e-learning: What does it mean to learn and teach with technological tools?

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This chapter outlines some key concepts about what it means to teach and learn in classroom contexts which use digital technologies. It also examines why the learning part of e-learning matters most. It is founded on an examination of international literature, while using New Zealand examples to illustrate key ideas and concepts. This chapter argues that teachers’ pedagogical design and actions are as crucial as they have always been for meaningful learning to take place, that student-centred learning is not a straightforward concept, and that what teachers’ roles are, is at stake.

Keywords pedagogy; learning; e-learning; mobile; ICT; social interaction

1. Introduction

Understanding how ‘e-learning’ is understood for the purposes of this chapter is necessary, partly because the term ‘e-learning’ is not without problems. I therefore begin with a working definition for school classrooms used by the New Zealand Ministry of Education in the New Zealand Curriculum, which simply considers it to be “learning which is supported or facilitated by ICT”1(p38). In other words, it defines e-learning as a means by which connections, sharing, support, and access to learning opportunities can be enabled. Moore, Dickson-Deane and Galyen2 on the other hand, consider that there are such wide variations in the conception of this term (along with online learning and distance learning), that defining the characteristics of each is almost impossible. They contend that in the higher education field, unless these characteristics can be better standardised, then “meaningful cross-comparison research”2(p129) will be difficult to achieve. However, e-learning is not just the preserve of higher education. It happens in schools too. For the purposes of this chapter, the New Zealand Curriculum definition will be used to frame this discussion, even while Moore et al’s work has some resonance. For example, their respondents tended to agree that “access to learning experiences via some technology” was a fundamental pre-condition, and that “connectivity, flexibility and the ability to promote varied interactions”2(p129) were also features of online learning. None of these characteristics, however, preclude face-to-face classroom uses of the technology and all imply social interaction of some kind. This differs from the transmission-oriented classroom characteristics that have featured prominently across a wide range of cultural, geographic, social, economic and political spectrums, and focused on delivery of content, rather than on learning3.

The next important definition relates to teachers’ pedagogical design. This term refers to the ways in which teachers deliberately organise and plan for learning to take place. For example, Kalantzis and Cope4 argue that as access to more technological tools in classrooms is possible, teachers are more likely to change their pedagogical design practices from teacher-centric to student-centric, from content-focused to creativity- and process-focused. In other words, the tools for learning are fast becoming flexible, any-time access, so curriculum content where the teacher is expert, is no longer likely to remain the norm. Thus the traditional conception of classrooms consisting of transmission from a teacher to groups of student is no longer tenable, partly because the technological world has changed so fast, and partly because access to information is often instant and, instead of being solely mediated by teachers, is mediated by digital and mobile devices. This anytime access has led to the growth of companies such as Knewton (www.knewton.com which simply considers it to be “learning which is supported or facilitated by ICT”1(p38). In other words, it defines e-learning as a means by which connections, sharing, support, and access to learning opportunities can be enabled. Moore, Dickson-Deane and Galyen2 on the other hand, consider that there are such wide variations in the conception of this term (along with online learning and distance learning), that defining the characteristics of each is almost impossible. They contend that in the higher education field, unless these characteristics can be better standardised, then “meaningful cross-comparison research”2(p129) will be difficult to achieve. However, e-learning is not just the preserve of higher education. It happens in schools too. For the purposes of this chapter, the New Zealand Curriculum definition will be used to frame this discussion, even while Moore et al’s work has some resonance. For example, their respondents tended to agree that “access to learning experiences via some technology” was a fundamental pre-condition, and that “connectivity, flexibility and the ability to promote varied interactions”2(p129) were also features of online learning. None of these characteristics, however, preclude face-to-face classroom uses of the technology and all imply social interaction of some kind. This differs from the transmission-oriented classroom characteristics that have featured prominently across a wide range of cultural, geographic, social, economic and political spectrums, and focused on delivery of content, rather than on learning3.

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In contrast, the New Zealand Digistore (http://digistore.tki.org.nz/ecp/home) is only accessible by New Zealand educators and students, but makes clear statements about what effective use of the provided resources is founded on. It says that, “Digital content is most effective when:

- [it is] embedded into an existing programme of learning
- [it is] supported by relevant offline experiences (before and after use)
- [it is] selected according to the needs and interests of the learner (informed by evidence)
- [it is] supported by effective teaching
- [it is] combined with other relevant digital content and learning experiences
- learners work collaboratively.”

