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CHAPTER 1

Why focus on big issues and critical questions?

Michael Henderson and Geoff Romeo

Introduction

The use of digital technologies in education, and more specifically for learning, is complex. Digital technology cannot be simply applied without consequences; effective use requires teachers and leaders to be aware of the underlying big issues and to ask critical questions. This is particularly important with the Australian Curriculum (and state derivatives) mandating the effective integration of digital technologies (ICT as a general capability) for all students Foundation to Year 10 (F–10) and the introduction of digital technologies as a compulsory subject for all students (F–8). Not only do we need to understand what the curriculum is asking of us as teachers, but also the reasons for the curriculum pressure, and the implications for our practice and for student learning.

Pre-service, graduate, and in-service teachers need to use digital technologies in their practice, but are they being exposed to the debate about *if*, *when* and *why* and given the opportunity to ask probing questions about the efficacy of existing, emerging and new technologies in the classroom?

It is important to note that this book and its authors, while adopting a critical perspective of digital technologies, contend that such technologies can benefit education. However, rather than focusing on what buttons to press, each chapter aims to empower the reader to understand why they should (or should not) use digital technologies, when it is appropriate (or not) to do so, and what new implications arise.

Instead of trying to teach rapidly outdated technical skills, such as showing how a blog can be used in teaching, this book enables readers to ask, 'What opportunities

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and risks do blogs afford me?' There are numerous resources online and in print to support teachers to learn how to set up a technology for their class – a blog, for example. We encourage you to hunt down those resources, which will change from year to year as the technologies change, but keep in mind the critical perspective offered in this text. Those resources often celebrate the *potential* of the technology, such as making claims of how that technology can positively influence students. However, such claims of potentiality need to be balanced by a critical awareness of the implications, assumptions and complications surrounding the use of the technology.

Indeed, there is an even more fundamental question underlying our decisions to use technology that needs to be asked: Why should we include technology in the classroom at all? Any glib or simple answer involving workforce readiness, student affinity or improved learning should be treated with suspicion. Each of these answers is debateable, with enough research evidence to suggest that at the very least we need to constantly contextualise our answers. For instance, not all students are expert at, or motivated by, all technologies. Despite this obvious but often obfuscated fact, the myth of digital natives (see Chapter 2) abounds in schools and in tertiary settings with the direct and troubling consequence of teachers making decisions about technology founded on misconceptions of student affinity rather than pedagogy. There are also political, sociocultural, economic, curriculum and policy pressures that influence our decisions as teachers, often without us even being conscious of them. Moreover, there are ethical, safety and pedagogical concerns that need to be explicitly interrogated. This book aims to bring these broad ranging issues and questions to the foreground so that teachers are able to make informed decisions about their use of technology.

The textbook, and each chapter within it, is driven by the same fundamental question: What critical issues do teachers need to know in order to help them make better decisions in the classroom about digital technologies? The authors of the chapters are notable figures from across a broad range of Australian Universities: directly engaging with policy, curriculum and other issues particularly relevant in an Australian context. However, the broader and underlying issues are not limited by geography, educational discipline or level. As such, much of this book is equally applicable for early childhood to secondary pre-service and in-service teachers in Australia and internationally.

Each chapter is designed to be a concise introduction to deeply complex ideas. A notable feature of each chapter is the critical questions it poses. These are the questions that teachers need to ask. However, the nature of the questions is such that they cannot be answered simply or easily. Indeed, many pose a dilemma; that is, any answer inherently raises further questions or problems. Even though each chapter poses critical questions, it is important to understand that all we can aim to do is to explain the issues surrounding those questions and point to potential avenues or lines of enquiry for teachers to guide their own reflective practice. It may seem strange to pose such complex and sometimes irresolvable questions in a book designed for non-specialist and pre-service teachers. However, these

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kinds of questions are rarely dealt with despite their significant implications for all teachers and their students. Understanding that these questions exist is an essential beginning point for any teacher seeking to use digital technology in their classroom.

This book is divided into sections reflecting five broad critical perspectives. Each section contains a number of chapters that have been purposely selected to introduce the big issues and critical questions surrounding digital technology practices, particularly in Australian contexts.

Section 1: Being critical of our assumptions: learners, learning and digital technologies

The chapters that make up Section 1 discuss the need to be critical of our assumptions about learners, learning and digital technologies. Often, digital technology is assumed to improve education and the social condition. However, many of our beliefs need to be questioned.

