback because I believe they were trying to be original and cover things on my paper which is not covered by others. I found the process wonderful.

Hatice highlights a benefit of the open reviewing process—it is not just the 'submitting author' who benefits. A wider community of people who have access to the journal but may never submit their own work can develop research skills by reading successive iterations of an article. Jackie mentioned that feedback "helped to clarify some of my intentions" and "strengthen[ed] the clarity of the writing", while Sara said her feedback from both reviewers had

> forced me to reconsider my emphasis, to look again at what was at the heart of my paper, what was really at stake, and was most important in terms of my own values and passion.

Sara's comment draws attention to the robustness of the journal's attempts to ensure that authors follow the precepts of Living Theories—the reviewer feedback had wanted her to be clear and considered about her own values, and how they were represented in the paper. It is evident in many respondent comments that feedback had pushed submitters to consider how their own living educational theories were developing and whether and how the evidence they had provided justified the claims they were making about their values and their practice. Hence, by adhering to the Living Theories principles of the journal, submitters could continue to work in transnational, cross-cultural ways whilst adhering to the values and passions that motivated their practice in their own contexts. Their investigations required them to be true to themselves. Reviewer comments helped them strengthen the ways that they showed harmony between claimed and demonstrated practice.

I strived to determine whether differing national and cultural lenses had affected reviewer comments, interpretations of the submitted work and how their feedback was received. The diverse backgrounds of the reviewers had not caused misunderstandings, except in the case of Sigrid, whose use of terms such as "student teachers are trained to be resources" was understood differently in Norway than in the UK. She wrote: "In Norwegian the word 'resource' in some settings has a meaning of being resourceful—which might be positive. And I guess the notion of training also have

a slightly different meaning." These clarifying comments were in response to Prof. Moira Laidlaw's questioning of her usage. The value of the open reviewing process is that Sigrid was able to explain the semantic variation, which Moira then accepted.

Hatice felt that, with one exception, all the reviewers had "understood my paper well, maybe because all of us believed in the Living Theory". Both Jackie and Sara felt their work had been fully understood. While no volunteer reviewer comments had been received from authors' own countries, two of the volunteer comments had been from their part of the world. Hatice mentioned these had been "maybe more helpful than I expected", while Sara mentioned comment by Dr Jack Whitehead on a new iteration which had "provided a hugely uplifting validation of the realigned paper".

As Hatice noted, perhaps the shared methodological underpinning of the journal facilitated authors' and reviewers' ability to relate and helped in the building of a community of practice. Hatice stated that "EJOLTS knows what it wants exactly, presents its paradigms clearly which is one of the most current, realistic, practical paradigms". Jackie reinforced this, saying, "Living Theory is the methodology that I use in my research. This journal publishes living theory research". And Sigrid commented that Living Theory had been a major inspiration for her work so EJOLTS "seemed like the best channel for publishing the work". Hatice said that "it did not feel like our different cultural backgrounds made an important difference [as] suggestions were both useful and practical. Mostly reviewers were very clear in their statements and we put a real effort to understand each other." Jackie felt that suggestions were "appropriate and strengthened the paper", while Sara said her reviewer comments were "not only appropriate but essential and transformative. They not only pushed a very different paper into existence but forced me through a real and transformative process myself."

There were various perspectives advanced on the actual process of open review. Some were favourable:

> A completely transparent process which is both more challenging and much, much fairer for submitting researchers (Sara)
>
> I loved working with EJOLTS because of the valuable feedbacks I got (Hatice)
>
> Straightforward (Jackie)
>
> I found it very user-friendly…responses very prompt and forthcoming (Sigrid)

However, sometimes the process didn't work so smoothly. While Hatice complimented the journal because the forum (the online process that holds all the comments, signed and dated) showed when her 'turn' was coming up, she sometimes felt "like the process is very slow. Because of some kind of misunderstanding or not, I lost a lot of time, and my paper was not ready for the following issue". For Sigrid, however, not faced with such delays, "The open review process made the review transparent. There was no long time waiting for a response. It turned out to be learning for life."

Interestingly, when asked why they continued with their paper after reviewer comments on the first iteration, the humanity (my word) of reviewers seems to have been a key factor. "The fact that the reviewers really showed me their reactions and feelings about the paper was an important incentive...I didn't want to 'let them down'…I realized I was given an opportunity for learning I had to take!" (Sigrid). "Reviewers' (volunteer or regular) constructive feedbacks were one of my reasons

to continue work" (Hatice). Jackie commented that "the response from the reviewer was very positive and I felt that the changes were not onerous", while Sara mentioned that "this is not just an experience of doing research and writing it up; it is an experience of challenging yourself as a human being in relationship with other human beings, and as someone whose own values and living contradictions have to be probed and laid open". (This is a particularly illuminating comment, in the light of the diverse national and cultural backgrounds of reviewers and authors.) Sigrid said, "I felt taken care of, I felt my work was treated with respect."

Where a blind-reviewed journal severs potential connections between author and reviewers, EJOLTS positively encourages contact. I wrote to Sigrid early on, saying, "Having re-read my own reviewer comments, and those recently added by [X and Y], I'm thinking you may be feeling fragile about your paper, despite the positive words we have all given you about it." These words were quoted by Sigrid in her questionnaire, saying that she "strongly felt that all responses were given in the best of spirit in order for me to grow…I had a positive hope I knew where to go on the base of the feedback". Jackie commented that she "appreciated the engaged response from the reviewer". Sara mentioned the synchronicity between EJOLTS' aims and its process, stating that

> EJOLTS presents a quite remarkable opportunity to contextualize reflection and inquiry in terms of living relationships. I am still deeply moved and inspired by the fact that love can be present and visible in an academic journal and between academics who know one another only as online colleagues.

This comment is, to me, evidence that digital technologies can help to build a real community of practice, even when the participants have never met, do not belong to similar institutions or countries, and are very diverse.

Feelings were not always positive, however. Sigrid commented on feelings of "dispiritedness" after receiving an editor's review, but recast this as "a great opportunity to learn how to become a researcher". Hatice had one reviewer who "criticized my paper but did not make any suggestion for improvement and sounded like he did not really understand my work". Sara, after feedback on her initial draft, experienced "frustration, depression that I would have to go through my process again, and the feeling that I could not see the wood for the trees". However, progress came from this. "This was followed by elation when, after a long incubation period, the light suddenly went on and I realised that I had lost sight of the whole reason for writing the paper and of all that mattered most to me."

So, did the authors feel that they had built skills as a result of participating in this open reviewing process with feedback from such diverse locations? The responses here were uniformly positive. Jackie, who is also a member of the editorial board for EJOLTS, expressed hope that she "was contributing to an emerging critical mass and encouraging others to do the same", and that the clarity of her writing had improved as a result of the process. Hatice, an experienced researcher already, said her research skills had not changed, "but as a writer I felt improvement…Reviewers found the limited parts and helped me to make my paper more clear to other people [and] increased my enthusiasm on my research. I was more eager to tell people my story." Sigrid's comments on the skills she had learned have already been mentioned above, but noted that the feedback had "pointed to the fact that the participants' voices were not as audible as intended". Probed about whether she would recommend to other writers to submit a paper to EJOLTS, Sigrid said, "I felt the reviewers to

encounter me in I-Thou (Buber) relationships although we had never physically met. This was very encouraging and made me handle the critique in a very positive way. Since my article was about love and critique in supervision, this experience also gave valuable data to my research!" All respondents said they would recommend this journal's review process to others. Hatice has positively encouraged one of her email lists and qualitative researcher colleagues to submit to EJOLTS. Jackie, as might be expected of an editor for the journal, recommends it to her students "not only as a means to get feedback on their writing but also to share their knowledge and build that knowledge base". Sara's comments on the benefits of self-probing as a living contradiction support this view.

Discussion

I wanted to foreground the voices of my respondents in this chapter, as their perspectives are what count in any claims I might make about the benefits of EJOLTS' open peer reviewing process in building transnational, cross-cultural researching and writing skills while developing a virtual community. I think readers can see from their comments that while there were some glitches (such as delays in processing drafts in one case; getting useful feedback from one reviewer; feelings of anxiety about their work), they are overwhelmingly positive about participating in this open reviewing process. Their responses indicate a clear sense that Living Theories methodologies and the EJOLTS journal have provided a communal space for conversation.

The feedback on what skills they have acquired, however, is more diverse. All seem to have found reviewer comments (whether to them personally or through viewing the feedback provided to others) benefited their writing. But with two of the four already experienced researchers, there were really only two who felt that their research skills had been further developed through the process. These two, however, were extremely positive about the effects that the review process had on their claims to knowledge, on their ability to express their values and beliefs, that the process had been "transformative" and was about "learning for life". Three of the four commented on the transparency of the process, and how it had enabled them to follow the progress of their paper through the reviewing process, or helped them to learn from feedback provided to others, or how the engaged responses of reviewers had encouraged them to continue even when feeling "dispirited" or "unable to see the wood for the trees".

It is interesting that none of them felt that the contributions from reviewers from different cultures, countries and parts of the world had adversely affected them. In fact, comments show almost uniformly that there was a sense of being understood and supported, regardless of where the reviewers were from (excepting the reviewer whom Hatice felt had not understood her work, not made suggestions for improvement and was tardy in responding—the sole criticism of a reviewer in this study). The only specific comment about misunderstanding was that between Moira and Sigrid, and Moira's was a question of clarification that Sigrid, because of the open reviewing process, was able to respond to and explain. No respondents felt that their own situations had not been well understood by their reviewers (apart from Hatice's one reviewer). In a digital world, it is encouraging that feedback can be sought, given, received and acted on in the ways that this chapter shows can happen.

Even though this is a very small group and this is a short-term study, the evidence suggests that transnational, cross-cultural communication can occur; it can help to build or extend skills, and as one

respondent indicated, this can actually happen in ways that are perceived as "loving". As Siemens (2004) wrote, "We derive our competence from forming connections...the capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in our knowledge economy" (An Alternative Theory section, para. 1, 4). EJOLTS has enabled both experienced and new researchers to form connections across countries and continents. The data presented here, although with the recognition that the group is very small, have shown how authors and their reviewers have reached across national and cultural boundaries to help each other to grow; to see where and how to better access information and support when conducting research; to challenge perspectives and to articulate better the work that we are all undertaking. Siemens continued: "Nurturing and maintaining connections is needed to facilitate continual learning" (Connectivism section, para. 3). My contention would be that the nurturing and connecting that is evident through EJOLTS and attested to by my respondents is supportive of this learning.

This raises questions as to why 'high status' research journals adhere to blind-reviewed methods as the 'gold standard'. I have encountered beginning researchers who have been crushed and humiliated by being on the receiving end of anonymous reviewer comments. The new researchers have little opportunity to explain or clarify their work to an anonymous reviewer. These beginning researchers have decided that they and their work are worthless in the face of such anonymous clobbering.

Connectivism instead suggests "a model of learning that acknowledges the tectonic shifts in society where learning is no longer an internal, individualistic activity [and that it] provides insight into learning skills and tasks needed for learners to flourish in a digital era" (Siemens, 2004, Conclusion, para. 2). As a Living Theory researcher who seeks to encourage equity in publishing transnationally and cross-culturally, I have already questioned, and need to continue to question, any such 'one size fits all' publishing requirements. Digitally supported communities are one way of sharing this work that allows us to grow digitally smarter as researchers and writers.

Conclusion

This small study has indicated that the building of research skills and communities via digital publication is possible and helpful. To determine how effective it is in building transnational and cross-cultural research skills more generally will take a much larger study over a longer period of time, but this chapter raises the issues and encourages further exploration. I claim, with support from my participants, that open reviewing is an appropriate and helpful tool in the building of healthy global research communities. However it flies in the face of mainstream current publishing practice. If the aim of research publications is to be exclusive, to appeal to small elites whose work is 'A-rated', then blind reviewing makes some sense. But it is hardly designed to build community nor to foster, in a digital age, a new generation of researchers whose ways of expressing themselves may be quite different but equally valuable.

Hence EJOLTS' avowed commitment is to open and transparent reviewing, allowing the inclusion of YouTube clips, audio recording, photographs and other ways of presenting knowledge, alongside ensuring that authors can express themselves clearly with validity and are able to debate their perspectives robustly along the way. As Dadds and Hart (2001) said, "If our aim is to create conditions that facilitate methodological inventiveness, we need to ensure as far as possible that our

pedagogical approaches match the message that we seek to communicate" (p. 169). EJOLTS "was established in 2008 to meet the challenge of publishing international and refereed multimedia explanations of the educational influences in the learning of practitioner-researchers". That it has done so effectively, in ways that have left authors feeling valued and supported, indicates that it has achieved the pedagogical match of message with approach. It is a great example of 'digitally smart' ways of supporting research skills development transnationally and cross-culturally.

I want to finish this paper with Sara's words in response to a question about why she submitted to EJOLTS rather than some other journal. This response mounts a strong challenge to some of the more traditional journals or ways of presenting new knowledge—a challenge that I believe is timely in an increasingly 'publish or perish' tertiary environment.

