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Change happens: Acceptance of “impermanence” and “flow” in teachers’ professional reflections on technology and change

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For several years the authors of this paper have monitored the use of information and communication technologies (ICT) in primary and secondary schools. In this paper they report on their work in progress, focusing particularly on data collected via teacher interviews in 2003. It is a ‘good news’ story that celebrates a shift in the way school teachers approach ICT, and that shows that teachers are a lot more comfortable with ICT than the authors have previously observed. The authors argue that a significant transition has occurred in the hardware, software and ‘warmware’, the people and how they can work with the hardware and software as part of their pedagogy. Existing research tends to construct change as something that has to be planned, prepared for and managed (eg. Fullan, 1997), and as something that teachers often resist (eg. Cuban, 1993; Grunberg & Summers, 1992; Hodas, 1998). This paper is distinctive in drawing on Eastern approaches to understanding change. Through an examination of the concepts of “impermanence” and “flow”, and how they apply to ICT, schools and teachers’ work, we seek to demystify change: Change happens, has happened and will continue to happen. We conclude that teachers’ increased familiarity with, and increasingly relaxed approach to, ICT has led to a shift in their attentions, such that they are less concerned with obtaining and mastering particular software and hardware, and more concerned with pedagogy and student learning.

Introduction

In this paper, we present preliminary analyses of teacher interview data collected in 2003 as part of a larger study of teachers’ professional learning in relation to new technologies, new pedagogies and social justice in schooling. Our analysis of a set of unstructured interviews with teachers in primary and secondary schools in Victoria suggests that conditions in schools are such that teachers are able to take a more positive approach to information and communication technologies (ICT) for student learning than in the past.

While previous work has found teachers to be relatively insecure, frustrated and unsupported in their efforts to make pedagogical use of ICT, or has seen their attention dominated by concerns about the nuts-and-bolts of the technology (eg. Lynch, 1999, 2000a, 2000b; Johnson, 2001, 2000; Blackmore & Johnson, 2001), our preliminary reading of this data reveals quite a different picture of teachers who are relaxed around technology, who are comfortable not being the master of all that goes on in their classrooms, and who are able to cope when technology breaks down. These teachers recognise that mastering particular software packages ought not be their primary concern, that ICT in schooling, and in their wider lives, represents a shifting ground, requiring improvisation, adjustment on-the-run, and continual learning and development as teachers. That is, these teachers have learned that ICT in schooling is similar to other aspects of their work; there is no magic pill and the way forward is via
experimentation, evaluation, reflection and learning encounters with their students and their peers. In this paper, we draw on Eastern understandings of impermanence and “flow” to explore these ideas.

This is a “good news” story in terms of teacher development and in terms of the conditions in schools that support professional learning: Because the teachers we interviewed are no longer anxious, insecure or “floored” by the practicalities of finding, accessing and using ICT, their concerns are now turned to more substantive pedagogical concerns about new ways of running classrooms, new learnings, and social justice in schooling. This change in teachers’ affective and attitudinal responses to ICT has been supported by gradual improvements in the conditions in schools in terms of hardware, software, networking and technical support. However, while the teachers interviewed appear no longer to be paralysed by technical breakdowns, or insecure about their roles in classrooms when students use technology, that does not mean that things are all rosy in schools in terms of ICT. The new focus of teachers’ concerns point to very enduring challenges in terms of pedagogy, technology and social justice.

**Background: ICT, change and the focus of teachers’ concerns**

We looked through the 1976 issue of the journal *Creative Computing* to remind ourselves of the curriculum focus of concerns around ICT and education at that time. We found the overwhelming message to be that the computer was a great gadget, particularly for those from the disciplines of Mathematics and Science. The earlier emphasis on ‘computency’ (Bigum & Green, 1993), or operational skills, focused on the ability to use the not very friendly hardware and a range of specific, usually discipline related, software. This focus had a long lasting effect and teachers were constructed, and constructed themselves, as techno-reluctant and technophobic (Lynch, 2003; Richards, 1998; Richards & Bhattacharya, 2001; Riel, 1998). We now have evidence of what we see as a positive move away from this, with teachers presenting themselves positively as users of technology when the need arises.