Nicola Johnson's (Chapter 2) critique of the digital native discusses the assumption that students have a high degree of skill in using, and affinity for, digital technologies, and asks us to question the hype surrounding young people and their use of technology. The chapter presents and describes a number of 'myths' and why they have become points of contention within education.

Geoff Romeo (Chapter 3) suggests that underpinning the use of digital technologies in schools is confusion, complication and contestation. The chapter explores the reasons for the conflicting ideas and confusion, how the research about technology in education should be considered, and the notion that well-informed professional judgement is the key to making high quality decisions. Romeo discusses the notion that making a distinction between *learning and teaching* and *learning and teaching with technology* is a contradiction that nurtures reluctance to change.

Jennifer Masters (Chapter 4) challenges us to question the moral panics that surround social networking and online technologies, leading to a more considered and balanced perspective. Yes there are risks for children and young adults but it is possible for young people to 'grow up digitally' in a protected and supported environment that minimises risk while building important skills for life in the digital world.

Neil Anderson (Chapter 5) discusses the under-representation of female students in digital technologies subjects in upper secondary school education and the resultant under-representation in university education and the ICT industry. He also examines the digital divide and issues associated with rurality and digital technologies in education.

Glenn Auld and Lena Djabibba (Chapter 6) use stories from the Kunibídji community in Arnhem Land to take a unique look at the complex issue of how

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Aboriginal and Torres Strait Islander students, particularly in remote communities, may negotiate the use of digital technologies in schools and beyond. Auld and Djabibba challenge us to consider the complex history of Aboriginal and Torres Strait Islander communities and of how one approach towards technology, for all contexts in Australia, is not viable.

Section 2: Technological affordances: what's so special about digital technologies?

The six chapters that make up Section 2 explore the affordances of digital technologies and probe the question: What's so special about digital technologies? There is a dominant mind-set in education and more broadly in society that the use of digital technology marks something that is innovative, modern, progressive and inherently beneficial. However, teachers need to be critical, and consider whether digital technology adds anything new to education, and if so, what are the implications for instructional design.

Andrew Fluck and Matt Bower (Chapter 7) explore, and define, the concept of computational thinking and demonstrate how it is considered by some to be of vital importance for our future economic prosperity. Computational thinking is particularly topical worldwide and is currently a basic element of the proposed digital technologies subject of the Australian Curriculum. Teaching computational thinking will pose a major challenge to teachers as they are preparing to enact the national curriculum in coming years.

Glenn Finger (Chapter 8) proposes that digital technologies present exciting challenges and opportunities for teaching and learning to promote creativity, and to enable visualisation, collaboration and communication. Finger stresses that it is vitally important that pre-service and practising teachers are able to design and implement meaningful learning experiences for their students so they can successfully develop and demonstrate these capabilities.

Chris Campbell (Chapter 9) explores the potential for digital technologies to break commonly assumed boundaries of the classroom, which include time (for example, in class time), location (for example, the classroom), and people (teacher and students). Campbell focuses on three examples of how these boundaries have been redefined including using the *flipped classroom*, using *massive open online courses* (MOOCs) and the *flat classroom* project.

Michael Henderson (Chapter 10) explores the often-maligned world of social media (for example, blogs, Twitter, YouTube and social networking). Henderson defines social media and social networking, critically considers some of the assumptions underlying the claims about potential classroom use, describes a set of conditions for successfully using social media in the classroom, and outlines a range of critical issues that teachers need to consider before and during implementation.

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Sue Gregory, Torsten Reiners, Lincoln Wood, Hanna Teräs, Marko Teräs and Michael Henderson (Chapter 11) critique digital games in the context of the curriculum and discuss the principles of gamification. They suggest that understanding the driver behind the success of gaming and transferring the principles into the classroom has significant potential to improve student engagement and outcomes.

Mark Pegrum (Chapter 12) explores the potential of using mobile devices for m-learning (mobile learning) and informs us that for many people, mobile devices have become the preferred way to access information, build knowledge and share understanding. Pegrum defines m-learning, considers how it can be implemented, and discusses potential drawbacks.

