CHAPTER 1

What is a digital
pedagogy and why
do we need one?

Learner Outcomes

After reading this chapter, you should be able to:

- understand the concept digital pedagogy
- describe the need for developing a digital pedagogy of your own
- know some of the imperatives that drive change in educational practices
- list the reasons that require education to become more digitalised.

Key Terms

- digital pedagogy
- digital native
- digital Immigrant
- digital fluency

What is a digital pedagogy?

During your studies you will have encountered the term *pedagogy* and be familiar with what it refers to. It is the basis of our profession and many of us would have an idea in our mind of what an effective pedagogy would be for the phase of learning or subject area we are planning to specialise in. For purposes of clarity, let's define it as the study of being a teacher and the process of teaching. There has been much research and speculation about the use of computers in the classroom, and technology has often been viewed as a *tool* to assist both teachers and students. But is that all? Research has shown that we learn differently and engage in different types of knowledge creation when we use technology. Research on the use of technology in teaching and learning has informed developments in learning theories such as constructionism, distributed constructionism and connectivism. Technology has also changed the way we view teachers. No longer is the traditional paradigm of the all-knowing, all-powerful teacher at the front of the class distilling knowledge into the empty minds of the students relevant. While this paradigm was at its peak in popularity during the 1960s to 1970s, it does still remain in some traditional classrooms across Australia. Technology was first viewed with great excitement by some educators as its potential was being explored. There was a lot of predictive comment made about the computer replacing the teacher, which led to some negative backlash regarding incorporating technology into classrooms. As this initial flurry of reactive commentary started to settle down, educators started to examine the potential of new technologies in teaching and learning. Technology has furthered the shift towards more independent, student-led inquiry modes of learning. Teachers now assume the role of co-collaborator or eModerator. So technology appears to be more than a mere tool in the classroom: it changes how and what we learn.

Throwing a computer into a classroom doesn't make the learning effective: teachers need to understand how to use technology effectively, understand the learning theories behind the practice and know how to select the right technology for the learning outcomes they seek. Teachers need a **digital pedagogy**. In simple terms, a digital pedagogy is the study of how to teach using digital technologies. This chapter explores why teachers need to develop a digital pedagogy. It examines the changing nature of students and the context in which we teach. It argues why we need to develop our skills in digital technologies and outlines the learning outcomes we can expect. Students and their parents expect that children will learn and be taught via digital technologies. It's a strong imperative: we either up-skill and embrace digital technologies or we get left behind by our students. The rewards for including technology in the classroom are numerous. This text guides you in detail through some of the ways of teaching with technology.

Why do we need a digital pedagogy?

Today's students use technology (IM, Facebook, Flickr, Skype) to be constantly connected— to friends, family, information and entertainment. Technology allows them to connect with more people, in more ways, more often… The current generation seamlessly transition between their 'real' and digital lives (BECTA 2008, p. 12).

Educators face the constant challenge of refining teaching and learning techniques to keep up with the increasing demands and expectations of students, whom we describe as *digitally expectant*. Students expect that the teaching and learning they will experience across their years of formal schooling will be rich in digital technologies. It is an expectation grounded in students' personal and recreational pursuits. The non-schooling part of their lives is rich in digital technologies: they watch digital TV; listen to digital radio; use smartphones; are fluent in Web 2.0, social networking, digital images and editing, mashups, Wii, Xbox, NintendoDS, iPad, electronic text … the list is endless. As new technologies enter the market they are enthusiastically taken up. The current generation has been eagerly labelled as 'Gen C', 'Gen I', 'Net Gen', 'Gen Y', 'Gen Z', 'Internet Generation', '**digital natives**', and so on. But are they really digitally fluent across all spheres of their life? An increasing number of educators and researchers think that these students are digitally fluent in their lives outside school, but markedly less fluent within the educational context.

The characteristics and behaviours of these students are distinctly different from those of their teachers. Teachers in the majority resemble Prensky's (2001) **digital immigrants**—they range along a continuum of those who have attempted to use information and communication technology (ICT) to those who have not embraced the use of ICT in the instructional process. Most teachers tend to be self-taught or peer-taught. Their technology skills tend to be limited to what is in their home and work environment. Most teachers are using technology every day, but the types of technology they use might not be as up to date as their students, nor even their teaching requirements, need them to be. Technological skills are not the defining factor for an effective digital pedagogy. This chapter does not argue that we all need to become expert programmers or web page builders. Digital pedagogy is more about an attitude towards and aptitude with digital technologies. It is more about a willingness to use them in the classroom effectively and to understand how and why they should be used.