We have for several years been monitoring the use of ICT in primary and secondary schools through its several phases, to the point where now the widespread assumption is that the introduction of ICT into schools is critical to prepare students as workers and citizens in knowledge based economies (Armitage, 1998; Clarke, 1991; Dowling, 1993). In the main, research during the 1990s focused on accessibility, availability, infrastructure and technical implementation of ICT into schools and classrooms. Blackmore, *et al.* (1996) found the greatest impact of ICT was primarily on school administration, on the management of data and for teaching preparation, rather than the integration of learning pedagogies into classroom practice, indicating superficial or ‘first level’ change (Lave & Wenger, 1995). A comprehensive literature review (Blackmore, *et al.*, 2001) investigating links between ICT, disadvantage and learning outcomes found little research on what teachers actually did in classrooms with ICT and with what effect on teaching practice and student learning.

Research suggests that the social interaction of teachers and learners (Hill, 1995) and teacher professional development (Blackmore, 1997; Fullan & Hargreaves, 1997) are critical to improving student learning. The ITLED Project and The National Children’s Literacy Project, *Digital Rhetorics* (Bigum, *et al*, 1998 ; Lanksheer & Snyder 2000), suggest that, for teachers new to using ICTs in the curriculum, new issues of behaviour management arise, the demands of classroom organisation change, difficulties are caused by unreliable hardware and networks, teachers’ and students’ work changes in
unpredictable ways and the pedagogical relations change between teacher and student and between student and student.

Lynch, in a 1997/1998 study, found that secondary school teachers’ thinking about ICT was dominated by concerns about access to the technology for themselves and their students, technical maintenance and support, and the perceived need for their schools to have more hardware (Lynch, 2000a). Teachers’ classroom concerns were primarily focused on challenges of monitoring and managing student behaviour when using ICT, a diminished sense of their own authority in ICT-rich classrooms, and anxieties about their own skills with the technology, rather than on issues of curriculum and pedagogy (Lynch, 1999, 2000b). Johnson and Blackmore (2001), in a case study of a large co-educational suburban high school, identified a range of attitudinal and affective teacher responses to ICT, including fear, excitement and cynicism, as teacher professionalism is increasingly tied to techno-literacy (Seddon, 1999). While access to, and reliability of, the technology were major concerns, there were also related issues of professional identity, for example, fear of losing control over what happens in the classroom, technical competence, and making the ‘right’ decisions about what technologies to use, and when and how to evaluate whether they enhanced student work.

Much of the literature on educational technology has constructed the integration of ICT into school learning as a ‘major change’ that has to be planned, prepared for and managed (eg. Fullan, 1997), and as something that teachers often resist (eg. Cuban, 1993; Grunberg & Summers, 1992; Hodas, 1998). The implementation of ICT in classrooms has been posited by many as a source of significant, capital ‘I’ innovation and capital ‘R’ reform (eg. US Panel on Educational Technology, cited in Becker & Ravitz, 1999; Duchateau, 1995; Riel, 1997). We have been familiar with the work of change theorists (Fullan, 2001; Cuttance, 2001; Hargreaves & Goodson, 2004.), who have seen context as critical to school and system reform, and others, such as Dainow, Hubbard, & Mehan (2002), who identify the key problems for school reform as being sustainability, transferability of successes to other schools, and whether reforms are imposed or bottom up. They argue that innovations are more likely to be implemented, sustained, reviewed and extended if they are ongoing, relevant and challenging. Based on our current set of interviews with teachers, we suggest that our notions of change in this context could be enriched by drawing on Eastern conceptions of change as something that is an essential part of life and work, that happens with or without our explicit determinations.

The teachers we interviewed in 2003 seemed to have matured in the focus of their concerns about ICT due to an acceptance of impermanence and an appreciation of change as a process which unfolds and is nurtured over a long period of time. Change conceptualised as a set of outcomes to be achieved through intervention over a short period of time does not appear to work especially well in terms of teacher identity and sustainability in this complex area of integrating ICT into practice. The teachers involved in this study appear to have achieved very positive outcomes in terms of professional identity and approaches to classroom pedagogy by embracing change as an organic part of their professional lives, rather than as something that results artificially through intervention, obligation or external orchestration.