Section 3: Policy: curriculum, values and agendas

The three chapters that make up Section 3 look at issues relating to curriculum, values and agendas. The emphasis placed on needing to teach with and about digital technologies in the curriculum, and the implication that any use of digital technology is a desirable innovation, is not a new phenomenon. Our practices, the curriculum, and the hype that surrounds digital technology have evolved over time, influenced as much by popular thought as by informed research on pedagogy and learning.

Sarah Howard and Adrian Mozejko (Chapter 13) examine three 'ages' of technology integration: pre-digital, personal computer and the internet, as they relate to technology provision in education, and how a critical view of digital technologies over time informs our understanding of teaching and learning.

Jason Zagami (Chapter 14) undertakes a critical examination of Australian national and state computing curricula within a global context. The chapter includes a commentary on 21st-century skills, digital literacy, the way in which the computational thinking concept has grown in international markets with its own agendas, and how this is now shaping the Australian computing curriculum.

Neil Selwyn (Chapter 15) looks beyond the hype that often surrounds digital technology in education, imploring us to critically evaluate buzz phrases such as '21st-century skills', 'digital natives', 'flipped classroom' and 'Bring Your Own Device'. These are the ideas that most politicians, policy-makers, employers, parents and even school leaders tend to hear when it comes to digital technology and education.

Section 4: Student learning

The seven chapters that make up Section 4 consider digital technologies and their impact on student learning. In every instance of using digital technology we need to ask whether it is improving learning. We cannot simply transfer a successful instructional design with digital technology from one classroom to the next and

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expect the same results. It is important to understand the kind of learning theory, instructional strategies, and issues of context (such as domain and age) in order to best approach using digital technologies for our own classroom.

Paul Newhouse (Chapter 16) examines why digital technologies are used in schools, and how that use may improve learning. He refers to what has been learned from research, and describes how teachers may use a critical and evaluative framework to guide their decisions about when and how to use these technologies. In particular he discusses the concept of *meaningful uses* of the technology. Newhouse's aim is to help you with the decisions you need to make about the use of digital technologies to support the learning of your students.

Newhouse's second chapter (Chapter 17) discusses the nature of assessment and alignment with the curriculum, in particular the problems concerning the validity and reliability of assessments. A range of digital forms of assessment is presented, along with a discussion of the potential of learning analytics and tips for getting started with e-assessment.

Peter Albion (Chapter 18) reasons that understanding how digital technologies might be used to support learning depends upon first understanding the nature of learning. Ideas about what can be learned, what should be learned, and how people learn, are important foundations for thinking about theories of learning and how they relate to digital technologies.

Albion's second chapter (Chapter 19) critiques inquiry-based learning and related approaches such as project- and problem-based learning. Albion discusses how such approaches respond to the increased availability of information in a networked world by emphasising the location and application of information by the learner rather than its transmission from teacher to learner. He suggests that with such approaches, the role of teacher shifts toward being a designer and facilitator of projects through which students learn rather than the primary source of knowledge in the classroom, and that shift is facilitated by the application of digital technologies to initiate learning activities, access and process information, and present results.

Donna Gronn and Ann Downton (Chapter 20) focus on the concept of numeracy, how it is dealt with in the Australian Curriculum, and what role technology might play in developing numeracy. As a *general capability,* numeracy should be developed in all learning areas as an integrated concept. Gronn and Downton define numeracy and what role, if any, digital technologies play in developing numeracy.

Scott Bulfin and Kelli McGraw (Chapter 21) suggest that the increasing ubiquity and use of digital technologies across social and cultural life is a key challenge for educators engaged in helping students develop a range of literacies useful for school and beyond. Bulfin and McGraw contend that many young people's experience of communication and participation is now shaped by almost constant engagements with digital technologies and this has important implications for educators and school systems.

Susan Edwards (Chapter 22) considers the use of digital technologies in early childhood education (birth to eight years). Edwards explains that the use of technologies in early childhood education has been characterised by debate

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regarding the extent to which technologies should be used with young children. The chapter begins with an overview of the 'to use or not to use debate' and then considers how digital technologies can be integrated in early childhood classrooms. It also considers the concept of digital play and how this is likely to influence the use of digital technologies in early childhood education in the coming decade.

Section 5: Professional learning

The four chapters that make up Section 5 discuss the big issues and critical questions relating to professional learning, often referred to in Australia as *professional development*. Understanding the dominant discourse and complex relationship between digital technologies and professional learning is important for in-service teachers as well as pre-service teachers who are embarking on a career of lifelong learning. Not only do teachers need to be aware of changing frames of reference in terms of competency and effective teaching with technologies, but also to be critical of such discourse.