> There were several equally important reasons [for submitting to EJOLTS]. First, the journal is a unique forum for those who are working within—and to develop—a living theory approach to their own reflective research and practice. It not only allows but expects the kinds of data, such as embodied knowledge, that is essential to the growth of human knowledge and yet is discounted by more traditional publications. Second, its online format and the open review process make submission, editing and publication a completely transparent process which is both more challenging and much, much fairer for submitting researchers. Finally, it allows the submission of work in ordinary, simple English instead of the deadly jargon that is so much part of academic writing. This 'academese'—like the Emperor's new clothes— possesses such a mystique that its patent absurdity, its obstruction of the very communication it exists to serve are no longer recognized. In summary, EJOLTS challenges what is considered valuable research, how it is evaluated and the form it is presented in, in ways that are powerful and extremely necessary.

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Chapter 9: eLearning lecturer workload: Working harder or working smarter?

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Abstract

eLearning lecturers who move into the online learning environment often discover that the workload not only involves changes but can be overwhelming as they adjust to using digital technologies as teaching tools. Questions arise about whether expanding this online teaching component in tertiary institutions is sustainable, given the levels of dissatisfaction some lecturers experience along with lower morale and apparently increased workload. One challenge facing lecturers centres on learning workload management strategies related to teaching in online learning environments.

This chapter describes a study examining the perceptions of 10 experienced online lecturers regarding both their online teaching workload and their workload management strategies.These lecturers were interviewed about their perceptions of working in such contexts, comparing them with face-to-face contexts. This chapter notes both conventional and innovative management strategies these elearning lecturers use, indicating the diverse range of workload strategies. These suggest that further research may better evaluate the effectiveness of these strategies.

Keywords: lecturer workload, workload strategies, workload management, e-teaching

Introduction

Digital smarts is the key theme of this ebook, and I choose to view it in relation to digital intelligence and expertise. Looked at another way, an alternative term that can apply to this concept is digital fluency. There is evidence of digital smarts in the strategies my participants developed to manage their digital workload, and these will be addressed later in the chapter. Another meaning of ‘smarts’ is a sharp, stinging pain and this is reflected in some of the stories the lecturers tell. These include stories of lost data or problems with the online technologies, causing psychological, if not physical, pain.

Digital workload has been an area of interest for me for some time now (see Bright, 2005). Because of this interest I was pleased to be allocated time as part of my current position at the University of Waikato (New Zealand) to investigate this area more closely and build on Donaghy and McGee's (2003) work reporting the experiences of lecturers working online at the University of Waikato. This earlier report, however, did not address either elearning lecturer workload or lecturers' strategies in managing this workload.

This chapter is thus based on a case study research project undertaken at the University of Waikato in New Zealand in 2012. The case study tells the stories of ten experienced elearning lecturers and the elearning workload management strategies they have developed. The term 'experienced' was operationally defined for the case study as having five or more years' online teaching experience.

Research to explore elearning workload strategies was justified for several reasons. Firstly, I hoped the research would uncover some innovative workload management strategies from the contemporary experience of seasoned practitioners. Secondly, it added to existing resources in cataloguing and disseminating strategies that other practitioners may adopt in their own online teaching practices.

Calculating workload: Issues and challenges

Issues surrounding how lecturer workload is calculated and what is included in this workload calculation are numerous and somewhat problematic. Firstly, there are no systematic, comparable models for allocation of academic workload within or across tertiary institutions either in New Zealand or internationally. In some New Zealand universities a rule of thumb workload approach seems to be a workload ratio for academic staff of 40:40:20. This is distributed as 40% teaching duties, 40% research and 20% administration (Human Resources, University of Waikato). Tynan, Ryan, Hinton and Lamont-Mills (2012) found in their study of five Australian universities that these universities have broad guidelines on workloads, and most have a workload hours allocation formula. However, none used comprehensive, detailed workload allocation models that accounted for the range of tasks which online teaching requires. Existing workload models in relation to tertiary teaching thus appear to be predicated on face-to-face workload models.

Secondly, there are wide variations in the literature on what is included in the category of elearning lecturer workload. Some studies include generic technical support of students and other non-academic functions (Cavanaugh, 2005). Another variable in this theme is whether course design per se is included as part of lecturer workload. Spector (2005) for example, leaves this out of workload considerations, but Nichols (2008) notes that creating an online course (or one for blended or hybrid learning) takes significantly more time than designing one for on-campus delivery. This suggests that face-to-face models are insufficient to calculate workloads that account for both blended and fully online learning.

Thirdly, a wide range of other factors contribute to workload. These include lecturer variables. These refer to, for example, high or low levels of experience with elearning (Tomei, 2006). Other relevant variables include course type and design options, such as blended or fully online learning, as well as the type and intensity of learning activities (Nichols, 2008). Infrastructure variables, such as

availability of instructional design and technical support, are also important considerations (Morris, Xu, & Finnegan, 2005).

Fourthly, the pedagogy espoused by lecturers, whether transmissive, constructivist or connectivist, also has a considerable influence on workload (Nichols, 2008). When relationships with students is an important focus (rather than a content-only-oriented focus), then the amount of communication between lecturers and online students becomes a significant workload element (Cavanaugh, 2005; Rumble, 2001).

Class sizes are also implicated. These can be as variable as boutique postgraduate elearning classes or larger undergraduate classes. O'Hare (2011), for example, reports on one Australian university course with a typical staff:student ratio of 1:75 taught by part-time elearning tutors at 12 paid hours per week. Essentially, this works out at approximately nine and a half minutes per student per week for all tutor/student interaction. Tomei (2006) calculates ideal class sizes based on the time spent on instructional content, suggesting that the ideal ratio works out at 17 students for face-to-face classes and 12 students for online classes. At least at an undergraduate level, this seems impossible when class sizes can be as large as 200.

Given the difficulties outlined above, it is not surprising that literature on this topic tends to be sparse over the last decade. This available literature falls into three broad strands. One strand supports the hypothesis that elearning lecturer workload is less than that of a lecturer teaching face-to-face classes (DiBiase, 2000). Another strand argues that the workload is about equal between the two types (Anderson & Avery, 2008; Thompson, 2004). A third strand suggests that elearning lecturer workload is more work (sometimes considerably more) than face-to-face teaching (Cavanaugh, 2005; Shaw & Young, 2003; Tynan et al., 2012; Visser, 2000). The majority of the available literature for the last ten years falls into the third strand.

A general concern about the available literature is that in several cases it is anecdotal and limited to the experience of an individual lecturer—some of the papers are autobiographically based on the experience of the author teaching a single course (such as Cavanaugh, 2005). Others are small scale case studies involving a handful of staff, for example, Donaghy & McGee (2003). Another concern is currency—many studies are now more than five years old, and the field has evolved markedly in terms of the usability of the loneline teaching and learning tools, including LMSs (Learning Management Systems). Five years is thus a long time in the online learning world in terms new resources (witness the rise and rise of Facebook in this timeframe) and LMS capabilities. These caveats about the literature are balanced by more recent studies (such as Conceiçãao & Lehman, 2011; and Tynan et al., 2012). In both cases, they involved interviewing more substantial numbers of lecturers (38 and 88 respectively), providing larger amounts of data for analysis from these more comprehensive samples.

In the more detailed case studies available in the literature, comments from elearning lecturers indicate a range of workload challenges they grapple with (such as Donaghy & McGee, 2003). For example, 'Elaine' noted that "online teaching had been more time-consuming because she had to know the readings in-depth and she spent more time having to motivate online students" (Donaghy & McGee, 2003, p. 4). 'Bill' from the same case study report noted that he allocated 6-8 hours a week for his online course. He estimated that in contrast, he needed four hours a week for teaching the same course/student numbers on-campus. 'Merilyn' reported that for her department, "A group of 60 [students] online was seen as a group of 60 on-campus, although I consider it takes longer to be an

effective teacher in an online environment" (Donaghy & McGee, 2003, p. 28). However 'Russell' commented that the time balanced out, saying, "it can be very time intensive if you allow it to be, and at certain times it needs to be [time intensive]"(Donaghy & McGee, 2003, p. 34).

In general, the literature that indicates online workloads are lighter than teaching face-to-face classes is the exception rather than the rule (DiBiase, 2000). A small number of writers conclude workload is about the same as teaching face-to-face classes (Anderson & Avery, 2008; Thompson, 2004). Most other studies maintain that it is considerably heavier than teaching face-to-face classes (Cavanaugh, 2005; Shaw & Young, 2003; Tomei, 2006); Van de Vord & Pogue, 2012). Visser (2000), for example, concluded that nearly twice as much time is needed to teach online than in a face-to-face setting. Some studies are becoming more subtle in their workload distinctions—one recent study by Tynan et al. (2012) concluded that with a distance education model of curriculum design, academic workload was increased prior to the semester starting, but reduced during the semester. Drilling into more detailed case studies (such as Donaghy & McGee, 2003; Tynan et al., 2012) reveals lecturers' concerns about workload generated by online learning, with an emerging theme from most interviews of increased workload as a consequence of being involved in online learning.

The most comprehensive study of elearning workload to date is the Out of Hours report (Tynan et al., 2012), which involved 88 interviews of lecturers from four Australian universities. This study found that "new methodologies have increased both the number and type of teaching tasks undertaken by staff, with a consequent increase in their work hours" (p. 2). The study also found that "[work] overload due to e-teaching was a significant factor in staff dissatisfaction" (p. 2).

So having surveyed the current state of play on workload research, we can now move on from the question of whether the electurer workload is more or less than teaching face-to-face classes to a more important question. This question relates to finding out what strategies experienced elearning lecturers use to effectively manage their online workload.

Online workload management strategies

The last decade or so has seen the emergence of a small number of books and articles providing advice to elearning lecturers about how to manage their online workload. Some elearning workload management literature addresses this theme in an anecdotal way, usually based on the personal experience of the authors—the tips and tricks approach. Examples of this are Boettcher and Conrad (2010) and Palloff and Pratt (2001).

For a New Zealand example of advice to lecturers, Mark Nichols (2008) addressed this topic in the second section of the ePrimer series, designed for new online educators and made freely available by Ako Aotearoa. Included in this series of e-articles is a set of strategies developed by Ragan and Terheggen (2003), listing a detailed set of workload management strategies based on an elearning lecturer professional development course at Penn State University (see Appendix One for a summary of these strategies). Another more recent addition to the literature on this topic is a research-based book published in 2012. Managing Online Instructor Workload by Conceição and Lehman (2011) is one of the first books exemplifying a research-based approach to online workload management, using a survey of 38 participants with 14 follow-up interviews. This book also includes a series of vignette case studies of what real-life elearning lecturers do, based on the interviews conducted for this book.

Research design and case study

Yin (2003) defines a case study as an empirical enquiry which researches a contemporary phenomenon within its real life context, particularly when the boundaries between phenomenon and context are not clearly evident. Some researchers have a very low opinion of case studies as a research methodology. Typical objections to the use of case study include that findings from case studies are not able to be generalised, and social science is about generalising. Others comment that case study is subjective, giving too much scope for the researcher's own interpretations.

Case study is appropriate for a number of reasons. Firstly, it allows people to tell their own stories. As a result I have the real, contextualised experience of practitioners as data for analysis. As well, good case studies, by their nature, contain an extensive amount of narrative. Good narratives typically contain the possibility of explaining something of the complexities and contradictions of real life (Flyvbjerg, 2006). My case study was no exception.

One of the aims of my research was not to produce a 'one size fits all' framework for managing elearning lecturer workload, but more of a smorgasboard of strategies that other elearning lecturers could review and examine (and hopefully try) to find out what works for them. Specifically, the hypothesis is that experienced elearning lecturers will have developed a range of strategies for effectively managing this component of their workload. The main research question was: *What are the effective work practices of experienced e-learning lecturers which enable them to manage the workload of online programmes by working smarter not harder*?

A limitation of the research is that selection of the lecturers was purposive and from a single institution, using the criteria that "cases are hand-picked for a specific reason" (Lewin, 2005). The case consists of 10 volunteer lecturers experienced with online learning from a single New Zealand university, participating in a semi-structured interview of 45–60 minutes. The volunteer lecturers were drawn from a list of 'experienced' lecturers recommended by the elearning support unit at the university concerned. The criteria for 'experienced' was defined as five or more years' online teaching. The range of elearning lecturer experience was from 5 years (least experienced) to 15 years (most experienced), across three faculties and disciplines (education, social science and computing) and a range of academic appointment levels from lecturers to an associate professor.

Initially 20 lecturers were approached with half that number agreeing to participate. The interviews were semi-structured with the same questions used for each interview. The conversation was digitally recorded and transcribed, then analysed according to a thematic coding scheme (see Table 1). This coding scheme was retrospectively elicited from the narratives.

Table 1: Workload thematic analysis categories

eLearning Workload Thematic Analysis Categories	
C1	Innovative workload management practice (outside the Ragan & Terheggen, 2003, framework)
C2	Conventional good workload management practice (included in the Ragan & Terheggen, 2003, framework)

C3	Communication with students
C4	Online interaction, assessment and feedback to students
C5	eLearning lecturer teaching and learning beliefs
C6	Planning and design of online courses
C7	Time and workspace management
C8	eLearning lecturer professional development—formal and informal
C9	Job descriptions and workload allocation management systems
C10	Comparing f2f and online teaching workloads
C11	Technology issues and keeping up with technology
C12	Institutional support for elearning lecturers
C13 Workload competition between different modes of delivery i.e., elearning and face-to-face	

Conventional workload management strategies

In classifying the workload management strategies elicited from participants, it emerged from their stories that some workload management strategies were common to a number of participants while others were unique and original, often to a single individual. I thus needed to differentiate between *conventional* workload management strategies and *innovative* workload management strategies.