**Research context**

This paper represents work in progress as a subset of larger research project which investigates teacher professional learning. The project is based upon the assumption
that learning outcomes are directly influenced by the actions and behaviours of teachers and learners in a particular context (Hill, 1995), that actions and behaviours are influenced by beliefs and attitudes, and that the introduction of ICT into schools and classrooms changes the relationships between teachers, between students, and between students and teachers in unpredictable ways (Comber & Green, 1999). Through a combination of a wide scale quantitative survey and action research case studies in suburban and rural schools, the larger study is investigating:

1. How teachers view ICT, understand ‘technology integration’, and what motivates them to integrate ICT into classrooms;
2. How teachers learn to use ICT pedagogically and to make professional judgements about its ‘use value’;
3. How the integration of ICT changes the practices of teaching and learning, and to what ends;
4. How learning technologies change professional relations and teacher work identities;
5. How classroom integration of ICT impacts on, and is facilitated or impeded by, school organisation; and,
6. How schools, teachers and students engage differently with ICT by location, gender, race, class, ethnicity.

This paper reports a small section of this larger study. Early in 2003, four Victorian school clusters (two regional and two urban) were invited to participate in a quantitative questionnaire. The questionnaire focused on beliefs and practices around ICT and included sections on teachers’ rationales for ICT use, their pedagogical beliefs, the conditions of use in their schools, and their beliefs about ICT in relation to the socio-cultural background and identities of learners. The 191 teachers from 19 of the 22 participating Victorian schools completed and returned the questionnaire. Preliminary analyses of the quantitative data suggest, with some variation between schools, these teachers paint a positive picture in terms of the conditions of use in their schools and their motivations for using ICT. However, the picture provided by this data on pedagogical beliefs, in general and in relation to learner difference, is less clear. As illustrated in the body of this paper, pedagogical concerns are now at the forefront of teachers’ minds in terms of their engagement with educational technologies; this is reflected in the quantitative data as shifting ground, compared to other domains where the ground appears to have settled.

To follow-up the questionnaire, a small number of teachers were selected for interviews to pursue questions of ICT, pedagogy and learner difference. A double clustering procedure was used to facilitate maximum variation sampling based on teachers’ questionnaire responses. In this paper, we use the 2003 teacher interview data from the two urban clusters to explored conceptions of change and professional learning surrounding the use of ICT in schools. We describe three themes, identified in this data, that mark for the authors, in the context of their previous work in this field, a qualitative change in the way that teachers conceive of and approach ICT:

(1) the acceptance of impermanence;
(2) professional learning as ‘flow’; and,
(3) new foci for teachers’ concerns.
Teacher interviews are drawn upon to illustrate these themes. In places, excerpts of data from earlier studies are also cited to illustrate the changes we have observed.

**Themes emerging in the data**

*The Hanged Man and acceptance of impermanence: “You don’t have to move to change”*

Discussions of educational ICT in the 1970s and 1980s were very much focused on the accumulation, mastery and application of “stuff” (hardware and software) by a small proportion of the teaching profession. Our early discussions with teachers about the usage of computers in classrooms were very much focused on the range of educational programs available for student use (e.g. *Grannies Garden*, *Crossword Magic*, *Where in the world...*) and how they might be used in the context of schooling. There was a concern with finding out which programs engaged learners, that is, which ones did students like and which ones didn’t they like. For science, mathematics and computer teachers, there was a focus on programming in Fortran and Basic, with the mastery of these languages as an aim in itself.

The 1990s saw dramatic changes in Australian schools in terms of the amount of hardware and networking that became available, and the growing expectation that all teachers would use computers with their students in all subjects. Teachers’ discussions of ICT during this time were characterised by feelings of frustration and insecurity, and focused on mastery of operating systems and software, technical problems with ICT, and the challenges posed to their identities as teachers, their sense of competence in the classroom, and their capacity to monitor and manage behaviour when students were using ICT (Lynch, 1999, 2000b).