This list implies that pedagogical design is expected to accompany the use of technological tools in classroom contexts. The relationship between pedagogy and technological tools is the focus of the next section.
2. Teaching and learning

Now that technological tools are featuring strongly in the economic and social landscape, it is imperative that education both harnesses its affordances for learning, and also supports students to be critical thinkers and users of it. Therefore, the “role of the teacher is still critical” as are pedagogical practices, even though the tools teachers will use continue to change. For example, the 2011 Horizon Report™ indicates that within two years, the following are likely to be, if not ubiquitous, then commonplace, particularly in countries where the infrastructure to support ubiquitous wireless access exists: electronic books, mobile devices (such as phones and touch-screen tablets), game-based learning objects and augmented reality. In terms of electronic books for instance, the 2011 Horizon Report argues that such affordances provide “new kinds of reading experiences” made possible by using “richly visual interfaces”5(p8). They also argue that ebooks “hint at possibilities” for learners, such as that recently demonstrated in a Vimeo video: (http://vimeo.com/15142335). These new kinds of reading experiences include opportunities to be self-directed as a learner, engage in interactive experiences; intuitively explore online resources; engage in collaborative, multi-modal, immersive activities; “and other deeply engaging approaches to learning” for learners, such as that recently demonstrated in a Vimeo video: (http://vimeo.com/15142335). These new kinds of reading experiences include opportunities to be self-directed as a learner, engage in interactive experiences; intuitively explore online resources; engage in collaborative, multi-modal, immersive activities; “and other deeply engaging approaches to learning” for learners, such as that recently demonstrated in a Vimeo video: (http://vimeo.com/15142335).

Even in developing countries where access to both the internet and electronic devices may be a challenge, there are reports of changes to learning and teaching behaviours when learning includes computer-based options7. Coupled with the affordances of mobile technologies and emerging evidence from classroom and other educational research3,5,6-12, these trends and examples indicate an essential focus of what education is required to do, and which is often espoused in curriculum documents. Teaching critical and conceptual thinking should have precedence over procedural and factual teaching and learning since content is no longer the preserve of experts, and is no longer king13, and because information is freely available online. What aren’t freely available online or elsewhere, however, are the means by which learners develop the ability to sift and sort appropriate evidence from opinion-pieces or marketing hype. This is a core job of education, and links to what Morris and Stewart-Dore argued three decades ago, that education is about helping students learn how to learn5, since that is what they are at school for. It also begs questions about what is assumed about the nature of learners, and what core role teachers have in a world constantly connected and open16. Levy and Murnane17(p83) for example, argued that, “the challenge posed by a changing economy is not to teach new subjects, but to teach all subjects so that students develop complex understanding and communication skills”. They also illustrated17(Figure 1, p82) the changing trends in the kinds of tasks expected of the United States’ workforce over a thirty-year period. These trends identify a rise in the need for workers to engage in complex communication and expert thinking compared with routine cognitive and manual work. It is entirely likely that similar trends are experienced in other countries where computer technology-based infrastructures are becoming, or have become, the norm.

This has important implications for ways in which learning opportunities are created in schools. It comes back to Kalantzis and Cope’s pedagogical design ideas for new literacies, and Levy and Murnane’s arguments about the primacy of developing critical and complex thinking alongside the ability to communicate well with others. These arguments also link to differences between tacit and explicit knowledge, and how they operate for learners, in relation to what they find as online learning objects. While these online learning objects can provide a concrete-sequential and stepped pathway of items which can fill gaps in procedural knowledge, knowing the parts of something, or the procedures involved, however, does not necessarily mean a learner knows the whole, or how it is linked to real life applications. This is often because the learning is often decontextualised and procedural, because it’s easy to measure.