Having reviewed the 37 strategies outlined by Ragan and Terheggen (2003) as part of the literature survey, I decided that matching this set of strategies to the participant themes would be a reasonable way to classify the workload strategies as conventional or innovative. The rationale for using this framework as a basis for this distinction is two-fold. Firstly, Ragan and Terheggen's strategy framework was formulated ten years ago: a fairly long time in the history of elearning lecturer workload. Secondly, their list of strategies is reasonably comprehensive and includes authoring strategies, teaching strategies, course improvement and revision strategies, as well as institutional strategies (see the summary in Appendix One).

(a) LMS-based interaction

Some of the conventional strategies affirmed as useful by the participants included establishing a regular, predictable routine for course interaction.[18] This element related to being vigilant about communicating with students using an LMS to focus communication and interaction.[19] In this context, Moodle was the LMS. As one participant explained:

[18] Coded as C7 *time and workspace management* in the Table 1 themes analysed across all participants.

[19] Coded as C3 *communication with students* in the Table 1 themes analysed across all participants.

> Because I'm the coordinator of the programme as well, I'll often get emails from all 100 [students] and it … it … at the end of the day, it can cause delays in sorting out what the student needs sorting out. So it's actually in their interests to be communicating in the Moodle spaces … it also has a history then of what we've been talking about, and umm I can connect to the … if I've been teaching in three papers as well, and someone says, "Can you tell me blah blah blah", and then I have to backtrack, it takes me a lot of time to backtrack.… it just causes delays really. Having said that, if someone sends me an email … I will respond to it. We do podcasts and say, "Use these [Moodle] spaces", and I also say, "If you haven't heard from me within 24 hours, it's because I haven't got your message". So resend it, re-contact me, I'm always happy for that to happen.

Interestingly, four lecturers had a policy of prioritising course-related communication via the communication tools available within the LMS. This was identified as a conscious workload management strategy to circumvent email overload, a problem noted in some of the earlier studies about elearning lecturer workload. A clear example of this was one lecturer who related:

> And I refuse to answer any emails, actually. If it's a classroom matter, it must go into the classroom [LMS]. And so that helps me to manage it because if there's 20 enquires in a morning, then I can just go in and follow up on it. That's how I manage it.

However, if the LMS was helpful for managing communication, lecturers also identified specific extra work created by using the gaps in functionality of the LMS. For example, this included the time required to upload individual assignment feedback files for large classes. As one participant recalled:

> It [assignments] can … but the only thing that really … I think … that creates the work is when you send them back. You know, uploading them all. It doesn't suck them all up like it downloads them [laughter] having to upload individual files is a real pain in the neck and really it's not … it's an administrivia thing. So that's time consuming and you have to spend … you have to make sure you've got a good couple of hours clear to do it, just to consistently go through it.

(b) Limiting hours of interaction

Two lecturers had a strategy of deliberately not interacting with students in online courses outside of normal working hours.[20] While they might 'lurk' or view discussions or other online activity in evenings or weekends, they resisted posting in order to prevent any student expectation that they were the '24/7 lecturer'. Two lecturers specified response times as part of the course orientation, responding within a certain time frame to postings, but not during weekends or public holidays, for example. One programme co-ordinator had a consistent response protocol (and a rationale for it) for all papers in the programme:

> Where our protocol is that you have to come back [to students] within 24 hours, and I … and I know what it's like … I've been a student myself, and I know what it's like … to

[20] This theme was coded under C7 *time and workspace management* in the themes of the interview transcripts.

be online and wondering who's going to be talking to you, and the importance of being responsive.

On further discussion the programme co-ordinator acknowledged that this protocol would require all staff working on the programme to work over weekends and public holidays—an unintended workload outcome of this policy.

(c) Workload patterns—little but often

Regular attention to what's happening on the online course is identified by four elearning lecturers as a key workload management strategy.[21] A point that these participants reflected on was their perception that with online learning they tended to do about the same amount of work as f2f teaching but the work was 'chunked' differently—that is, smaller chunks of time but attended to more frequently during the working day and week. Some lecturers had a pattern of regular time allocations at particular times of day or particular time slots throughout the working week; others allocated their time on a less regular pattern but still based on the principle of 'little but often'.

As one participant reflected:

> I developed a pattern early on in my working life with online papers which involved checking the online courses for activity in a regular pattern—first thing in the morning (7–8ish am), and/or lunchtime, last thing in the day (5–6ish pm). So this was bounded within the working day and mainly within the working week—sometimes [I] checked papers during the weekend but did not usually actively respond to students in the weekend time frames.

Interestingly, Ragan and Terheggen (2003) imply the importance of time management as part of their workload management strategy framework but do not explicitly list any specific time management strategies per se.

(d) Students helping students

Three elearning lecturers identified students helping students (rather than always relying on the lecturer for feedback or to provide answers) as another way of managing workload within their online courses.[22] As one participant reported:

> One of the things I work to over time is getting the students to take more responsibility for what they ask for feedback on. So they … they critique it themselves first, get other people's opinions on it, and then get to a point where they can ask for feedback on specific things and ask for specific things.

(e) Advance preparation

[21] This theme was coded under C7 *time and workspace management* in the interview transcripts.

[22] This theme was coded under C4 *online interaction, assessment and feedback to students*.

Another key component to managing workload for three elearning lecturers was advance preparation of online courses, learning activities and resources. While just-in-time alterations were sometimes necessary, teaching workload was considered to be much more easily managed if the course was completely or substantially ready before the course was opened for student interaction. One elearning lecturer identified the importance of trying to "see the course as the student sees it" so students weren't confused, anxious and unclear about what they were meant to be doing. This meant viewing the course in the LMS using the 'student view' function to see the course layout as well as reviewing the key elements of the course (activity instructions, assignment instructions and assessment criteria) for ambiguities. He concluded that for him, this was "managing my workload by good course design".

So participants reported a number of workload strategies that were identified as conventional workload management strategies. However, a number of innovative workload management strategies also emerged from the interviews.

Innovative work management strategies

Innovative workload management strategies were operationally defined in the case study as 'those that were **not** included in the framework outlined by Ragan and Terheggen (2003)'. A range of workload management strategies emerged that met this definition. These included several ways of protecting uninterrupted teaching time, using media other than text to give student feedback, and scaffolding students into more active roles in the learning as a way of reducing workload.

(a) Fencing off online teaching time

Experienced elearning lecturers used some strategies which were aimed at safeguarding online teaching time.[23] For example, one lecturer put a sign on the office door when engaged in online preparation and teaching. Another diverted the office phone to voicemail during similarly designated online teaching time. As well, most lecturers blocked out the time they scheduled for online teaching in their online diary, to dedicate uninterrupted time on online teaching or assessment tasks. As one participant said, "Yeah, yeah, I do. A couple of things—if I close my [office] door people know not to bug me—that's my colleagues—that's because I like uninterrupted time."

(b) Phone support

One elearning lecturer had a strategy for supporting students new to elearning. This involved giving a designated phone-in time of about an hour and a half during days within the first few weeks of a course. During those dedicated phone-in times, she worked in her office so she could answer calls immediately if students phoned in. This helped reduce student anxiety and gave reassurance. "So they know then, in an emergency they can call. Sometimes they just need an oral articulation, so I just find that being available—but available during the day."

(c) Team teaching

[23] Coded under theme C7 *time and workspace management* in the interview transcripts.

While a lecturer teaching online is often a lone ranger in both designing and teaching online courses, team teaching was identified as both a workload creator and an enabler of workload management. Two elearning lecturers said that team teaching contributed positively to this.[24] Organisationally, this was because these teams were deliberately established for programmes rather than being voluntary or ad hoc. In such teams, staff moderated or managed online discussions together, or took smaller, manageably sized groups each. As well, colleagues supported each other when team members were sick or had unpredictable crises. In some cases, it hasn't been necessary for team members to meet physically in the same space. As one lecturer noted:

> It's a team teaching approach … we have a team meeting every Tuesday, every week, and that's really important, and not all our team will not be here, so we'll have them on Skype.

Two lecturers found it beneficial to have colleagues who could be a sounding board for ideas to help solve problems—often a solution was suggested that was more efficient than the one the lecturer had initially thought of. For three staff I interviewed, team teaching was 'the way they did things' and they viewed this as very much a preferable and more workload friendly model than the lone ranger model.

(d) Giving feedback—podcasts

One substantial workload element for elearning lecturers is giving feedback to online students.[25] Two elearning lecturers created short podcasts as a way of giving student feedback instead of typing substantial text-based feedback. This was done using freely available (and free) podcast software (such as Audacity). As one lecturer said:

> So we use a lot of voice files, we do a lot of voice file feedback, and for me that works really well. I use Audacity at the moment. So beginnings of discussions I'll say, "These are the things we're looking at, but by the way, last week when we were talking about this, you did this."

This was also seen to have benefits in personalising the course for students and enhancing the lecturer's online presence. As well, in discussion forums it meant that the lecturer's comment did not intrude on text-based discussions. By using different media, it created parallel conversations with students compared to the student-to-student conversation going on in the text-based forums.

Giving feedback was also a reflection of the particular pedagogy of the lecturers—for example, connectivist pedagogy, which has a key focus on relationships as an important factor in learning[26] (Anderson & Dron, 2011). An example of this connectivist pedagogy can be seen from one participant's interview:

> I would say I'm a reasonably relationship-oriented online lecturer. For me the

[24] This was coded under the interview theme C12 *institutional support for elearning lecturers.*

[25] This was coded under the interview theme C4 *online interaction, assessment and feedback to students.*

[26] This was coded under the theme C5 *elearning lecturer teaching and learning beliefs*.

> communication between the lecturer and the students is a really important part of the course, even though from time-to-time I'm a little bit slack, I'm not a kind of rigidly structured online lecturer, so I make a point of being in there relatively frequently but not locked into a rigid schedule, just doesn't work. I would be the kind of online lecturer who prefers students to do the learning, so I work to encourage interaction within the class, rather than the … sort of the more lecturer-centred 'post something that the lecturer responds to' approach, which gives a kind of star-shaped pattern with the students communicating with the lecturer rather than each other.

(e) Lecturer forum input

Another strategy related to lecturer input to discussion forums, which the literature notes as another major component of online lecturer workload.[27] This strategy involved progressively less input to discussion forums as the course progressed. The lecturer made explicit what sort of input she was going to give to each discussion at the start of each week as part of a weekly news forum posting. Towards the end of the course, students were given specific roles within discussion forums. These roles included taking on tasks such as summariser, devil's advocate or supporter. This strategy relates to the explicit overall course goal of growing students into autonomous learners in online learning contexts.

Some unexpected themes

As well as these innovative strategies, several themes emerged from the interviews that were unexpected yet present across a number of the interviews and were of relevance to my interest in online learning workload.

(a) Workload competition

One unexpected theme relates to the issue of the competition that goes on between work tasks.[28] Three of the 10 participants had a teaching workload comprised of fully online courses and no face-to-face (f2f) classes. They perceived this as a much easier workload to manage than teaching a mixture of online and face-to-face (f2f) classes. The participants teaching a mixture of classes (fully online or hybrid/blended and f2f) reported a tug of war conflict between these modes, noting that often it was the online teaching that got squeezed into the 'out of working hours' time frame by the f2f commitments. As one lecturer noted:

> I have been able to have the privilege of working fully online for the last three years. And in this A semester we were really short of staff, so [colleague's name] and I both volunteered to teach a face-to-face paper together. It was … it reminded me how hard it is to be face-to-face and then online … you know, "I've got to put that down now, I have to go, I've got to go and face a class."

Either all f2f or all online are easier workloads to manage than a mixture of both. The majority of

[27] This was coded under the theme C4 *online interaction, assessment and feedback to students* in the interview transcripts.

[28] This was coded in the interview categories as C13 *workload competition between different modes of delivery*.

those teaching online, however, taught a mixture. This may be, therefore, the most difficult workload combination of all to manage. Further research might unravel the full extent and veracity of this speculation.

(b) Enthusiasm for online teaching

Another unexpected theme was the enthusiasm that three of the participant lecturers had for teaching online role and associated tasks.[29] As one participant said, "One of the biggest challenges, to be honest, for me, is not to become too addicted [to responding online]." Another participant noted, "I think people who are enthusiastic online lecturers, they're enthusiastic because they enjoy it, so for them, it's not a burden as such." When asked, "Do you like the elearning stuff?" another lecturer responded, "I love it… it really actually… you know it makes my heart sing." Congruent with this theme was the preference for these three lecturers to work in a widely distributed 'little and often' pattern including evenings and weekends. As one participant noted:

> So I will check at the weekend as well. But I don't find that a big intrusion on my life at all. I find—with my laptop—this probably makes me sound really sad [laughter], my laptop sits by my bed at night, 'cause I listen to the radio. So for me, on a Saturday morning, I sit there with my cup of tea, and I just go through all my Moodle spaces, and I know everybody's happy. And I do the same thing on Sunday.

One of my assumptions as I talked to lecturers was that they would be seeking (as much as possible) to limit their elearning work to the standard working day times, Monday–Friday. Some people were doing this; however, for these three participants their enthusiasm for online teaching was such that they did not view working in the evening or weekends as an imposition or an irritant. People who love their work are (in this case) less concerned about work/life balance and find in work a purpose and pleasure that blurs the boundaries between work and leisure. Perhaps these particular lecturers experience what Csikszentmihalyi (1991) identifies as 'flow': a state in which people are so involved in an activity that nothing else seems to matter. The experience itself is so enjoyable that people will do it even when it encroaches on personal time.