However, our reading of the 2003 teacher interviews paints a very different picture of teachers as users of ICT. In our analysis, we were struck by what we interpreted as a more relaxed, easy-going approach to ICT. We characterise this approach as that of the Hanged Man of the Tarot deck. The Hanged Man [One¹], represented as suspended upside-down by one leg, but relaxed and composed, is characterised by acceptance, wisdom, reflection, serenity and patience. As Fenton-Smith (1996) writes,

> The man is tied up, but this does not seem to worry him. He can use this time to reflect upon life and his actions so far. From his perspective, he can see the world is a strange place indeed. Upside down the world can be seen anew ... By seeing the world upside down, he can see some of the pointless things that filled his time and that still fill the days of those around him.

Mary, an Art teacher and Science coordinator at an urban primary school, stressed that change has been a fundamental characteristic of her work in schools:

> I’ve been here for about 15 years. But the school’s just changed around me, including buildings. We’ve been on four different sites while I’ve been at Green Acre, so you don’t have to move to change schools. (Interview with Mary, Green Acre PS², 2003)

¹ Known in some packs as the Hanged One.

² Pseudonyms are used for both teachers and schools.
The lesson of the Hanged Man [One] is you don’t have to move to change; change happens so we are constantly in a state of flow. Mary’s conceptualisation of change is consistent with Eastern understandings that are based on a principle of impermanence (Evans-Wentz, 1974, p.17). This is the notion that change is occurring all around us all the time. Eastern teachings suggest that, to fully manage change, we need to progress through three stages: recognition that everything within and without us is in a constant state of flux; acceptance of constant change is not as easy as it sounds, as there is a great deal we would dearly, love to see not change; and, embracing impermanence such that we fully live with and thrive in a state of incessant change (Burgess, 1998). Mary appears to have embraced impermanence in her attitude to her identity as a teacher and the role of technology. Consequently, she has developed a ‘no fuss’ approach to classroom usage of ICT:

The computer is another asset to play. And it’s here, so let’s put it in as part of life, as part of learning, as part of growing up, as part of being at school and at home… It sort of a bit like the car. Could you imagine our world without a car? (Interview with Mary, Green Acre PS, 2003)

Mary may be an extreme case in terms of the level of ease with which she approaches change and embraces impermanence in her work environment. However, other teachers interviewed showed similar attitudes and approaches, particularly in terms of their acceptance of uncertainty when they reflected on their encounters with ICT. For example, Bruce, a senior English and Health teacher at Knights Point Secondary College, reflected on his changed attitude to technological breakdowns in the classroom, saying,

There’s always going to be a few technological glitches but that can happen to anything… I’ve actually started being a bit more flexible about it and say, ‘Okay, if it’s not working, just save it and we’ll get it later’. Or, now that we’ve got the email in school, I say, ‘if possible, email it tomorrow [to] the school address and we’ll get it’. … I’m not panicking about it as much as [I used to]. (Interview with Bruce, Knights Point SC, 2003)

Bruce’s response to technical uncertainty contrasts dramatically with that of teachers involved in earlier studies. Consider the following excerpt from a research journal, taken from a 1997 study (Lynch, 2000b), which provides a snapshot of interactions in a technology rich classroom:

As the lesson proceeded (with students working in their groups at the computers) the class became increasingly rowdy. This was escalated by students having problems printing. Some yelled out, “it won’t print,” then sat and did nothing or fooled around. Others simply fooled around. Not all groups had trouble printing. Ricky [computer-savvy student] went into the back room (where the printers are) supposedly to fix the problem. He didn’t return until Judy [teacher] shouted at him [15 minutes later] and insisted he return and help his group. Judy was very frustrated with him and was dubious about the reasons he gave for needing to remain in the back room. (Research Journal excerpt, English class, Newtown SC, 1997)

Unlike, Judy, who was at a loss to respond effectively to technological breakdown, Bruce has developed a very flexible approach to classroom computer use that carries through to his approach to managing students’ behaviour and his access to the computers. When asked how he decides when and whether the students can use the computers, he replied,
[I’m] pretty much quite flexible about it. Although, when we know everyone is
going to have a computer, I think that that’s the time to do something more
specific when you can do in on the computer. But, in other situations, they’ve
usually just asked me if they can use it. And I’ve been taking a Year 7 class, not
mine, just because the teacher was away, and they did that thing of all rushing in.
So I just made a timetable. Half them had the computer for half the class then I call
‘time off’ and then the next lot goes on. (Interview with Bruce, Knights Point SC,
2003)