It is not only the expectations of students that need to be considered. Increasingly, parents, employers and the wider community expect the education system to produce technologically fluent students—students who can use a wide variety of digital technologies, and who have the behaviours and knowledge that will enable them to use emerging technologies.

Let's have a closer look at these expectations. Parents are aware of the increasingly digital world within which their children live. It would be normal for parents to assume that the teaching and learning their children engage in includes digital technologies. Schools are increasingly asked to bridge the gap between what the parents can afford to have in their homes for their children to use, and the types of technologies they would like their children to experience or be fluent in. Employers are digitally expectant of employees. Whether employees are secondary students in part-time jobs or students exiting from the education system, employers expect them to be able to use digital technologies. These expectations include fluency in basic programs commonly used, but some expectations might be subject-specific depending upon the types of subjects the students studied and the field they are entering. Finally, there are the expectations from the wider community. It would

be a commonly held belief that schools are using a wide variety of digital technologies in their teaching and learning. The media often report on schools that are doing a particular project using digital technologies, people see students using digital tools and there are government initiatives such as the laptop program that create in the minds of the wider community a sense that schooling is increasingly digital.

Figure 1.1: Factors that drive a digital pedagogy
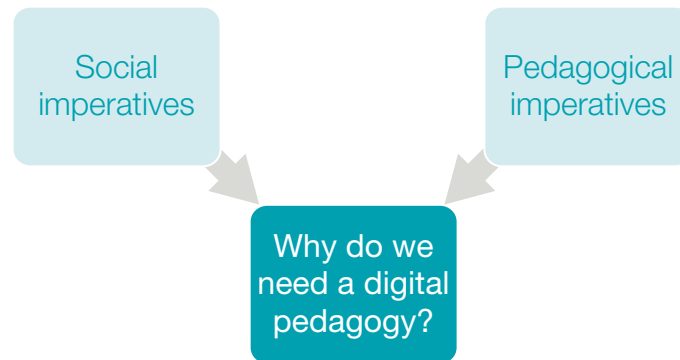
So far, we have explored some of the reasons that drive the need for a digital pedagogy. Largely, they are all concerned with a sense of expectancy and they are all social, they involve *people*. The social imperatives outlined so far include students, parents, employers and the wider community. But what about teachers? Do they feel digitally expectant? For teachers, the sense of expectancy might be different. There is certainly a sense of digital pressure. New programs such as the laptop roll out, new classroom technologies such as interactive whiteboards or digital projectors certainly add to feelings of digital pressure. Teachers want to be able to use new technologies effectively and they want to know ways that will result in positive learning outcomes. This is where a digital pedagogy comes in. It provides teachers with the ability to meet new digital technologies and be able to use them effectively in their classrooms.

Social imperatives are not the only drivers for a digital pedagogy, as shown in Figure 1.1. There are also pedagogical imperatives. As mentioned earlier, there have been new developments in learning theories and educational research that has shown that technology has great potential in teaching and learning. These theoretical underpinnings are explored in further detail in Chapter 2.

Critical Reflection
How 'digitally native' are you?

In 2001 Marc Prensky published his article 'Digital Natives, Digital Immigrants' and it has received both acclaim and criticism. When it was published in 2001 there was a climate of exploring how technology was changing life, people, how we communicate and how we learn. It was an exciting time with lots of speculative ideas and thoughts being shared. The concept of a digital native was exciting; it was going to transform education, transform how we teach, how we perceive our students. It was also frightening to some educators. Panic ensued; how were they going to cater for these digital natives and their learning needs?

In the settling down of this climate of excitement and debate, a few concepts remain in our vernacular—digital natives and digital immigrants are two such examples. Here is how Prensky (2001) described digital natives:

> *Digital Natives are used to receiving information really fast. They like to parallel process and multi-task. They prefer their graphics before their text rather than the opposite. They prefer random access (like hypertext). They function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to 'serious' work. (Does any of this sound familiar?)*

- Do you think Prensky's description of digital natives is accurate? Or are there sections of this you agree or disagree with?
- How 'digitally native' are you?
- What response would you have had as an educator after reading Prensky's article?

Personal Reflection

What are your drivers for developing a digital pedagogy?