This level of work satisfaction and enjoyment perhaps overturns some assumptions about managing workload, and my hypothesis that lecturers seek to limit their workload in search of a harmonious work/life balance.

Conclusion

Teaching online has both similarities and differences to face-to-face teaching. Teaching face-to-face is always 'in the moment' with much of the work around the learning event (lecture, tutorial, workshop or lab) being scheduled and driven by the class timetable for each week. Teaching online has created different workload patterns, both in terms of (usually) more preparation time before the semester starts and in the time taken for lecturer-student interaction as semesters progress. For experienced elearning lecturers, some patterns have emerged in their workload management

[29] This was coded as C13 *elearning lecturer teaching and learning beliefs* in the interview transcripts.

strategies. 'Little and often' seems to be the work pattern most participants in this case study used to keep track of events within their online courses. There is also a tendency for some elearning lecturers to put boundaries around email contact and prefer communication within the LMS. However, for some lecturers, working online is such a passion that they do not consider trying to confine the online work they do to traditional working week patterns. Instead, they engage in this work when it suits them.

Through telling their stories, these lecturers have shared a rich range of workload management strategies. As previously stated, this chapter is not intended to be a prescriptive 'how to do it' framework for all elearning lecturers to follow. Nor is it a statistically significant enumeration of the particular strategies of a large cohort of elearning lecturers. Rather it is a collection of key strategies that they adopted that managed their workloads. These same strategies may be useful for others to adopt or adapt. As New Zealand Māori aptly summarised in one of their proverbs about knowledge:

> Ko te manu e kai ana i te miro, nōna te ngahere.
> Ko te manu e kai ana i te mātauranga, nōna te ao.
>
> (The bird that partakes of the miro berry owns the forest.
> The bird that partakes of the power of knowledge owns the world.)

By sharing the stories of this group of elearning lecturers, my hope is other practitioners may find their strategies useful, resulting in positive benefits for both online students and lecturers.

Key findings of this case study show that experienced elearning lecturers use a range of strategies, both conventional and innovative, to manage their online workload. These strategies are individually tailored to the lecturers' own pedagogical orientation and preferred ways of working. At the same time, contrasting approaches to work/life balance are evident, with some staff limiting work to specific time frames while others engaged in online teaching activities in a more 'whole of life' way. There are plenty of 'digital smarts' evident from this case study, such as the enthusiasm and expertise which contribute to being both digital and smart. The strategies these electurers used also demonstrate worksmart tactics that help them sustain their online presence and helpfulness.

Further research might explore the relationship between these workload strategies and other relevant factors, such as how a lecturer's workload relates to student engagement and course satisfaction; actual online lecturer time-on-task compared to their perceptions of workloads; and the impact of institutional strategies on either ameliorating or exacerbating elearning lecturer workloads.

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Appendix 1

37 workload management strategy items developed by Ragan & Terheggen (2003) and adapted here

Authoring Strategies (11)
Adopt a course development model that provides a known framework for learners (helps to coordinate presentation and technologies). Using a unified LMS helps
Identify and save existing resources (reduces development time); save in shareable locations
Create and share reusable templates (helps to streamline processes and assist with development)
Apply project planning methods to course development to reduce complexity and simplify the process
Provide lecturers with sample online course structures as models for adaptation
Provide specific and ordered instructions for assignments (reduces requests from students for clarification close to the due date)
Course development teams reduce academic workload through distributing tasks
Design balanced instructional activities. Encourage peer review and collaboration. This better enables efficiencies and social constructivism. Prioritising activities in a course helps to reduce workload and focuses student attention and engagement
Finalise one module or unit before developing the rest of the course to help streamline the design and structure
Create a learning object database. Learning objects are reusable items across multiple courses. The initial setup of such a system takes time; this may only work for large courses
Develop rubrics for graded student assignments. Rubrics streamline grading, make the requirements explicit and help students work effectively
Teaching Strategies (9)
Clarify and enhance students' technical skills before registration where possible to reduce

stress about technical competence during the course
Provide a detailed course outline that makes course expectations clear and acts as a central point of reference
Define the operating parameters of the course: that is, make student and staff responsibilities transparent
Create feedback rubrics (enhances consistency of feedback and saves time when providing feedback; rubrics might include administrative, academic and assessment feedback offered during the course, and can be customised for individual students as required)
Establish routines for interactions (helps to manage workload and builds student confidence in the faculty). Specifically, shorter but more frequent course interactions prevent an overwhelming backlog of activity. Be clear about timelines of tasks and deadlines
Use an LMS (centralises administrative and communication functions)
Foster group dynamics. This takes time initially, but helps students collaborate and rely on one another as sources of support, expertise and knowledge
Begin each course with an activity that encourages interaction and is low risk. This helps boost students' online confidence and generates a sense of community
Establish consistent, effective methods of electronic communication. Use the LMS posting areas and discussion forums for class announcements and frequently asked questions. Keep these interactions away from your email inbox
Course Improvement and Revision Strategies (8)
Conduct multiple evaluations of your course (invests time in the short term for the long-term benefit of smoother and more manageable revision)
Conduct pilots or expert external reviews that help identify potential problems before students are exposed to them and possibly reduces the need to manage emergencies
Manage the revision cycle as an integral part of the course, building in time and budgetary projections
Develop methods for managing dynamic course elements such as references to textbook pages and web links. This might be done by placing all web links on a particular page, or referring to headings or sections instead of page numbers. Use tools like Drive to collate reference lists with hotlinks. Share the docs within the LMS. It is easier to update a GoogleDoc than it is to always change links within an LMS

Invite student feedback at the end of the course, and carefully consider the issues students raise. This may lead to items for a Frequently Asked Questions area
Develop and maintain a course history (helps the revision process and will help you to reuse previous discussion items)
Involve the original course author in the revision process, as they are already very familiar with the content
Reward students for reporting errors in the course (formal or informal rewards)
Institutional Strategies (9)
Ensure staff have access to instructional design and systems support (makes better use of institutional resources)
Provide adequate teaching staff development opportunities, which is a critical component of success in elearning
Provide technical support for both staff and students
Provide an adequate LMS. While largely taken for granted these days, an LMS has the advantage of being a single user interface, with central administration and support
Establish institutional parameters for online operation (helps to manage and reduce administration tasks)
Integrate institutional administrative systems and tools such as registration and grades reporting to streamline these processes
Provide clear institutional policies on intellectual property (eliminates confusion and misunderstanding between staff and the institution)
Define the role of online education in the mission of the institution (removes barriers of confusion and ‘unit(es) otherwise disparate units and departments’)
Develop an institutional policy for compensating and rewarding faculty and academic units

Chapter 10: Digital $%#@ smarts a lot! An autoethnographic account of academic work

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Abstract

Digital technologies and eLearning afford many rewards and pleasures including enabling academic work to be smarter rather than harder. This chapter is an autoethnographic (Ellis, 1999) account of academic work. Specifically, as an exploratory study, I investigate my relationship with the digital world over two years, with an emphasis on my own digital literacies (Bawden, 2001, 2008; Gilster, 1997; Martin, 2006) and pedagogies. Initially I drew on a year of field texts (Clandinin & Connelly, 2000) including emails, screen shots, personal journal notes, video, and electronic documents. I noticed themes such as displeasure, pain, frustration, and anger occurring in relation to my digital world. Identifying an absence of narratives in the literature about academic work in relation to digital experiences, I took more notice of the negative feelings in the second year of this project and created narratives that represented my experiences. These narratives, what I term digital bytes, are by no means universal but provide some insight into available subject positions and pedagogies to learn an academic digital habitus. I explore *smarting* as a significant outcome in academic work and embodiment of the digital. Smarting, in a negative sense, is not a useful outcome for university business or for educational change that is positive, proactive, sustainable, or even intellectually, digitally, or pedagogically smart. If intellectual work, in partnership with technology, is to remain central to universities, we need to be cognisant of how academics learn an academic self, our pedagogical work in teaching and research, and the professional and public pedagogy of the institution in relation to technology. I discuss implications for learning by those doing academic work and for the institutional employers attempting to facilitate engagement with the digital world.

Keywords: eLearning, digital technology, pedagogy, self, autoethnography, academic work

Opening scene

Figure 1: http://youtu.be/Zr1s_B0zqX0

The sound of a solo pluck of a stringed instrument followed by a deep voice announcing "this is it" as the camera slides, slow motion, around the face of a smiling African American woman in her own world of music, cut off from the train she is riding by her white ear buds. Next, another pluck as a crescending monotone fills the soundscape, the camera cuts to a silent classroom of Asian young people totally engaged with fingers scrolling across the surface of modern day slates on their last century furniture in last century configurations. "This is what matters," the calm omnipotent voice announces, keeping us in suspense as to what "it" is. The young boys in the classroom raise their arms enthusiastically, presumably in response to a question from the teacher, who is absent from the scene. "The experience of a product," the voice goes on with another pluck of the string. Now a dimly lit young child nests in her/his adult's lap and headless body, both focused with ET-like digits on the lit screen of a tablet that lights their faces in a muted glow. "How will it make someone feel" is answered with surprise from the young person before fade to black and open to a male and female

> embracing below an umbrella in the moment before a kiss, her arm fully extended sideways, her hand grasping a phone as though set for 'the' shot, the photo of the moment. "Will it make life better?" the voice questions as the pair smile for a 'selfie'. We move through other social scenes: a restaurant steaming with food smells, "does it deserve to exist?"; "we spend a lot of time on a few great things until every idea we touch"—from a stage at a rock concert; "enhances each life it touches"—at a family gathering exhilarated by reliving memories; "you may rarely look at it"—feet in a bedroom covered with pictures on the wall; "but you'll always feel it"—as the camera cuts to the owner of the feet, joyously interacting with a touch screen as she rolls around her bed. "This is our signature and it means everything" as the hint of the Apple icon on the phone shows through her grasp and the picture fades to a simple tag line: "Designed by Apple in California".

This one-minute ad, "Our signature", leaps to the heart of this chapter. To me, the advertisement captures the pervasiveness and importance of the digital[30] world—its importance in relation to people. In a recent advertisement for a Dean's position at our university it was stated:

> Our motto is "Ko Te Tangata", or "For The People", and we put people at the centre of everything we do as we focus on bringing excellence, distinctiveness and international connectedness to our region. (Dean job advertisement, accessed January 28, 2014)

Like both advertisements, I place people, doing academic work, as central to this chapter. I work from an assumption that those doing academic work are central to the functioning of universities, academic work being the object investigation in this paper. Discovering or creating new knowledge, learning and then teaching, are part of this work.[31] Increasingly, too, digital technology, new communication technologies, eLearning and digital literacies are part of our academic work, yet many of my experiences are far from the sweet, slow-motion, joyous events captured in the opening video. Although I am positioned as an early adopter of technology with a positive yet critical disposition towards the digital, the experiences and learning that informs this chapter illustrate some of the blind spots associated with research about the digital world—the displeasure, suffering and pain.[32] These are *my* meaning of 'smarting' or 'smarts'. Using what I playfully call *digital bytes,*

I call attention to the *smarting pedagogies* that constitute (my) academic work in the lived space between policy, advertisements and people. This is with a motive to reconstruct academic work as positive, generative and intellectual; to explicate the role of technology in such work; and draw attention to the institutional disconnect from the changing academic field.

New communication technologies provide possibilities for transformative pedagogies (Owen, Grant, Sayers, & Facer, 2006; Turvey, 2009), as well as changing pedagogical paradigms that address power relations:

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[30] I use "digital" to include information and technology communication and literacies

[31] I also recognise those questioning the demise of intellectual work within universities and the work that digital technologies can do to loosen the relationship of universities and intellectual work by enabling new intellectual spaces to form beyond the university field, but these discussions are beyond the scope of this chapter.

[32] While I will unpack these adjectives I acknowledge they are first world problems but with potentially significant effects for academic work and relationships across advantaged and disadvantaged worlds.

> In all learning these are the central issues: Whose agenda is at work, with what power, with what principles of recognition of learning. How is that agenda presented and is it accepted or recognised by those who are potential learners? As "learning" escapes the frames of institutional pedagogy—a matter in which the e-technologies are deeply implicated—these are questions of increasing importance. (Kress & Pachler, 2007, p. 19)

Kress and Pachler go on to argue that different dispositions towards learning involving new applications, networks, devices and learners in relation to knowledge or information may bring about a new "habitus of learning" (2007, p. 27). eLearning is thought to promote intellectual thinking and new behavioural patterns from a change in thinking dispositions (Bouhnik & Carmi, 2012). While Turvey (2009) considers such a change in relationship to knowledge by asking "how has the formal education establishment responded thus far to the shifting technological landscape?" (p. 784), Georgina and Hosford (2009) also consider the implications for higher education and its workers:

> The move toward integration of technology is obvious and most apparent through the creation of blended courses. The new goal in higher education now seems to be the creation of a university-wide professoriate in both information literacy and technology literacy. Therefore, the manner in which technology training is conducted may be vastly important. Technology alone does nothing to enhance pedagogy; successful integration is all about the ways in which technology tools are used and integrated into teaching. This, of course, means that faculty must be trained in the use of the tools not just given access to the tools, integrating new software as part of an interactive teaching and learning strategy. (p. 695)

Clearly, the digital has significant implications for contemporary academic work.