Margaret Lloyd (Chapter 23) alerts readers to the number of *standards* frameworks that describe expectations in terms of teacher competency with digital technologies. Some of the frameworks are theoretical and drawn from systematic research while others are systemic policy guidelines or mandatory requirements. Lloyd critiques selected frameworks and suggests that they can be either millstones – cynically seen as part of the 'quality' agenda, or milestones – positively seen as marking out both personal learning goals and system transformation.

Sarah Howard and Adrian Mozejko (Chapter 24) suggest that a culture of educational technology-related policy and curriculum change has led to minimal improvement in teaching and learning and has, instead, resulted in teachers being labelled as 'resistant' to change, 'luddites' and 'risk averse'. Howard and Mozejko challenge these simplistic labels, and offer a more critical perspective of how and why teachers (dis)engage with technology.

Michael Phillips (Chapter 25) challenges us to examine the often-uncritical debates about the use of digital technologies in classrooms, suggesting that many of the articles written about digital technology tend to do so in unrealistic terms. Phillips reasons that the 'state of the actual' may be somewhat different and determining which teachers are using digital technology effectively as part of their classroom practice is quite complex.

Finally Kathryn Holmes and Nicole Mockler (Chapter 26) ask us to consider the complexity of teacher learning and development and how teachers can be supported to continually improve their practice. They provide a critique of current, research-based practices to support the professional development of teachers and highlight how professional learning is most effective when teachers are engaged with other teachers. They suggest that several decades of simple ICT technical training has not led to effective use of the technology in the classroom and that inquiry-based learning, where teachers become researchers, may hold the key to reshaping practice.

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Concluding comments

All teachers, regardless of year level or discipline, are expected to teach through, with, and about digital technologies. However, you also need to be able to recognise the broader concerns and consequences of those practices. Each chapter in this book is designed to help you ask the critical questions: When and why should I use digital technologies? Is it appropriate in this context? What are the implications and consequences I need to consider?

Your gut feeling that a technology will benefit your students' motivation or learning is a valuable starting point. However, the decision around choosing a technology cannot stop here. The broader issues of gender, culture, socioeconomic condition and safety need to be considered, as do the implications for pedagogy, instructional design, learning and assessment. Your understanding of the *big issues* and *critical questions* and your willingness to approach your teaching as a reflective and critical practitioner, are the keys to making intelligent and pragmatic decisions about your use of digital technologies for education.

Exploring

- Before reading the various chapters in this book it may be a useful and enlightening activity to reflect on your own assumptions, beliefs and knowledge. In particular, try to explain your understanding of when and why digital technologies should (could) be used in your classroom, and the implications and consequences of that use. Write down your thoughts and return to them after reading each chapter.
- Here are some questions that have been designed to provoke your thinking. Try to identify, and be critical, of the underlying assumption in each question:
  - Why do students enjoy using digital technology?
  - Why are digital technologies effective in improving learning?

Further information and resources on this topic are available at <www.cambridge.edu.au/academic/teachingdigital>

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SECTION 1

Being critical of our assumptions: learners, learning and digital technologies

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CHAPTER 2

Digital natives and other myths

Nicola F Johnson

Introduction

Students are mistakenly assumed to have a high degree of skill in using, and affinity for, digital technologies. Within primary, secondary and tertiary sectors, students have been labelled 'digital natives', deemed to have different capabilities to that of previous generations. In addition, use of technology is often claimed to lead to addictive and socially isolating behaviours. This chapter problematises these kinds of assumptions and aims to leave readers better equipped to critically appraise popular discourse and, in some cases, the hype surrounding technologies and young people. The chapter presents a number of 'myths' and describes why they are mythical but explains why they have become points of contention within education. Consideration is given to different 'myths' and the chapter provides a number of suggestions for future reading both within this volume and further afield.

CRITICAL QUESTIONS

- What constitutes good teaching? Does this teaching involve using digital technologies? If teachers do not use ICTs in their teaching, are they poor teachers?
- What might be barriers to using technologies in schools?
- What misbeliefs about teaching with technologies might be causing these barriers?
- What labels are used to categorise people? Are they useful, harmful or simplistic?

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