As you see in Figure 1.2, two types of imperatives have been identified as drivers for a digital pedagogy. But are the imperatives limited to these two categories? Or can you think of some other drivers that perhaps have motivated you to develop a digital pedagogy?

Figure 1.2: Drivers for a digital pedagogy
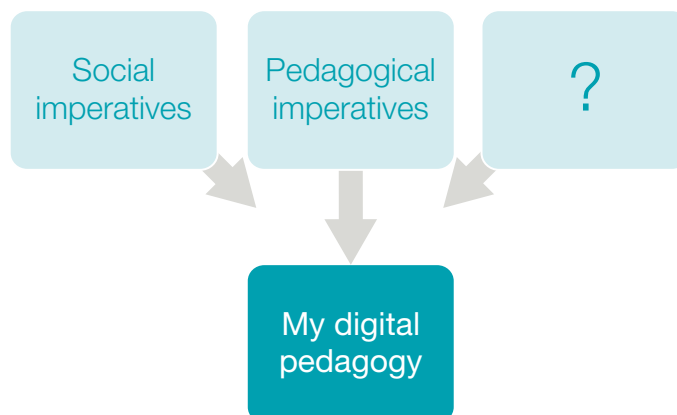
How do we develop a digital pedagogy?

We have established the case for a digital pedagogy and hopefully you are starting to realise the importance of adopting such a strategy. But how do we develop a digital pedagogy? Do digital pedagogies come via coursework? The simple answer to this question is no. It would be lovely to think that we could complete a unit at university entitled 'Digital Pedagogy' and that would be it. A *digital pedagogy* is many things, but most importantly it is an attitude and aptitude. This sounds

nebulous, but think about the nature of digital technologies. They are fast-changing and evolving quickly, particularly web-based applications. Think back over the past couple of years: new Web 2.0 tools have emerged rapidly, we have moved from text SMS messaging and emailing to Twitter and Facebook as a means of communicating with friends and family. What will be next? This constant evolution means that we can't rely upon a single unit or professional development workshop to provide us with a digital pedagogy. Rather, we need to develop an attitude and aptitude that leads us to engage with new technologies as they emerge and look for their educational applications. It sounds easy. You are probably sitting there thinking, 'Well, I am open to new technologies', but we need a breadth of theoretical knowledge and understandings to help us to take a new digital technology and embed it meaningfully into an educational context. Not so easy now is it? It is almost as if we need to be technologically fearless. Think about how your students jump in and try new technologies. Adopt the same behaviour. Ask your students or your peers what they use; learn from them; be guided by them. There is a sense that we are all in this together.

One of the hardest transitions for teachers is the move from being the expert in the class to being the co-collaborator, and digital technologies often force us to adopt this position whether we want to or not! For example, you might have decided on a particular program for the students to produce their work with, but a student in your class might suggest a different way or a different program, something you might not be familiar with. The technologically fearless teacher would stop, listen and explore that suggestion with their class. The traditional 'expert' teacher might resist that suggestion and stick with the idea they had with the technology they know. See the difference? But this is all about attitude, and hopefully by engaging with the material in this text you will see why that is so important.

Now what about aptitude? A digital aptitude is grounded in theoretical understandings. It involves understanding the learning theories that are attached to digital pedagogy, the types of learning opportunities it affords and the learning outcomes that are expected. It is a meshing of our pedagogical expertise with digital technologies. While this is examined in greater detail in Chapter 2, a brief look at the impact digital technology has made on learning theories is warranted here. As pedagogues, we are aware of constructivism, its meaning and role in learning. What happens to constructivism when technology is added? This was a question Seymour Papert (1993) explored that led to the term *constructionism* in his book, *The Children's Machine: Rethinking school in the age of the computer*. It is inspired by the constructivist theory that individual learners construct mental models to understand the world around them. However, constructionism suggests that learning can happen most effectively when people are also active in making tangible objects in the real world—in a sense, learning by doing. The key to the difference between constructivism and constructionism is that constructionists perceive learning to be most effective when part of an activity the learner experiences is constructing a *meaningful product*—more specifically that the meaningful product is created using *technology*. Papert's early work was based on using the computer programming language, Logo, to teach mathematics.