The university within which I do academic work has recently considered the implications of technology on core 'business' and academic work. The release of the position paper *Future Directions for Teaching and Learning at the University of Waikato* (2013) considers implications of technology, eLearning, and digital literacy within an environment of competition, sustainability, and within the field of education. In this current dynamic, neoliberal climate, to ensure that intellectual work, in partnership with technology, is to remain central to universities, we need to be cognisant of how academics learn an academic self, our pedagogical work in teaching and research, and the professional and public pedagogy of the institution in relation to technology. After describing the methodology behind this chapter, I present several *digital bytes*. These are narratives that capture some of my lived pedagogies in relation to digital technology. These provide substance for further exploration in how we learn our academic self in academic work, how we engage with the pedagogies of technologies, the role and nature of digital technology in work that is both sustainable and generative, and the role of the institution in effectively instituting and supporting digital technologies.

What sits behind *digital bytes* as narratives of smarting?

The theoretical assemblage of Carolyn Ellis and Art Bochner (e.g., 2000) Norman Denzin (2000, 2010) and Soyini Madison (2012) informs my broad methodological orientation towards scholarship

in the form of autoethnography (Reed-Danahay 1997). This methodology uses the researcher/writer's perspective, foregrounding experience and meaning making from the subject position—in this case, 'academic'. It is a way of depicting "people in the process of figuring out what to do, how to live, and the meaning of their struggles" (Bochner & Ellis, 2006, p. 111).

As part of an ongoing autoethnographic project, I have kept a digital journal of my academic work experiences for some years. This journal constitutes what Clandinin and Connelly call "field texts" (2000) or "data", and "interim research texts" or early forms of analysis. With further refinement and alignment, these two text sources become "research texts" in the form of reports, or in this case, a chapter.

The field and interim research texts presented here were created during a two-year timespace around the trigger for this chapter, an invitation to participate in a book-writing project about Digital Smarts. On hearing the title I immediately thought of the pain I had experienced in relation to digital technology in the past year. I had been participating in an eLearning group at the university as one of the several professional development opportunities I participated in to augment my digital literacy and to keep abreast of eLearning possibilities that may enhance student learning in my classes. After the invitation by Diane and Noeline, I reflected on my journal for the past year of academic work in relation to my digital experiences. This journal included general descriptions, screenshots, video capture, documents, and emails of the work with which I was engaged as part of my job, sometimes on a daily basis and in rich detail, sometimes as minimal entries across a week. It also included entries that captured bodily responses to practices, ones that seemed intuitively important to note; there was something about incidents, pedagogical events or my reaction to them that told me something was being learned, like an 'aha' moment, or that something was out of alignment with my sense of the world. Elizabeth Ellsworth asks, "What might become possible and thinkable if we were to take pedagogy to be sensational?" (2005, p. 24). Inspired by her work and that of Sarah Pink's *Doing Sensory Ethnography* (2009), I was paying attention to the bodily sensations that were modulating and mediating my digital learning.

Identifying and then coding past journal entries as 'smarting' sensitized me to some of the emotions, affects and material effects of my work as related to my digital world. I depart from others' use of smart/s in this publication by using it as an analytic verb and noun, as "feeling upset and annoyed" and a "sharp stinging pain" (see Image 2). Smarting incorporated negative affect and emotion including frustration, pain, displeasure and a sense of loss of competence. It could include a liminal space where 'self' as an entity becomes lost, felt as 'not', or as abject—all as negative experiences of self. Unlike Smuts' (2010) argument that there is desirable nonpleasure, the smarting I refer to in this paper is undesirable nonpleasure, specifically as it **demotivated** learning. While the negative affect and sensory experiences may result from, or act as a marker of, the experience of learning, it was nonetheless undesirable in its intensity and often within particularly high stakes timespaces.

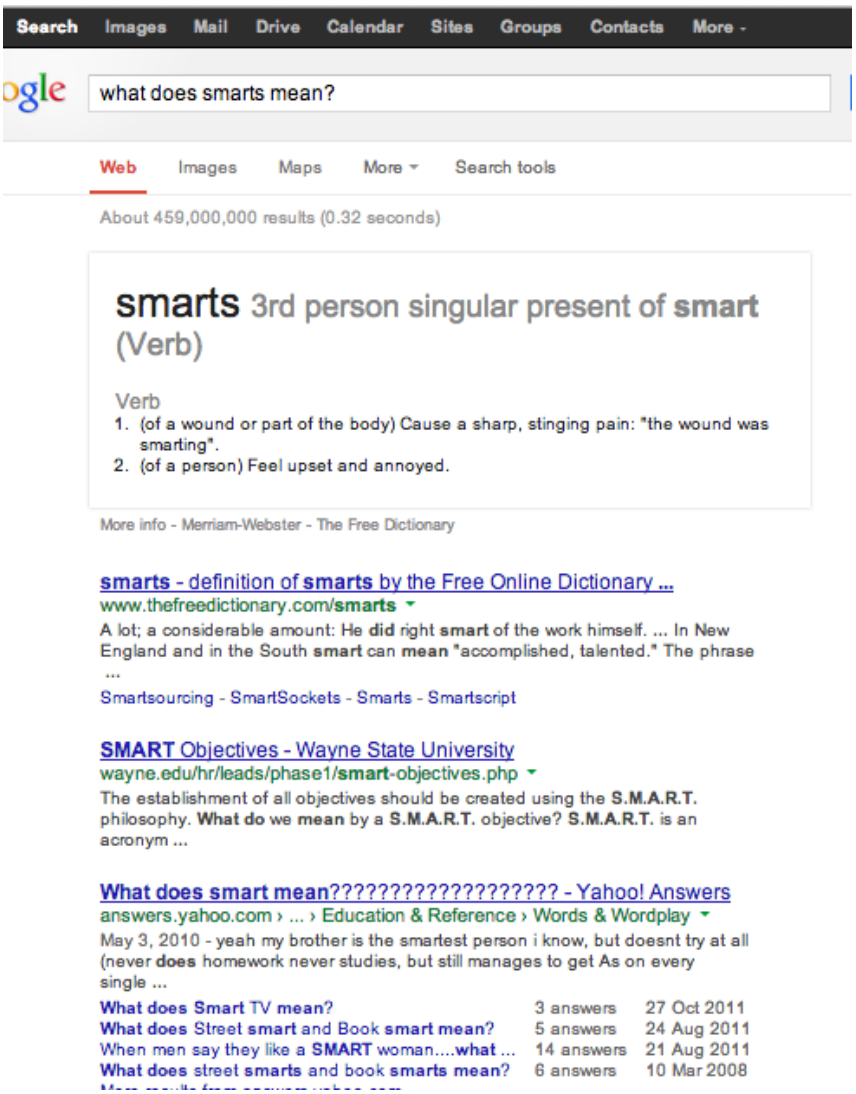

Figure 2: Screenshot of Google search to understand 'smart' accessed 100813

Journal entries also took the form of reflections on such pedagogical events. These were early interim research texts. After identifying instances of smarting, I journaled on questions such as "What was going on? Who was involved and being affected? How did it feel? What senses were triggered? What was the result? What did I learn?" These helped me to be more aware of each event in the year that followed the writing invitation, and to journal with detail and attention to the senses. Pierre Bourdieu's notion of reflexivity (1990a, 1990b) becomes an analytical utensil to excavate my practices of sensing, and making sense of, the embodied subject positions that I take up or that are made available to me (Grosz, 1994, 1995). I was looking for what positions were made available to me in relation to technology, for example as 'digitally literate', 'learner', 'early adopter' or 'failure',

both in terms of how I position myself but also how I am being positioned within the culture/field/social spaces of academic work.

Much like Bourdieu situates the habitus in a dialogue of constituting and being constituted by social fields, others capture the embeddedness of self within society, micro interacting with macro, as forms of analysis (e.g., James Gee and D/discourse analysis, 2007). This relationship is one I attempt to capture using autoethnography, which locates self within extended group contextualisation of academic work. I employ a combination of autobiography and reflexive ethnography, describing my experiences and critiquing such experiences using reflection, conceptual frameworks and contextual clues. Tami Spry refers to this orientation of scholarship as "performative-I" (2006) that illuminates critical reflexivity. While debates about the value and applicability of autoethnography continue (e.g., see Terry, 2006,p. 211), there is a solid base of scholarship supporting methodologies framed as autoethnography, from Bourdieu's expectation of researcher reflexivity (1990a) that includes critical reflexivity (Madison, 2012) while being mindful of the moral implications of such work. As Ellsworth notes, "We have been positioned to knowing in a way that experience is undervalued, suspicion swirls because experience is 'under-theorised' and easily 'contaminated' by naïve subjectivity" (2005, p. 2) so my critical scholarship seeks to legitimate such work as an entrée to future practices that are more socially just within the field of academic work. From a knowing position doing academic work, I do autoethnography and expose some of the difficulties that seem to otherwise go unnoticed.

Following Ellis (1999, 2004), my autoethnographic narratives, what I call *digital bytes*, draw on "the conventions of literary writing and expression" featuring "concrete action, emotion, embodiment, self-consciousness, and introspection portrayed in dialogue, scenes, characterization, and plot" (2004, p. xix). The bytes are based on collated journal entries that cluster around pedagogical moments situated in my work. They represent a stitching together of fragmented and complex instances of learning the self, learning one's relationship with technology, learning one's relationship to others, and therefore the institution. As with previous work (lisahunter, 2013, 2014), they are my attempt at making sense of the smarting I was experiencing as academic work.

Smarting bytes

Digital Byte 1: Spinning wheel of death

I see you, for the umpteenth time today. In my work den, filling in the fourth electronic form in Word sent through email and requiring information from the internet. With a half crazed, light, and flighty voice, your presence triggers my song "Spinning wheel very pretty and the spinning is so sweet but the fruit of the poor spinny is impossible to eat". I jump out of my office chair and catch my tights on the broken base. I think "Fuck you", while you continue spinning to the song I sing. I become a mass of flailing arms and legs, akin to what one might see at a nightclub, without even noticing whether the office door was open or not. My frustration soars in my spinning body as my movement becomes more refined in the little space I have. My whirling dervish motions make me giddy and time seems to have stopped still. I glance back at the screen on one rotation, the wheel continues and my song continues. Anyone who knows Peter, Paul and Mary's song "lemon tree" will sing along with me. But my whirling dervish skills only last for several seconds more as anger electrifies and zaps through my every cell and synapse, from tan t'ien to eyes,

fingers feet and my gaze is stolen by the screen and the color wheel spinning, spinnnnnnnnnnng, spinnnnnnnnnng. "Look at me, look at me, look at me," I yell more forcefully than Kath would, looking accusingly at the wheel and being its voice as it gloats at my helplessness, forcing me to be patient for the millionth time today, "I'm not a lemon, I'm a spinning wheel of DEATH," it ventriloquizes…my voice moves into a slow, foreboding guttural tone and I feel the tension in every muscle of my flesh as I throw myself back into my chair, contract my limbs and glare at my screen, the pulse in my temples pounding at my bulging eyes. "Spin my pretty, spin" a Gollumish performance as a trance-like state overcomes me and I merge into the machine, unable to move the wheel along from the outside, my shaking of the mouse and test taps on the keyboard bringing nothing, "NOTHING," I spit through clenched teeth facing my enemy with only centimetres between us. "I may as well poke a cadaver," I growl.

I become it, in a flash; I contemplate throwing myselflaptop out the window. We sail in slow motion, floating, almost suspended, as I too feel I am part of its white casing, circuit boards and "intelligence". Then, just like on the films that play with time I/laptop speed up and crash on the ground below into millions of fragments, again slowing to a second per minute to see every fracture, every crack expanding and project upwards and outwards like a flower opening or a balloon of water breaking. The moment seems to last forever. I become space and I sigh peacefully, released. The wheel stops and my trance is broken. I re-emerge, the hardware reality where the wheel, now replaced by a cursor, beckons me to attend to the task I have waited precious minutes to progress. This is not the first time the wheel of death has visited me today. The technical experts suggest the visitations are due to "Word being flaky", "you've got too much open", and "we've had some problems with the server today". My despondency washes through the room as I have no solace knowing these limitations are imposed and inherent in work that must be done yesterday, and the wheel of death is likely to visit again very soon as it has so many times before on my five year old laptop extension of my academic self.

Newsflash. A recent study reports two instances of desk rage per day. My experience isn't isolated according to this story:

Figure 3: Desk rage

But does it need to be this way? Aren't thinking and ideas central to my work? Not a desk computer? Another study by Georgina and Olsen (2008) announces general recommendations for an inclusive technology-literate faculty. I wonder, am I technology literate? How do I deal with a flaky Word when colleagues only send me a Word file for me to work from? "Bring it on," I sigh as I read the list, filling out my imaginary responses (Figure 4).

(a) release time for training;	X. it's an add on
(b) technology mentors for peer to peer discussions and innovations;	If you seek them out but they are few
(c) supplemental pay increases to faculty who are the most involved with the evolution of the integration of technology into pedagogy;	nope
(d) departmental-level surveys for determining individual faculty technology needs;	Nope, tried to instigate one - low interest
(e) follow-through procedures that are clearly stated with precise goals and objectives for the University, college, department, and faculty;	Don't think so
(f) decentralization of technology;	Mixed, and confusing
(g) access to real-time IT support staff;	Yes but not ideal
(h) IT staff with pedagogy or instructional design experience;	limited
(i) faculty representation into IT infrastructure conversions;	nope
(j) faculty input into software choices;	nope
(k) realistic and practical pedagogy-based goals that are representative of the institutional and departmental mission statements;	nope
(l) user-based technology assessment techniques;	nope
(m) departmental-level faculty-run technology forums;	No although a few of us muddle through
(n) college-level faculty-run technology forums;	One that I can't get to as I'm teaching
(o) university-level faculty-run technology forums;	Yes, oh yes
(p) and university or campus-wide centers for faculty technology training staffed with college, and/or departmental faculty representatives comprising technology-literate faculty.	Yes and no.