Polanyi25 for example, is credited with making this tacit knowledge concept more understandable by expressing it as being more than can be explained by telling, usually referred to as explicit knowledge. The usual analogy is riding a bike: the physics of it explains the forces at work, but it is the experience of riding that links complex thinking to it. The thinking is applied to staying on the bike and negotiating hazards along the way, and understanding how the forces of motion operate in a context rather than as an abstraction or method. If a student is provided the explicit knowledge alongside the implicit knowledge, and the strategies of metacognition that can help see that they go together interdependently, then learning is likely to be deeper, more meaningful, and able to be applied again in different contexts. That learner is then in a better position to communicate to others what it means to ride a bike. To take another example, we can read a cake recipe or have the method explained to us, or even learn the chemistry involved in applying heat to combinations of ingredients prepared in specific ways, but unless we bake one and see the result, we’re unlikely to connect the method to the experience of the texture, taste and smell of the cooked cake. It illustrates the difference between being told something, compared with the opportunity of trying it out, reflecting on the experience in the light of the new knowledge about why, and examining what the best next steps are likely to be. This is about applying reflective and critical thinking to a task, rather than merely following a set of procedures someone else has dictated. Teachers can be intimately involved in this kind of learning by being available to intercede when the ‘why?’ stage is reached. It can work with students at most levels of development and ages, and mirrors learning from one’s elders (mothers, fathers, other relatives or significant others) from childhood and links to what Vygotsky had to say about the social nature of learning19.
For students, there are consistent themes in what they want from education. They want to learn, they want to experiment, they want to be taken seriously, and they want to be treated fairly. They also want to have fun. In schooling contexts, and borne out by extensive interviews with large numbers of students in New Zealand secondary students over six years, ‘fun’ means being given the chance to interact with each other to solve problems, however fraught that interaction might be. It is the collective doing, talking, sharing and wondering that is important to learners, coupled with the sense of achievement from making headway and feeling successful. Hopkins also found almost identical answers, graphically demonstrated in a fishbone diagram that described the kinds of lessons that students preferred in UK contexts. These experiences happen by design, because it is teachers who organize these opportunities in schools. When technological tools accompany carefully designed lessons which expect students to develop understanding, seek out information, pose questions, experiment and take risks, self-evaluate and peer-critique, then they are lessons in which critical thinking is deliberately central. Take, for instance, Barlow’s explanation of what happened when he forayed into blogging about his subject, science. What is most interesting about his efforts, is that he continually examined what was going on, and experimented with ways of intrinsically hooking into students’ ways of using digital and social media. Students took an interest in what he had to offer, because it used the same means of access they were used to. He also hooked them into it because it piqued their curiosity and thinking.

For teachers, the complex and contradictory forces at work in their professional lives may militate against consistently focusing on critical and deep thinking. For a start, and especially in secondary school classrooms, it is quite likely that assessment wags the curriculum dog. By that I mean that if the assessment regime is centred only on measuring discrete skills that don’t involve shades of grey or an expectation that learners will demonstrate critical thinking, then teachers are likely to feel that their role is to help students succeed in those assessments. They are likely to revert to telling and providing notes – the very things that run counter to not only what students say are good learning experiences, but also what might develop critical and evaluative thinking. When technological tools are introduced, it is probably reasonable for teachers to fret over how long it takes them to become proficient with these tools, particularly if they want to retain control over them. They may also fret that the technology won’t work when they need it to, so time and effort will have been wasted. Unfortunately, teachers who think this way demonstrate risk-averse behaviours which may signal safe and predictable, teacher-oriented, content-driven, transmission-oriented classroom learning. On the other hand, there are those who suggest that this same behaviour can also be read as a legitimate response to a lack of timely and on-hand technological support.

3. Teaching and learning and technological tools

Parry suggests that “one of our obligations as educators is to consider how the mobile Internet changes not only how we teach, but what it means to be knowledgeable and educated in our culture. And just as important, the mobile web opens up a host of pedagogical possibilities”. It also exemplifies Siemens’ notion of connectivism, implies not only social interaction mediated by digital media in ways never before conceived of, but also explores what it means to have immediate access to information via the Internet. It has enormous implications for education. Parry, for instance, talks about ways that pedagogical possibilities exist in making explicit some of the affordances and skills needed when using mobile devices that can easily access the Internet. For example, he invites students to use their devices to look things up on the web, but to also consider the veracity and credibility of what they find, using some of the skills and comfort with technology many already possess.

This mirrors the intention of a lesson I provide for initial teacher education students who want to be secondary teachers through the Faculty of Education, The University of Waikato. In this session they are assigned to one of six groups to review an assigned website. All groups have the same questions to answer, and so each group assigns members one of the questions. The answers are put into a group’s shared GoogleDoc, and then the whole group has to evaluate the totality of the information and choose what to share with the wider group. This task helps them experience one way of collaborating with technological tools, and how groups can function to achieve learning goals. What none of the groups know in advance (although they are given hints), is that all sites are either bogus (either for fun or art), or promote particular political agendas. The bogus spoof sites are about Victorian Robots, a campaign to save the guinea worm (a parasite the World Health Organisation is attempting to eradicate), a campaign to save the Northwest Tree Octopus, and a site purporting to be a cosmetic surgery clinic specialising in sculptural bone grafts. The two politically oriented sites focus on holocaust denial and misogyny masquerading as men’s rights. The pattern of responses when each group was asked to evaluate the site have been similar across cohorts and years. Essentially, most of these adults (most of them graduates or mid-life career changers) took the sites on face value. Few investigated beyond the site itself to examine the extent to which the ideas could be verified. Recent comments have also shown that time and again, critical thinking skills are not being applied to Internet sources. What used to be applied to newspapers (if it’s in the paper it must be true), is now being applied to the Web.