Constructionism has evolved since Papert's work and it has often been defined as active learning with the added element of technology. Learning with computers or learning with technology resulted in a new learning theory emerging in the field. This was revolutionary. The addition of technology *changed* how children learnt. It opened up new learning opportunities; a new learning theory in education had not been seen since the mid-1970s. This has been just a short examination of how educational theory has evolved since the rise of technology in classrooms; it is explored further in Chapter 2. What we can take from this short synopsis is that digital technologies have

had a huge impact on teaching and learning, not just in the form of the types of technological tools available for use, but also in the way we understand how learning occurs. An effective digital pedagogue understands these elements and they form the scaffold upon which teachers construct their lessons.

CASE STUDY

Read the following scenario and answer the questions that follow:

After two years working as a supply teacher and completing a couple of term-long contracts, I had secured my first full-time teaching position. I was absolutely thrilled and raring to go. About the same time the school received a large grant for technologising the school, it was decided that a computer lab would be created that could be used by different subjects. The idea was that all the technology was to be in one room and timetabling would share the room out across teachers. Now, the potential here for very little access to this room was high—we had 74 teachers on staff. But as it turned out, very few teachers wanted to use the room. The percentage of digital immigrants on staff was low. It wasn't that they were not prepared to try, but a whole room of technology was overwhelming and fearfulness was a typical reaction.

As a relatively young teacher, I thought the computer lab was irresistible, so I enthusiastically arranged for all my different classes to have some time scheduled in there. As the term progressed, I found my students were happy and excited when their computer lab lesson came round; it was a great motivator for them to get through the harder content and then engage in some inquiry-based learning in the lab.

As the term progressed, I found that I was starting to be on the receiving end of some very negative comments from my colleagues. They felt I was slacking off and not working, that my class would be falling behind, that I wasn't covering the content. It reached a point where I was asked to see my HoD and explain what I was doing and how I was covering the content. Essentially, I was asked to justify the time I spent in the computer lab with my classes. I had to produce evidence that the students were actually learning something. As you can imagine, this was all very confronting and disillusioning for a new teacher. When I think back on that now I get so angry. The students were engaged, motivated, enjoying the content and, most importantly, they were *learning*. Yet, according to my peers, I was negligent and not teaching.

1. How do you justify the place of technology in the classroom?
2. Do you think it is still perceived to be an easy, lazy option for teachers?
3. Do you think that teachers need to do very little when they take a class to a computer lab or similar? Is it just a matter of 'crowd control' and keeping them on task?
4. What are your perceptions of lessons that are technology-based?

Critical Reflection

An often quoted statement by Marc Prensky (2001) is:

> *Today's students are no longer the people our educational system was designed to teach.*

- Do you agree?
- Think back to your schooling, are the students you encounter now different to your schooling days?
- In what way are they different?
- Is the difference solely due to technology?

Why bother? I know how to use a computer!

Many teachers would be of the opinion that they are already digitally fluent. They can use a computer to generate great worksheets, use an Excel spreadsheet to record grades, Google for information, send a text message on their phone, email and play Wii at home. Yes, they are certainly fluent in the technologies of their choice, but could they justify why they are better to use? What type of learning results from their use? What other types of learning do students acquire working with technology, apart from new knowledge or content knowledge? Do they understand the types of learning styles technologies favour or enhance? Could they justify their use in the classroom to parents? There are pedagogical reasons that justify the use of particular technologies in the classroom. As professional educators we have acquired pedagogical expertise via our pre-service programs and through our experience as teachers. We understand the value of various approaches, how to cater for particular learning preferences or styles, how to meet the needs of all the learners in our classroom. Let's turn to the wider field of educational research to see if it can answer the question of why we should bother.

Reason 1:
We are situated in a global information society

> *Traditional notions of education are no longer sufficient to prepare a workforce for a contingent and dynamic world. Currently, we live in an era driven by information, global competition and new technologies that are changing the way we think, live and work. The Industrial Revolution was built on machinery, skills and labour; however, the information and knowledge-based revolution of the 21st Century is being built on investment in intellect and creativity. New jobs are emerging which require a different set of knowledge, skills and attitudes (Pillay, Boulton-Lewis & Wilss 2004, p. 17).*

The phrase *global information society* is much used; it can be taken that we are living in a highly interconnected world. Information and communication are no longer limited to our local environment; they are not restricted by boundaries. The types of skills required in traditional professions have changed due to technology and the machines we use across a range of industries and professions, and because the way we conduct business has changed. New professions are constantly emerging due to the increase in technologies. The students in our classrooms will be entering this new

digitalised workforce and schools bear some responsibility in preparing them for that. While much debate exists on 'whose job it is'—schools' or universities'—there needs to be an acknowledgement by all sectors of education that society and our working life are increasingly digital. Preparing students to be successful, contributing members of that society is a shared responsibility.