Figure 4: General recommendations for an inclusive technology-literate faculty (Georgina & Olsen, 2008)

"What can I DO?" I say with my head in my hands. "Back to the slog" comes the echo.…

Digital Byte 2: "Learning" systems, "learning systems" and learning "systems"

Knock knock…the email reminders constantly tap at my mind, professional development, workshops, eLearning, pedagogies, transformative pedagogies of digital systems, come one come all, but my colleagues opt not for the uni-based system of Moodle but a faculty-based one…what's best for the students? Which students?

Figure 5: Poster

This poster (Figure 5) opens millions of drawers in my memories, hiding info in nooks and crannies that I try to make sense of. The excitement of exploring some or many of these is slashed with the taser-like experience delivered daily by deadlines and unknown policies dictating procedures that knock unannounced at my door. I'm afraid to open the door when the din outside is increasing. If only I knew if they were friendly. "Google drive", "Moodle", "Panopto", "Vlogs", "eportfolios", calls the salesperson come technical expert through the megaphone. "Step right up folks. Improve your students' learning, teach them to teach using these tools, enhance your own pedagogies, step right up." The announcements keep coming through emails, the posters around the corridors, our staff Home Page and the university website…

Too late to use for this semester… too long before practically using it next time…learning lag, neural pathways thin or break. Do I bother? No one else in my corridor is keen. Let's try a couple…

Figure 6: Workshops

Anticipation, excitement, I can taste my passion for learning as again I read the many courses and workshops available to advance my digital literacy and eLearning. An overwhelming urge to tick all the boxes in the multitude of emails advertising "opportunities" holds my hand still as my calendar vibrates its coded work demands and small spaces available. Behind those spaces are the lists of lists of commitments: preparing for teaching, ethics application, project design, funding sourcing, write that chapter, revise that paper, your report is due, answer this email, fill in that form, PhD supervision, your master's student needs extra help, can you do a guest lecture for us?, Bourdieu Hui funding, congratulations you've been awarded a summer scholarship so start the work, editors' advice on your chapter has arrived, book the car for school visits, reminder—eLearning brown bag lunch, article is awaiting review, marks are due, external evaluation of your course requires documentation, graduation coming up, think about the conference, get your abstract in, accommodation needs booking, your pcard …aaaaah, I'm drowning in 'stuff' and the familiar professional development emails tug me back in one direction.

"Information, so much information. Can I read faster perhaps?" I ask myself, chest tightening, with the email window open at the Moodle courses I want to attend. "How many emails can one get in a day…and about the same thing?" I wonder and make a note to find time to count them one day. I'm exhausted. Working with the computer all day is not healthy 'they' say but I've left my emails for a day and just can't catch up. Email triage drains my blood and my hands are cold despite tapping furiously on the keyboard. The freshly cut grass outside wafts through my window and the soles of my feet imagine the cool relief the grass would provide. "Get out there and get some fresh air," I

negotiate, but my body stays tucked into the folds of my office chair as the email list and the work behind the list beckons my eyes. "To Moodle or to not Moodle," I ponder. I can feel the tightness in my gut and I wriggle my shoulders to pull them down with a deep in and out breath. Perhaps I could squeeze in a few Moodle sessions. I HAVE to start somewhere, I WANT to do it…Can words take over my life? Decisions? Time? Priorities?

Figure 7: Words

Digital byte 3: Online exams? We don't do that!

Her voice is urgent at the other end of the phone. "You need to organise rooms for your exam," she states. "I thought that is what the central exam system does?" I reply rather mystified. "No, in this case, because you want to use computers you have to ensure there are spaces available." I feel like I'm missing something here. I was assured at the outset that the online exam was tenable; in fact, I was encouraged to do it by the technical staff. Without the exam date being set, how can I book computer rooms? This doesn't feel right. Another call, "You need to ensure you have technical support in the rooms." Now I'm getting really worried. "We don't do that," my technical support colleague informs me! "An online exam hasn't been done in this faculty before," he continues. "You could change the exam to a test and run it yourself," the examination manager says. "We can talk about this as a possibility next year," he says. But my course outline is the "legal contract," my line manager reminds me. "You will need to get every student's signature to say you are changing from an exam to a test," says the faculty administrator.

The next few weeks of workshops and lectures and Moodle posts discuss with students changing from an invigilated exam to a test, asking if it would be a problem for anyone and if not, gather their signatures to acknowledge the change. The buggers don't all come to class or "talk" on Moodle though, do they? "You REALLY need to get those signatures quickly," a cacophony of voices echo. I telephone 22 outstanding signatures, leave messages, email personally. A week later, still six to go. An underlying tension sits with me daily. It's too late to go back. Stuff them, if they don't come to class or communicate with me, why should they have the right to stuff it up for everyone else? We can't keep changing the outcome but the 'rule' says we must stick to what is advertised without ALL those signatures. My blood boils knowing that what IS advertised is also

impossible DESPITE me getting confirmation prior to hitting that upload button. I'm trapped. These systems are cruel. I taste blood inside my mouth and realise I have been chewing my mouth raw.

Digital Byte 4: Mixed messages and the buck stops with YOU (me)!

Multi dialogues
Broken fragments
Across
time
Like my self
Threads tangled between time and people
Almost organic emails producing faster than the synaptic pathways
Developing in my flesh as learning
The core of university work
How do I make sense of it?
Trying new things Planning with technical and eLearning staff
Not all is foreseen advice varies

Who is there to help when it is needed? Who is there to help the students? Who is there to help me help them? How will it all play out? Am I playing with fire?

I email 'technical support'
Technical support
responds
We to and fro
A process of inquiry a process of logging jobs?
Amongst everything else?
The giant leap of 'going Moodle'

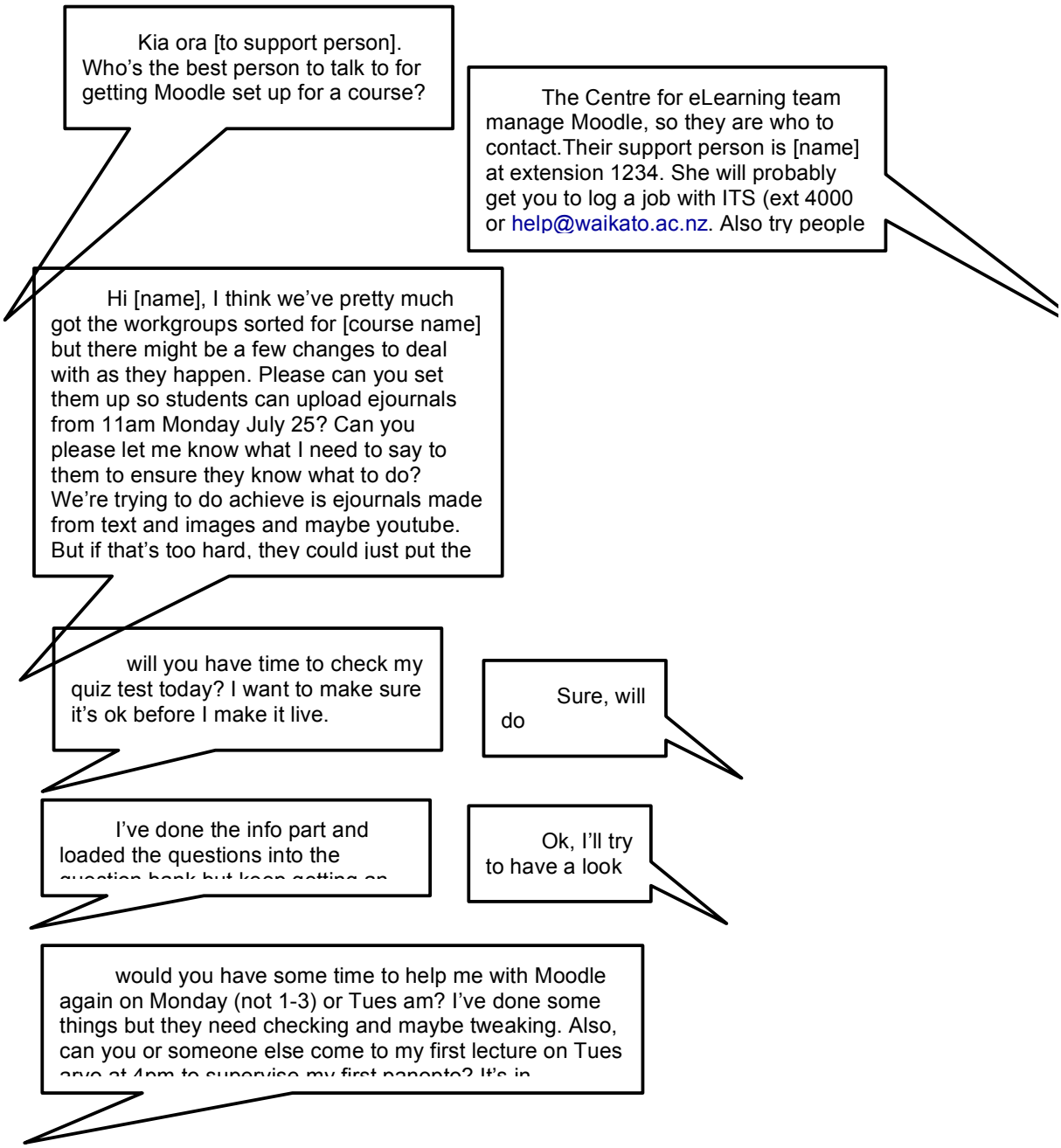

Figure 8: Conversation 1

To: secretaries@waikato.ac.nz
Subject: **[Secretaries] Moodle Teachers - please release your papers :)**

Secretaries - please circulate to teaching staff
A Semester 2011 Moodle Reminders (copy of the post from the Moodle Users Course)
Moodle Queries: ALL Moodle queries should be directed via the ITS Helpdesk in the first instance to be logged (this is required for reporting and tracking of queries). Helpdesk staff will assist immediately where they can and send any requests they cannot assist with to the CENTRE FOR ELEARNING Team for action. **Teaching access to papers:** You should have already requested and received access to your A Semester papers. If you still cannot see these when you log into Moodle please email the ITS Helpdesk (help@waikato.ac.nz) to request teacher access to it/them. Include the full paper occurrence in your request, e.g. ABCD123-11A (HAM). If you wish to require a meta-paper (two occurences merged and taught together) please request this via the ITS Helpdesk before you begin development of individual papers. **NOTE:** Due to the busy time of the semester please expect a delay in these requests being actioned.

Importing last year/semester's Moodle content: Remember that importing (copying) content from a previous paper into this one is your responsibility, instructions are available within the Moodle Users Course. This is a relatively easy process, follow the instructions and view a video tutorial in this Moodle Users paper on the eLearn Moodle site. ***Please Note:*** We have had a few queries relating this process not working correctly. **It is VERY IMPORTANT to set the number of sections BEFORE starting the import process to ensure the resources/activities are copied into the correct sections. If you do not do this everything will appear in the very top section!**

Student access to papers: When you are ready for students to access your Moodle paper remember to change the 'Availability' setting (via the Administration - Settings screen). Students cannot see hidden papers, which are displayed with a Grey link on the front Moodle page. All students who are currently at 'ENR' (fully enrolled and have returned their Offer of Place) will receive automatic access - if there is a student missing please ask them to check their enrolment before contacting the ITS Helpdesk.