Perhaps this may relate to how people has used the label Digital Natives. Prensky’s concept has become a blanket, catch-all term to mean that every young person is digitally able. However, he intended it as a metaphor for “describing the differences that many people observed, around the turn of the century, between the attitudes of younger and older people regarding digital technology”. The blanket use of that term serves to hide a glaring gap: that digital
skills tend to be used informally, and often uncritically. However, there is a commonly held view that being able to use digital tools equates with thoughtful, critical use of information found online. Prensky points out that being technologically able does not mean the same thing as referring to capabilities or knowledge. Instead, the term Digital Natives term was intended to describe their greater “comfort” with such tools.

Warschauer for example, notes that new technologies appear to be changing literacy practices, and this implies a need for pedagogical practices to better meet this challenge. After all, learning how to think critically is not an osmotic process. As Prensky asserts, “technology alone will not replace intuition, good judgement, problem-solving abilities and a clear moral compass”, and while many people under 30 may use digital tools skilfully, especially for social connectivity purposes, there is actually a very diverse range of skill sets and levels. In other words, this age group is not homogeneous, and there is evidence that while they have skill in using the Web, this does not mean they are necessarily proficient at advanced searching or examining the validity and reliability of found sources.

However, if adults who want to be teachers fail to apply strategies of information literacy and critical thinking, then how are students in schools supposed to? Processes of critical thinking are taught, not innate: the ways in which adults as initial teacher education students are taken in by content in websites is evidence of this. Parry’s explicit pedagogical practices of, as he puts it, understanding information access, hyper-connectivity and the new sense of space is one model that demonstrates both modelling of concepts and sharing in practices to enhance understanding and critique. His strategies for deepening critical responses are important because they not only harness existing technological affordances students are accustomed to using, but also make explicit some ways of navigating and checking what students find online. After all, what students need to explicitly learn over time is how to read complex and contradictory texts, search online, and distinguish between what is bogus, opinion and evidence, before becoming independent learners. Thus, having more than functional literacy, procedural knowledge and access to appropriate tools is every educator’s job.

This, however, is not as easy as it sounds. Teachers have considerable expertise as content providers, but may not also have a strong understanding of effective pedagogy from learners’ perspectives, let alone from diverse learners’ perspectives. Many are comfortable with a transmission style of teaching because it assures them that they have delivered the curriculum. What is often by-passed are potential synergies. These relate to the explicit teaching of students to think critically, to use social interaction and/or the social networking affordances of digital media to solve problems and create new knowledge and products that demonstrate it. While time to think and act individually is important for every student some of the time, so is social interaction. Students want to talk about what’s going on in their learning with their peers. It is how humans learn.

When teachers are expected to use new/different strategies to promote literacy or to incorporate technology into their practices, the explicit teaching of teachers about the pedagogical practices either underpinning them or likely to result from them, are seldom part of the process, yet understanding how these new practices often imply students engage in social interaction is overlooked: the learning theory often does not go with the procedural explanations. Therefore, teachers miss out on deepening their conceptual knowledge about pedagogy, particularly when it comes to professional learning about ICT. Instead, teachers are, as Mishra and Koehler argued in relation to how teachers are often introduced to new technology, experiencing the separation of learning about technology from content, context and pedagogy. They have often been taught the procedures, not the educational purposes or applications of the tool. This may be why teachers often ask for content-specific models or examples to contextualise the innovation. This suggests that many are either not used to considering learning from outside their content areas, and/or adapting an idea from one context for another, or don’t have the emotional energy to spare to think of potential affordances on their own. So when teachers begin to incorporate literacy strategies or specific technological tools in their lessons, it can feel initially as if they have lost control. Probably all that has really happened is that either students are relishing opportunities to collaborate actively, taking charge of their learning, or that the teachers themselves are experiencing anew what it really means to learn: that it is often uncomfortable and destabilising: at first.