Reason 2:
The Australian workforce needs to be digitally prepared

> *As the world becomes more interconnected and global markets for skills and innovation develop even further, it will be crucial for Australia to have enough highly skilled people able to adapt to the uncertainties of a rapidly changing future. Higher education will clearly be a major contributor to the development of a skilled workforce (The Bradley Review of Higher Education 2008, p. 11).*

Increasingly, educationalists believe that our information-based society requires a rethinking of the skills and knowledge traditionally disseminated by schooling. Digital competence, the confident and critical use of ICT for employment, learning, self-development and participation in society is an expected attribute of a skilled workforce. This movement parallels developments in teaching and learning, which have seen the embedding of ICTs in classrooms, as online learning, and the use of digital tools and learning platforms across phases of education.

Reason 3:
Not everyone is a digital native

The prevalence of digital technologies in our lives has meant that students have different needs, goals and skill requirements from those of previous generations, hence the need for new disciplinary methodologies to provide students with the skills required to contribute meaningfully to society. This implies redefining the parameters of traditional schooling. There has been much commentary on the current students' cohorts, having been labelled 'digital natives' (Prensky 2001) or the 'Net generation' (Tapscott 1996). However, the reality is far from what has been prophesied. While the use of digital technologies has been widespread, it has been most commonly a recreational not scholastic pursuit. Students have lower levels of skills than would have been expected. Given that the modern workplace requires ICT-literate knowledge workers, it is imperative that students attain the skills required to succeed.

Reason 4:
Using digital technologies in the classroom is engaging and motivating

Imagine you are in a traditional classroom where the favoured strategy is the didactic model of instruction. One day your teacher arrives and announces that the class is being moved to the computer lab and that you will be engaging in an inquiry task using the internet. Your first reaction— excitement? How about your level of motivation? Or would you feel bored at the thought of such a lesson? The answer is obvious. But often we overlook the excitement new approaches can have in the classroom. It is by no means limited to technology—a new approach, a different strategy, the use of visuals, artifacts, guest presenters; all would result in increased engagement and motivation.

However, as classrooms are increasingly technology-rich learning environments, and students are engaging in digital technologies outside schooling, it would foolish to ignore their appeal. Here is a teaching and learning strategy that comes with a predisposition in the users; students like technology, they enjoy using technology and they find learning tasks that involve technology are more engaging and motivating.

Is technology more suited to a particular phase of learning? In a word, no. The range of technologies available to teachers means that their applicability is across the phases of learning. As you will see from this text, there is a section dedicated to the use of digital technologies in the early years, primary and secondary. Due to the combination of their experiences outside school with technology and a sense of techno-fearlessness, students have the potential to engage with technologies across all phases of schooling.

Reason 5:
Life-long learning

'Life-long learning' is phrase that has become increasingly visible in educational policy documents, curriculum documents and syllabus documents. Educational outcomes are no longer restricted to the years of formal schooling; we are now concerned with developing the skills and aptitudes in our students that will ensure they engage with learning across their lifetime. This does not mean that they enroll in university or formal courses; what is being imagined here is the use of digital technologies as a tool to engage in life-long learning. Imagine you are post-formal schooling, but have access to the internet. Your learning never ceases; you Google information, read various websites, perhaps subscribe to RSS feeds, share your thoughts in a blog or read other people's blogs. You are constantly exposed to, engage with and create information digitally. You are *learning*, you are expanding your knowledge and understanding. You need to have been shown how to use, or to have experienced these technologies in order to carry them over into your post-schooling life. So we need to incorporate digital technologies, develop digital literacy in our students and help them critically evaluate the technologies during formal schooling. Effective learning in school that is rich in digital technologies will ensure learning longer through life.