Your original request information:
Incident Number: 63286
Summary: Add Moodle teacher role
Details:
-----Original Message-----
From: lisahunter [mailto:lisahunt@waikato.ac.nz]
Sent: Friday, 22 July 2011 9:34 a.m.
To: University of Waikato
Subject: URGENT please create moodle occurance for [Course A]

dear helper
i am new to staff and to this process.

please could you help me. i need a moodle occurance to be created for [Course A]. it's rather urgent as it is required to fix some other problems and this has been identified as the best solution. yesterday x said to request this and i need to have it available and in use for monday if not sooner. are you able to help please? many thanks in advance slange ;-)	
	Hello Lisa, Your incident 63286 has now been fixed, unless we hear from you, your Incident 63286 will be resolved. Your incident will then be closed after 5 business days. Resolution Details: A required step in the process, making sure that the paper is correctly configured in the Jade system was missed which has caused the delay in it appearing in Moodle for you. Tonight once the update script runs, the paper will be created in Moodle and you will be added as the teacher. So from tomorrow you will be able to add resources to the paper for your class. Kind regards ITS Service Desk Should you have any questions or comments regarding this case please do not hesitate to contact the ITS Service desk on Ext. 4008 (838 4008 from an external phone) or email us at help@waikato.ac.nz, quoting the incident reference number above. Do you wish to comment on your experience with ITS in relation to this job, go to: http://its.waikato.ac.nz/Projects/ITIL/questionaire.shtml
Your original request information: Incident Number: 111003 Summary: Moodle Query - Quiz results Details: From: lisahunter [mailto:lisahunt@waikato.ac.nz] Sent: Thursday, 16 August 2012 4:27 p.m. To: University of Waikato Subject: URGENT Importance: High hi, my online test is happening at the moment. the screen shot below shows three questions are colored (15, 22, 39) but i'm not sure why (i'm doing a test run)...it's not anything that should be hidden is it? Tena rawa atu koe & slange ;-)	
	Hello Lisa, Your job request 111003 has now been processed, please read the actions undertaken in relation to your request Outcome Details: as per email thread : don't panic - you (as the teacher) will see a different view from students as you are previewing the quiz and not actually attempting it. Please contact us if you have any further enquiries regarding your job

	Kind regards ITS Service Desk Should you have any questions or comments regarding this case please do not hesitate to contact the ITS Service desk on Ext. 4008 (838 4008 from an external phone) or email us at help@waikato.ac.nz, quoting the incident reference number above. Do you wish to comment on your experience with ITS in relation to this job, go to: http://its.waikato.ac.nz/Projects/ITIL/questionaire.shtml
	Moodle maintenance scheduled next Wednesday 16th November 2011 at 12pm By - Wednesday, 9 November 2011, 12:36 PM Moodle will be unavailable for approximately 1 hour for a small update. This update is nothing as drastic as our previous one on the 26th October (!!) and will include various Moodle community fixes including the following two issues **Importing** - this is due to new permissions which will be fixed soon. Please log a job with helpdesk if you need to import to a Summer School paper. **Assignment submissions screen -** Teacher accounts no longer show in assignment submission grading screen **Assignment receipts -** these are included in the .zip download again **Lesson activity improvements** - Teachers can now remove the pop-up file from the beginning of the activity.**Moodle upgrade status ~ Wednesday 9th November 2011** **Panopto integration** - you can easily share your Panopto recordings with more than one paper. Students are automatically given access when the Panopto block is configured. **Turnitin -** Assignments with Turnitin that have been created after the upgrade are working as expected. There are several new fields you may have noticed which allow you to determine which of Tii's databases the submissions are checked against (include the student paper database). You can also visit the Turnitin website via a link on the submissions page. Note that similarity reports for older pre-upgrade assignments remain in the system but cannot be accessed via the web interface. We continue to work with an external consultant to ensure these links will work in future. Once again, if you require a report but cannot open it please log a job with the helpdesk. Please also take a few minutes to view the General Semester Reminders in this Moodle Users Course for tips on receiving access to papers, importing material and making your paper(s) available to students
'hi [elearning] have been intending to get back to you about moodle and students uploading their videos for [Course A] but just been so overloaded i've not yet made it. can i talk with you about it wednesday morning at 10? or can you email me on mon or tue if it's a simple answer i can post out to students?' help!	

Table 1: Conversation 2

!

Sandwiched

Between students and support personnel
Other threads, tangled, knotted, at a loose end, with students just as lost as me
Questions more email threads
Questions I do not have answers to but are nevertheless thrown my way
My responsibility to teach them to learn how to solve their own problems?
Or pragmatically answer their questions and move the problem away from me?
The first takes more time that I don't have
The second encourages ignorance.
I (column 2 below)
Become the buffer, punched, squeezed, stretched, between
The 'client' student (column 1 below)
and the
'institution' technical support (column 3)
In email matters technical
It happens quickly …

Table 2: Email conversation

STUDENT EMAIL	MY EMAIL	IT SUPPORT EMAIL
[student] I think Moodle crashed this morning when i tried to post my ejournal as it says Error: Database connection failed. It is possible that the database is overloaded or otherwise not running properly. The site administrator should also check that the database details have been correctly specified in config.php. So I'm emailing you as a last resort and I will go see the tech people today to sort out if its my computer or the system. Sorry for the email but I didn't see	Hi [IT support] is what the student said true and if so, what's the best way to manage it from my end? send an email to all students allowing an extension????	There were Moodle issues intermittently this morning between 7-8.40am. Up to you whether you want to allow an extension, but it was certainly available last night and is ok now. if you did want to notify students then using the news forum would be appropriate

another way around it. i can always repost my ejournal to Moodle when its back up. just wanted to get it to you on time		
	Hi [IT support] a bit urgent so going straight to you. i thought x and i switched off the students being able to see any feedback until after 6pm once the test was closed. am i able to go into edit function while the quiz is in action or will that *&!R* everything up?	don't panic, you will see a different view from the students as you are previewing the quiz rather than doing it. The settings are ok (although if you change them it won't stuff anything up). Students will NOT see the feedback when they've finished - they will see what they have selected and general quiz feedback which says something like come back after 6pm to see your marks. helpdesk - please log and resolve a job for this :)
	Hi, my online test is happening now. the screenshot shows three qus are coloured (15, 22, 39) but i'm not sure why (I'm doing a test run)... it's not anything that should be hidden is it?	
Part of a Moodle email from me to students: ...2. also, as a reminder re DMA, read course outline for information as a first step as per lecture last term. unless otherwise arranged with me, upload to YouTube your YouTube address where the file is and your written script is all that you need to enter via Moodle. remember that IF you want to keep it private, then you can choose this when uploading to YouTube. if you're still worried about uploading to youtube there are plenty of sites that tell you how to do it. including http:// www.google.com/support/youtube/bin/answeer=57924		
Hi lisa i have finished my DMA and i have tryed uploading to the youtube three times and it is not compatible with moviemaker i used. am i able to burn it	Hi [IT support] ive had some students sending me emails about trying to upload to youtube.suggestions for making technology a worthwhile option? there's 140 of these coming in tomorrow so i hope it's not	Hi, up to 140 students the day before something is due??? that sounds like the rugby equivalent of a hospital pass. please do not indicate that we can assist at this time. hold the line and we can

to disk or on on a usb. sorry about the hasel. kind regards	going to be a headache. can they access technical support for this?	re-assess after the semester to determine if/how you can tweak the assignment. I think you should encourage the students to work together to support each other on how to achieve your assignment. … and the student having difficulty with 'moviemaker' is not searching hard enough or trying hard enough. that programme is more than able to create a video that can be uploaded to youtube. its amazing what i find when i search for the following phrase: 'how to upload a movie maker file to youtube'. basic lessons on using google search engine might be needed eh?
	i agree with you but i don't want to be the meat in the sandwich around expecting students to use technology but not being able to to respond when things go wrong and i cop all the emails. i've been talking to them all semester about this this [and wasn't advised there would be problems] and next time i'' have them do trials before the due date to make sure this sort of thing doesn't happen while they are in panic mode. but also, this bunch is nowhere near the technosavvy so big gap between what literature is saying and these students' realities. i'm not into handholding but also not into having their worlds imploded. perhaps i've expected too big a leap given who i'm working with but it's taken a semester to 'know' what sorts of students are here and in this course, I'm not imagining 140 will all panic or have issues (i already know one hasn't...phew) but also need to know the extent to which they can seek a technology human's support and	

	work somewhere in between. already tried encouraging working together but there are still some that have no friends, are not problem-solvers, do not go to lectures etc and they often have the loudest voices (both literally in taking one's time AND in the ALL IMPORTANT measures of our teaching… the APPRAISALS!!!! - IF ONLY THEY DIDN'T COUNT)	
	hi [IT elearning support] i went into moodle to try and 'assign role' for a marking tutor. i searched for her name but couldn't find it.she's been employed here as a marker this year so not sure why it didn't come up. can you suggest what i do next to make it possible? she needs to be able to see all students' ejournal answers and their DMA youtube address and scrip upload. on this second piece of assessment (DMA and script) is it best just to tell students to upload like they have ejournal or should i set up another post? x will be marking ejournals and DMA so if she could choose either ways (dma en masse then ejournal en masses OR one person's dma then ejournals at once) that would be best set up i'd imagine. she would also need the capability to paste a table with marks and comments that go back to students. is all this possible?	

The sheer volume of emailing and information processing is blowing my head apart.

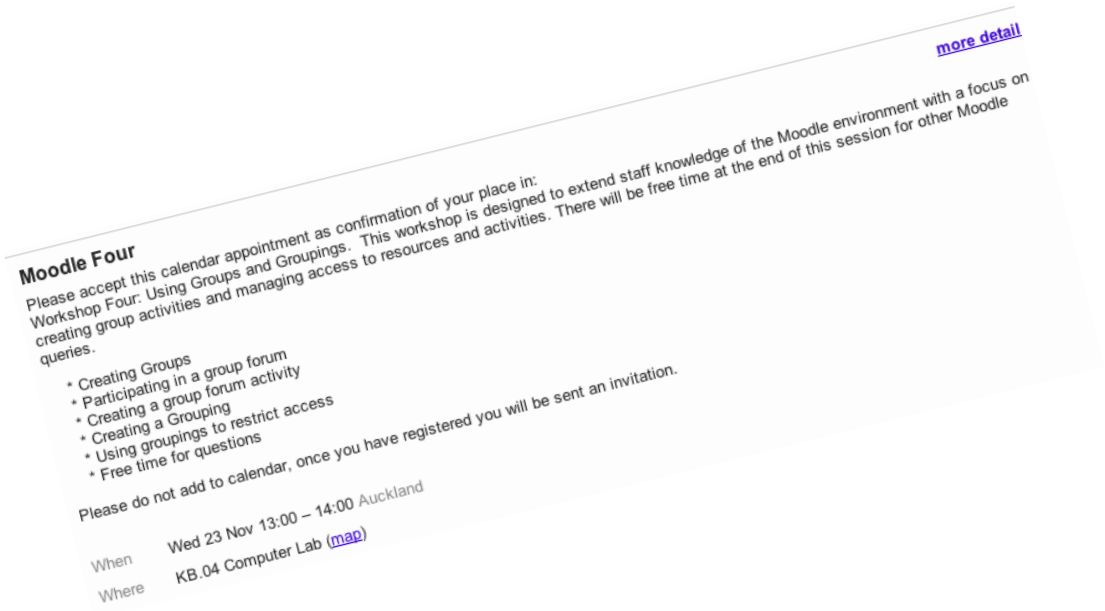

Figure 9: Calendar notification

Another invitation…time to flick to formal pd. Byte 3 starts up again…

With "1. Getting started", "2. Paper settings", and more recently "3. Assessment tools in Moodle workshop" jerking through my Cognitive Stage of learning, the first of the three stages, I walk still somewhat nervously, into Moodle workshop #4 thinking, "Will I ever get to the third stage (autonomous)?" "I am beginning to relax with increasing cognitive familiarity in the language and semiotics of the learning system," I tell myself in not so many words as I enter the now-familiar training space hidden in one of the university's basements. My cells feel open: "Perhaps I'm moving into the Associative Stage of learning, the 'freeing' stage," I muse. It seems a bit of a nonsense doing these courses when the courses I teach into don't use Moodle, but I get autonomy in my first course next semester so perhaps I could implement Moodle as a pedagogical tool for eLearning to investigate the findings of current research that point to the importance of digital literacy for our students. The university seems to value it, at least according to what is said via advertising and with the creation of workshops like this. I too invest precious time excited by the advertised prospects of the applications I hear about, not just in Moodle. In the last university I worked in, BlackBoard was useful but I do remember the angst created with upgrades just before the semester started. I look around the small well-fitted-out computer lab of strangers, none from my department or faculty. The group of eight learners seems such a small number for a university with a staff of six hundred. The first facilitator of four steps up to the teaching computer and introduces us to the workshop's content. "Playing along with instructions in a low stakes environment is really the way to go," I reflect, missing an instruction

and losing my way. One of the other staff is quick to respond to my raised arm. She gets me back on track although I'm not quite sure how she got me there, my eyes too slow to catch where the cursor did its thing! "Concentrate and keep up." I smile at the screen and flick the mouse around the table, pleased with my new course page ready for hours more play later.

"Damnit. I've forgotten how to change these headings," I curse as I try to recall what I had learned a few days ago in Workshop 4. My good intention of returning to my new course page within a day of learning got wiped out with marking and other administrivia. After hours of trial and error and a timid call to the person who ran the course I feel like giving up on the idea of running a mixed media course that aims to enhance students' digital literacy. The literature may say that digital literacy and eLearning is necessary for 21st century learning, but no one else seems to give a toss. Moodle v the faculty "learning system", two sets of staff with differing opinions and advice, unclear copyright issues getting clarified with library staff, seemingly no support for Moodle by others at the staff meeting, students with few mobile digital devices and low literacy, and still so much more to learn and make sense of while still living in the other world of printed course readers, paper outlines and digital naysayers. "It's isolating." I feel like punching into my keyboard conversation with the unknown 'help' human. I have to "log a job" and wait patiently for a reply, in the meantime my thoughts going elsewhere and this thought thread dissolved until time dries away the millions of other thoughts so this one can recrystallize. "Why can't I just talk to one human that knows my story and is assigned to help me rather than hoping the 'help' person will forward my email request to someone familiar," I sigh. The world feels like it is closing in as I wait at a time that I cannot afford to wait; semester is looming and I need quick answers to keep my thought thread alive. Even though I've already had a private tuition session with one of the eLearning staff, I forget too much too quickly at these information overload sessions, or I later run into problems I didn't know that I didn't know. But he is gone again and I feel I must try to get answers myself, after all "I'm not stupid am I? and I'm not afraid to learn or learn to learn," I say more confidently to my laptop as I flick my thumb across the mouse pad to search for other answers to my problem on the screen.