And yet, when students talk about using these tools and strategies as part of their learning, they indicate how much more fun their classes are. For example, in a 2010 mobile learning project at Howick College, New Zealand, students readily reported greater concentration and engagement, more revision and self-evaluation, and readiness to share their work with their peers. Using social media tools in learning contexts can also make it easier for all students to participate, especially if the infrastructure in a school provides students access to wifi, and if they have their own devices. One example, although in a tertiary context, the University of Texas at Dallas exemplifies what this can do:

“Students in another Twitter-friendly classroom at Purdue University agree that digital communication helps overcome the shyness barrier. “It’s just an easy way to answer questions in class without embarrassing yourself and raising your hand in a big lecture hall,” said one student. Studies frequently discover that greater participation translates into better academic performance, motivation, and a likelihood of adopting different points of view, which is why it is so striking that Twitter can foster that type of communication.”

Students’ excitement when using tools affordances and opportunities that allow them to try things out, worry away at ideas and concepts, talk with each other, contribute ideas and comments, make decisions and solve problems, should be unsurprising. Gee for example, when he examined students’ behaviours when gaming noted that challenge was important to learners, as long as the challenge was within their capability, but would stretch them. Kapp argues this in
relation to games and learning: “if done well, the complexity of the story will foster increased thinking and cognition. A purposeful story embedded in reality helps learners with their understanding of the underlying factors influencing the outcome of a situation and in developing alternative solutions. Immersing the learner in a well designed story and having them live the events and actions leads to the learning of higher level skills.”\(^1\)\para 6 Hopkins\(^2\) described the same kinds of learning expectations from students and these have been mirrored in New Zealand examples when students could use mobile tools for learning\(^12,46\). However, the tools by themselves do not develop critical thinking; instead, they may support conditions within which that can be fostered, but once unleashed, the ‘Trojan mouse’ of introducing such tools into learning contexts, cannot be very well restrained\(^47\). It comes back to teachers’ pedagogical design and how they specifically precipitate critical thinking, particularly with technological tools. As Kennewell\(^8\)\(^{10}\) suggested, while “ICT can help learners to engage with lesson content and influence the course of lessons, [without effective pedagogical input, this is not] always in the way intended”. McLeod too exhorts teachers to focus on critical thinking. In a blog post, he advocated that teachers attending the 2011 ISTE conference to “Approach every vendor booth and presentation with one question in mind: Will this genuinely enhance my ability (and that of my students) to live at the upper end of Bloom’s taxonomy?”\(^69\)

In the end, unless there is a consistent, deliberate and extensive focus on pedagogies and tools/affordances that develop critical thinking in students – no matter how old they are or how ‘clever’ they are seen to be – then students will be short changed and that means adults will be too. Critical thinking is not the preserve of age or discipline; it can, and should be, be fostered from an early age. It links closely to the value and power of timely and purposeful feedback and feedforward – what is done well, and what is needed to move to the next level of accomplishment, whether that is conceptual or practical. Also, learning is social. As Schwier\(^6\)\(^{10}\) observes, “Content only comes alive and grows beyond its predetermined boundaries through active, sustained, and legitimate engagement among learners. My epistemological assumptions about learning are pragmatic. All learning involves construction of understandings that are personal, and learning almost always has a social dimension”. This is true for teachers as well as students. The world students inherit will be materially different from the one that exists now in terms of connectivity\(^24\), and, if the trends identified by Levy and Murnane\(^17\) continue, it is critical, divergent and creative thinkers that our society needs, not procedural and compliant thinkers.

4. Conclusion

This chapter has argued that teachers’ pedagogical design and actions are as crucial as they have always been for meaningful learning to take place, that student-centred learning is not a straightforward concept, and that how teachers conceptualise their core role is at stake. What teachers do to plan learning is crucial. As Schwier\(^6\)\(^{10}\) pointed out, “learning is good, regardless of the amount of control the learner has. And learners don’t always want to be in control. But when they do take control of their own learning, and when they invent their own learning network and learn how to use it skillfully, learners have the tools for life-long learning”. The “learning how to use it skillfully” is where teachers need to pitch their efforts. The skill is in building from procedural learning to critical thinking, not stopping at the former. It is a long-term and iterative process. Challenging students to do better than they’ve done before, and to think more deeply about things than they’ve ever thought before, is indeed the core of a pedagogy which aims to support learners to be fully-fledged critical citizens. When technological tools can be the means through which this can happen, then it is more likely that their preparation for adulthood and independence as learners and critical thinkers is underway. And if e-learning really is the Trojan mouse that disrupts practices from that point forward, it can only be seen when students really do become articulate, critical learners. What teachers can then be proud of is the part they play in preparing students for their futures, however uncertain and unknowable they may be.

5. References