We have seen five reasons why we should 'bother' to acquire a digital pedagogy. Are these the only reasons? Absolutely not, but they are the main drivers in our current educational landscape. We are all members of the global information society. Initially its impact was limited to how we accessed and exchanged information or how we communicated. Now it is impacting on our curriculum and students' learning outcomes. We are rethinking the end result of our education system. After the exciting speculation at the start of 2000 on the impact of technology upon learning, we are starting to realise that not all people are digitally fluent or are digital natives, and that the much hypothesised **digital fluency** appears to be restricted to recreational pursuits, not educational. Educationalists are seeing a need to up-skill students in digital technologies during their schooling. The educational benefits appear to be powerful reasons to adopt a digital pedagogy—who would not want a more engaged or motivated class? Finally, apart from the policy imperatives that we develop in students the skills needed to be life-long learners, there is also the motivation to ensure that inquiry and learning never stops. The benefits to the individual and wider society are limitless. So are you convinced yet? The need for a digital pedagogy that works alongside or with your current pedagogy is clear.

Critical Reflection

In his book *Grown Up Digital* (2009) Donald Tapscott describes the characteristics and behaviours of people he refers to as the 'Net Generation'. These are people who were born after 1990 and who have grown up in a technology-rich world. Tapscott believes that this particular generational cohort has different needs and behaviours from previous generations. How they will engage in the workforce will be different from previous generations' workforce engagement, how they spend their recreational time is different; how they seek information, shop and interact with their friends is unique to this generational grouping. Tapscott extends this difference to education and builds on Prensky's suggestion that the current educational system is not suited to our current students. He calls for changes and suggests seven ways for educators to tap the Net Gen potential:

1. Don't throw technology into the classroom and hope for good things.
2. Cut back on lecturing.
3. Empower students to collaborate.
4. Focus on life-long learning, not teaching to the text.
5. Use technology to get to know each student.
6. Design educational programs according to the eight norms (choice, customisation, transparency, integrity, collaboration, fun, speed and innovation in learning experiences).
7. Reinvent yourself as a teacher or educator.

- Do you think the characteristics of your generation influence the type of teacher you are? Do you think there are particular teaching strategies you favour because of your generational grouping?
- Do you agree with this list?
- Are you a Net Gen yourself? When you read the list above, did you think that these summarised your generation's preferences and strengths?
- Think about the students you have taught—are they indicative of the Net Gen or do you think that this might not be true of all students?
- Is there anything you would add to this list?

These are interesting questions to ponder and will probably lead to some absorbing discussions with your peers. It would be interesting to see if the types of teachers we become are largely influenced by the generational grouping we are a part of. Do you think it is possible to unlearn your generation's preferences? Perhaps this is what Prensky was suggesting with his term 'digital immigrant'—those from previous generational groupings who have not grown up in a technology-rich environment but who now find themselves teaching in one. Maybe it's a case of jump in or be left behind?

Summary

The case for developing a digital pedagogy in a teacher's repertoire is persuasive. The prevalence of digital technologies in our lives has been steadily increasing in recent years and our understanding of how we should be teaching and how students

learn best has been constantly evolving. It would be logical to predict that these two elements would at some stage collide. There has been a growing body of research since the early 1980s on the impact technology has in the classroom. It has been seen as a transformative technology: it has transformed how students learn and it has transformed how we teach. The simple act of introducing technology into the classroom is not enough. Teachers must understand how technologies will affect learning, what the outcomes are likely to be and the teaching strategies that need to be used. Teachers must also be able to use the technologies themselves.

It has been shown above that the need for a digital pedagogy is driven by two imperatives: social imperatives, such as the expectation that learning will be digital; and pedagogical imperatives, such as the effect technology has upon learning. But these are perhaps not the only drivers. Our society has changed due to the impact of technology. Society is no longer constrained as being local or even national; we are all members of a global information society. The way we communicate and acquire information has become digital. The workforce that our students will eventually enter is affected by technology. Professions and industries have been undergoing a digital revolution of their own; the types of technology used across professions now are increasingly digital. One of the aims of the schooling system is to prepare students to enter the workforce; hence there is a need to include digital technologies in the curriculum. A further reason for the need for a digital pedagogy is that people are not all equal in their digital fluency; not everyone is a digital native and schools are often required to bridge the gap between those who can access digital technologies and those who cannot.

Perhaps one of the strongest reasons a digital pedagogy is needed is the impact digital technologies have on student engagement and motivation. Learning is viewed more positively and hence learning outcomes are often easier to achieve due to the added element of digital technologies. It is a simple idea: students enjoy using digital technologies in their lives outside of school and so come to school with a predisposition towards digital technologies. Lesson or learning experiences that include such tools are viewed more positively.