"The examinations person has ok'd the paper's exam to be online," I note as I tick the list of jobs I need to sort out before the semester begins. Last year's Moodle element of the course was full of dilemmas but it was a good introduction for enabling them to create evidence of their learning in ways they had never before explored. Students cited the helpfulness of other resources embedded in the Moodle course page, their learning through the quizzes, everything being centralised, being able to revise recorded lectures and, best of all, creating a YouTube video for the first time. We also had lots of frustrations together and I took a hit in my course appraisals. In short, I felt blamed for students' lack of knowledge, they having had little formal exposure to technology or eLearning in semester 1; university systems seem not fully in place; limited technical support for students; my steep learning curve on a 'needs to know basis', and for 'being different' to the other courses. Another semester began. Some of the bruises were still throbbing, but spurred on by several more professional development courses and an air of "eLearning is expected and normal", I prepare the next iteration of the same course with the new version of Moodle. I hit "upload" with some sense of accomplishment as the managerialised templated course outline loaded into Moodle. "Nothing like getting locked in before you even get to know your students' needs." I roll my eyes. "Where's the pedagogy in THAT!" My colleagues race to get their course readings into the printery before the semester begins, but I relax knowing that I can add, change and even just link to sources online seconds before they are

needed. Reflecting on the previous iteration of my course I know I have learned a lot of new skills and ways of working but wince at the cost! "Please let this semester be better," I hear myself, looking at my computer.

Pedagogies and the digital in doing academic work—a discussion

While the digital bytes above are only a small representation of my experiences of academic work, they illustrate some of the complex issues that we deal with as we participate with and in the digital world. Questions of where our self begins and ends in relation to digital technology, how we learn who we are in relation to technology, and how we negotiate relationships with colleagues and others embodying the institution jumped out from my journal. Questions such as these also interact with other questions: what is whose responsibility in the learning and teaching of digital literacies? Who is responsible for the professional development of academic dispositions in relation to technology adoption? Some of these are now considered.

Pedagogical spaces between human and technology: fleshed and mediated

Just as learning is considered by social psychologists to take place in the dialogue between people, with the incorporation of digital technology into our work there are pedagogical spaces created between machine, software and flesh. There is no inside or outside, or computer as other, but a mediated set of practices that emerge with the presence of hard/software and human. Ellsworth's notion of "sensational pedagogy" (2005) suggests I become constituted by the outcomes of my interaction with technology in the context of academic work. Such constitution, if positive, must motivate, challenge and facilitate learning the self as a competent risk-taker embodying intellectual praxis.

In the digital bytes, I experienced something that was quite the opposite to the positive. Instead I experienced the "sensational" as being about incompetence, stress, wasted time, reinventing the wheel, complicated discussion threads, aloneness, frustration, and a loss of energy and confidence to keep trying to learn or help others to learn. For systems and institutions such as universities there are vital considerations necessary for pedagogical processes to emerge with productive, rewarding and generative outcomes for those doing academic work. Neoliberal influences that evoke only business, rather than intellectual responses, without attention to unconditioned academic habitus in a technological field, signal doom for both intellectual work and the economic outcomes of a university. In digital pedagogical spaces "affective somatic responses" (Grosz & Eisenman, 2001, p. xiv) arise out of an assemblage in a similar way to how Ellsworth (2005) writes of architecture and body. The corporeality of one's flesh in relation to timespace and the digital is pedagogical, creating sets of experiences in learning the academic self. Learning to assemble a digital corporeality, to 'become' and 'be' digital in academic experience is part of learning to take up an academic self.

If the health of an institution is constituted by the health of those who embody that system, the flow between flesh, pedagogy, and machine should not result in knots, tensions, or dis-ease in the worker. It seems clear that, in terms of digital literacy in academic work, those who are on the 'richer' side of the literacy gap will "attain productive stances toward design and tech-savvy identities to a

greater degree than poorer ones" (Gee, 2005, p. 4). Gee continues by pointing out that access to technology alone is not enough but that "mentoring and rich learning systems built around the technologies" (p. 138) is necessary for the full potential of these technologies to be realised. The only technological/digital literacy development that has occurred for me has been through my effort in addition to my expected workload and my own self-motivated seeking of professional development. Many of my students also reported having had little experience or formal development in their previous university work. There were times where the knots, tensions and dis-ease had me questioning my involvement while other staff had an easier time with pen/paper courses, ignoring changes such as Moodle. Were they any poorer? Lankshear and Knobel (2008) suggest such gaps in digital literacy will be tied to success in our present-day world:

> Taking an expansive view of digital literacies—one that includes popular cultural practices, everyday practices like workplace blogging, online shopping and participation in online network sites—extends the scope for identifying and understanding points at which these same conducive processes and principles operate within digital literacies that are increasingly part of the everyday lives of educators at large. (p. 14)

Given my experiences, however, I would suggest that in attending to the everyday practices of educators/academics, establishing conducive practices for individual digital engagement as a rewarded part of their workload rather than as opt-in add-ons will see a healthier embodiment of digital engagement and working smarter not harder. Currently, the gap between those working digitally and those not goes unrecognised, and possibly even penalised, by institutional practices. Changing to adopt a more mediated and digitally engaged habitus requires institutional support in terms of time and recognition, technical support, and the necessary hardware and software to experiment and drive change.

Pedagogies for digital exploration beyond learning the self

> If people are to nurture their souls, they need to feel a sense of control, meaningfulness, even expertise in the face of risk and complexity. They want and need to feel like heroes in their own life stories and to feel that their stories make sense. They need to feel that they matter and that they have mattered in other people's stories. If the body feeds on food, the soul feeds on agency and meaningfulness. (Gee, 2007, p. 10)

Colin Lankshear and Michelle Knobel work with James Gee's statement to argue, "agency and meaningfulness are the very stuff of literacies as situated social practices" (2008, p. 8). Yet in the learning of self (Ellsworth, 2005) illustrated in the digital bytes, there is a lot to suggest that there is little or no sense of control, agency or meaningfulness as there is not the time, space and support to take risks and deal with complexity and uncertainty. If an incompetent academic self is the most available subject position in relation to the digital world, learning is more likely to be reduced, damaging or hindering academic work.

Learning takes place when there is time enough to learn and then practice in authentic contexts. Much of our work as academics entails contexts that only arise once a year or semester (for example, setting up a Moodle site: Byte #2), and fluid and emergent contexts that are often high stakes (failing technology during an exam or assignment upload). Success in these contexts requires an availability of technical support as it is needed. Having to pause time, work asynchronously, or pick up the thread of a problem later in order to complete the necessary task is not always an option. The fragmentary and complicated nature of interactions, particularly in high stakes arenas such as student assessment, and where ultimate responsibility lies with the teacher, make for negative outcomes with very material effects. Georgina and Olson (2008) remind us that "technology alone does nothing to enhance pedagogy; successful integration is all about the ways in which technology tools are used and integrated into teaching" (p. 8).

Developing technological pedagogical content knowledge (TPACK; Koehler & Mishra, 2008; Mishra & Koehler, 2006), including setting up blended courses, new practices such as online exams, or introducing students to unfamiliar technologies, requires in-time and on-time dedicated human expertise to inform planning and aid troubleshooting. Without it the university jeopardises losing those academics willing to take risks, willing to engage with digital literacy themselves and willing to incorporate learning into courses for the benefit of student learning. Where other staff and even university systems are resisting such a move it is difficult to step into a subject position that only makes incompetence, increased time lost in trial and error, or frustration available. It is a recipe for working harder, not smarter, and says much about a workplace culture.

Digital literacy as cultural medium—not yet achieved in workplace

The workplace culture seems filled with gaps, gaps between policy and lived experiences, gaps between assumptions about student and academic digital literacy levels, and gaps between learner (student and academic) digital needs and resources for learning. Lankshear and Knobel also talk about a tech-savvy gap:

> The distinctive socio-technical accompaniments of digital literacies—the myriad "learning incidentals" that come free with the online and offline learning systems attaching to digital literacy practices within affinity spaces of any kind, but including popular cultural forms—suggest the possibility of addressing "the new gap" (the tech-savvy gap) in such a way that we [simultaneously] address the old gap, the gap in regard to traditional print-based literacy. (2008, p. 14)

Somehow we are caught in a web of gaps, caught by being pulled in different directions with an imperative to have digital content knowledge and the necessary pedagogical content knowledge to facilitate students' digital learning. That we are all learners and that we might be modelling learning in an uncertain world does not cut it with students. This becomes very clear in their evaluative comments at the end of semester, comments and ratings that play out significantly in annual academic appraisals and promotions.

The ideal of a university being a learning culture sits in sharp contrast with the business culture of client/stakeholder/student, processed by the academic who embodies the university business. If at the same time the culture is not one where enhancing digital literacies, digital systems, and digital learning are embodied comprehensively within the university, other than in policy

documents, intended learning and outcomes may be severely compromised. Given the findings of Georgina and Olson (2008), of "significant correlations between technology literacy and pedagogical practice integration" by faculty… and "that faculty technology training may be maximized for the integration of pedagogy by using the training strategy of small group faculty forums with a trainer" (p. 1), there are clearly helpful institutional strategies imaginable, but are they available in ways that enhance academic work?

Conclusion: Have I byten off more than anyone can chew? Or is it a case of 'once byten, twice shy'?

Our practices synchronously constitute our habitus and the fields within which we are located (Bourdieu, 1990a), so for academic workers to embody digital literacy and eLearning as pedagogy, as intellectual work that enhances the academic field, there needs to be a myriad of nuanced, proactive, and responsive practices enabled within a university. For example, en masse or one-off eLearning professional development that depends on an individual academic's motivation or equal distribution of technology regardless of technology uptake has not been effective enough for me to feel supported in endeavours to be digitally literate. Nor have my high investments in time and energy resulted in effective or efficient skill or knowledge enhancement. Whether digital technologies are used to liberate teaching from the constraints of time, space and place or to broaden technological and pedagogical horizons, the responses emerging from the field need to include "re-visioning our ideas, practices, and training schemes in order to impart our pedagogical messages" (Georgina & Hosford, 2009, p. 695). That is, the pedagogical messages of the university wanting enhanced digital literacies through the embodied practices of academics needs urgent revisioning if those who are willing are to be supported to embody digital pedagogy that goes beyond technology for technology's sake.

I emphasize that the nature of academic work needs careful attention. While you ponder the gap/link between the two initial advertisements, one for a technology brand, the other for an academic position at a university, and my experience of technology in a university, I want to emphasize the point through a third source, a Māori whakatauākī, to consider what is pivotal for the emergence of a new digital habitus of learning in academic work:

> He aha te mea nui o te ao?
> He tangata! He tangata! He tangata!
> What is the most important thing in the world?
> It is people! It is people! It is people!
> (http://www.korero.maori.nz/forlearners/proverbs.html accessed 080813)

But what is necessary for the possibilities of competent TPACK academic subject positions to emerge; for those doing academic work to enact human agency and social change that constitutes academic work in relation to positive and possibly even undetermined subject positions with digital technology? A challenge by Rajchman to those interested in pedagogy, is to play the game of thought:

> free in its creations not when everyone agrees or plays by the rules, but on the contrary, when what the rules and who the players are is not given in advance, but instead emerges

> along with the new concepts created and the new problems posed. (Rajchman, 2000, p. 38)

To me, an engagement with digital technologies and literacies is to provoke what Kennedy describes as "new affectivities, new intensities between people [that] might provide a mutant sensibility which could prove more significant in changing people's experiences of themselves and the world than any macro-defined politics" (2003, p. 13)—the reason why I got into this "position" in the first place, the position of working with academic praxis.

A visceral sense of lived and embodied sociocultural forces coagulate in academic work/ers, as knowledge makers, as pedagogues, as digital explorers. Like that which my employers are drawing our attention to, academic work presently and in the predicted future, is about an interrelationship with computers (hard/software), technologically savvy workers, and the idea that digital literacy can promulgate education/learning. As the core practice of universities is legitimated as 'ideas', then enhancing ideas and shifting paradigms, if not creating new ideas, is core practice. The place of digital literacies and technology in this practice is contentious. However, for us to seek new possibilities, new emergence, recognising the pedagogical limits to our knowledge, as unpleasant as they may be to recognise, seems necessary. This, however, requires considerable support for those willing or required to take that road. As such, supporting academic work as exploration, as timespace freedom, as technorelated may be necessary. As this rhetoric is heralded in policy documents such as those of our own institution, to play with thought in relation to technologies introduces new ways of being in academic work.

Pedagogical moments can be described as having

> a sense of enjoyment of not having gotten there yet and of not even being eager to do so because of the suspension between new and old ways of being is in and of itself a very pleasant and engrossing one. (Ellsworth, 2005, p. 172)

For some academics to be supported in adopting and developing a digital habitus, I suggest we need to replace individuals' *digital bytes* with *pedagogical moments*. As well, while time and responsibility are imperatives of such a *potential* learning space, we need to address removing time and responsibility to avoid overwhelming and unpleasant senses that close possibilities for learning selves. A panicked academic struggling with technology and aware that students (and academic staff reviewers) will be unwilling and/or unable to see the context is not an ideal context for learning. Academic selves are the core to embodying academic work and therefore need palpable and sensory support if change is to occur.

I wonder what it would take for our experiences of academic work to parallel the opening advertisement? Smarting, in a negative sense, is not a useful outcome for university business or for educational change to be positive, proactive, sustainable, or even intellectually, digitally, or pedagogically smart. Returning to the above whakatauākī, for digital change to occur it is about the university's people, those doing academic work. They need support, reward, and motivation to develop a digital habitus. To aid this the nature and extent of smarting needs to be understood to inform digital change.

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