Last, there has been a change in the outcomes of education as expressed in policy documents, curriculum and syllabus documents. No longer is schooling focused upon learning outcomes achieved over a certain number of years; the skills we are endeavouring to develop in our students are supposed to ensure that they become life-long learners. This paradigm shift in the minds of educators and policy makers is interesting to note and also perhaps made possible by digital technologies. Prior to the internet, was schooling concerned with what students did after formal schooling? Possibly not, but because we are increasingly reliant upon digital sources of information and because we now see the potential for learning to carry on outside of the classroom, there has been a shift in focus. Schooling and the skills we impart during formal schooling are now to be carried on and used post-school. As these skills and post-school education are largely digitally based, the importance of teaching these skills well and of teaching the associated skills of critical inquiry and digital literacy should be embedded in our lessons.

FURTHER READING

DEEWR (2008). *Review of Australian Higher Education. Final Report.* [Online] From http://www.deewr.gov.au/HigherEducation/Review/Pages/Review ofAustralianHigherEducationReport.aspx.

Dye, J. (2007). *Meet Generation C: Creatively Connecting through Content.* [Online] From http://www.econtentmag.com.

Goldberger, P. (2003). *Disconnected Urbanism.* [Online] From A. Lenhart, M. Madden, A. Ranking Macgill & A. Smith (2007). *Teens and Social Media. Pew Internet and American Life Project.* [Online] From http://www.pewinternet.org/pdfs/PIP_Teens_Social_Media_Final.pdf.

Lessig, L. (2002). *The Future of Ideas.* New York: Vintage Books.

Lorenzo, G., Oblinger, D. & Dziuban, C. (2006). *How Choice, Co-creation, and Culture are Changing What it Means to be Net Savvy.* [Online] From http://connect.educause.edu/Library/EDUCAUSE+Quarterly/HowChoiceCo CreationandCul/40008.

McNeely, B. (2005). *Using Technology as a Learning Tool, Not Just the Cool New Thing. Educating the Net Generation.* EDUCAUSE E-book. [Online] From http://www.educause.edu/UsingTechnologyasaLearningTool,NotJusttheCoolNew Thing/6060.

Oblinger, D. G., & Oblinger, J. L. (2005). *Educating the Net Generation.* [Online] From http://www.educause.edu/educatingthenetgen.

Papert, S. (1993). *The Children's Machine: Rethinking School in the Age of the Computer.* New York: BasicBooks.

Pillay, H., Boulton-Lewis, G., & Wilss, L. (2004). Changing workplace environments: Implications for higher education. *Educational Research Journal*, 19(1), 17–42.

Prensky, M. (2001, October). Digital natives, digital immigrants. *On the Horizon.* Vol. 9, No. 5: NCB University Press. [Online] From http://www.marcprensky.com/writing/.

Tapscott, D. (2009). *Grown Up Digital.* New York: McGraw Hill.

Taylor, M. (2006). *Generation NeXt Comes to College: Today's Postmodern Student.* [Online] From http://globalcscc.edu/tirc/blog/files/Gen%20NeXt%20 handout%2006%20oln.pdf.

Trendwatching. (2004). *Generation C.* [Online] From http://www.trend watching.com/trends/GENERATION_C.htm.

Windham, C. (2007). *Father Google and Mother IM: Confessions of a Net Gen Learner.* Presented at ELI Annual Meeting, January 23, 2007. [Online] From http://connect.educause.edu/library/abstract/FatherGoogleandMothe/39228.

WEBSITES

http://www.marcprensky.com/

While Prensky is not an educator, you could describe him as a social commentator. His articles are noteworthy, as he coined the terms 'digital native' and 'digital immigrant', so it's worthwhile having a look at his ideas.

http://www.papert.org/articles/const_inst/const_inst1.html

This is a transcript of a speech Seymour Papert delivered in Japan in the early 1980s, just at the start of his work with Logo programming and the development of constructionism. It's an interesting speech as it explores the differences between constructionism and instructionism.

http://trendwatching.com/

The name pretty much explains what this website is about. It's an interesting source of current trends and predictions about future trends.

http://dontapscott.com/

An interesting website of yet another social commentator. It provides some nice reviews of his books, which give you a better idea of the types of speculative offerings he makes. His work should be noted and, interestingly, his books are based upon his own children and what he has observed as they have grown up (a little like Piaget and his work observing his daughter!).

http://www.metropolismag.com/cda/

An online magazine that tends towards articles on worldwide trends, the impact of technology and how society is changing.