I usually give them an option. Like they’ve just done for me, they did an essay,
which have taken two periods to do, sort of modelled on the SACS that they do in
year 11 and 12. And so I just said, ‘For the period, we will be in the computer room
and you can word process it if you’ve got time and you want to’. But I don’t make
it compulsory. (Interview with Bruce, Knights Point SC, 2003)

Bruce’s attitude to computer access for, and by, his students, and his self-reported
ability to cope when technical problems arose, contrasts with concerns and responses
captured six years earlier, when the challenge to teachers of gaining access to
computers for their students, and their efforts to monitor and manage students’ use
of computers, were primary sources of effort, anxiety and concern. The 1997 data suggests
that technological breakdowns posed significant challenges to teachers’ identities and
capacity to manage the classroom (Lynch, 1999, 2000b). Bruce can recall similar
challenges in years gone by, but his current outlook presents as a teacher who is
confident and effective in a classroom with computers.

While this change in attitude warrants comment in itself, it is also a reflection of
improved conditions of use. As well as reflecting on his more “flexible”, less
“panicked” attitude, Bruce noted that the number of computers had increased over time,
the instance of technical problems had decreased, and that technical support in the
school had improved (these trends are supported more generally by the findings of the
quantitative data across schools). Further, his skills and efficacy with the technology
had improved; this is taken up in more detail below when we look more closely at
professional learning.

Both Mary and Bruce present as confident and competent teachers and users of
technology. They seem to have accepted, as stated by Mary, that “[you] don’t have to
know everything”. This is a particularly important learning when consider that
technology, in schools and out, is a moving target, because the aim of mastery of any
one product no longer applies. Mary’s confidence in her professional identity is evident
in the following interview excerpt, where she describes how she and a colleague take
advantage of each other’s expertise:

We actually do a tremendous amount of team teaching. Now what that means is it
as far as ICT is concerned is that we don’t have to know everything. In that if I
have something that my children need to know that I can’t adequately explain
Denise will teach them. And I would teach her kids something that she’s not
comfortable. I would take the upper end maths group and I would explain to them
about face 4 numbers or something which pushes them on while she would do
something with my children. (Interview with Mary, Green Acre PS, 2003)

Professional learning as “flow”:

Related to an understanding of impermanence and constant change, is the idea that
professional learning takes place constantly as part of the “flow” of teachers’ day-to-
day work. Although it has become more common to speak of ‘just-in-time’ training and ‘learning-on-the-job’, the notion that professional learning is part of a teachers’ everyday work as they experiment, improvise and adjust, and that, through doing and reflecting, teachers learn and develop professionally, is still not taken seriously by many who see teacher development as something that is done-to teachers by experts in a pre-planned way and outside of the usual classroom environment. Mary, reflecting on her entrée to teaching, professes that “teaching is like that”:

Yeah it’s been a real experience. If you’d have asked me 20 years ago about computers I’d have probably gone – No! But teaching is like that. If you don’t approach teaching like that nowadays you’re in the wrong game because life is changing so fast. Children are changing fairly quickly too and the influences that are on children are changing therefore we have to move with them. Otherwise what happens is they will be over there and you’re over here. (Interview with Mary, Green Acres PS, 2003)

Chandler (2001) wrote, the history of computers in education is one of adjustment, of “making do with what is available” (Chandler, 2001), adapting change with the core practice of teaching and learning. This is improvisation and adjustment is reflected in Mary’s story:

In 1990 or thereabouts what we did was we were in an old school building that was basically condemned so we could do anything we wanted. So we basically unplugged all the computers and we put them in the corridor. So Denise was on one side, I was on the other side, and we plugged all the computers in the corridor and after we tried to burn the school down… we shorted out all the circuits and a few other minor details. We actually got them going. And what we did was we actually used them in a language and maths blocks and I still do that to this day. (Interview with Mary, Green Acres PS, 2003)

Mary’s professional learning around ICT interacted seamlessly with her learning at home:“Technology sort of came into my life early on in computers, but not through me, but through my own children” (Interview with Mary, Green Acres PS, 2003). Bruce, at Knights Point, tells similar stories about his professional learning around ICT:

It's only really through practising and having to do something myself that I finally learnt. So most of my learning has been informal. I don’t really go out to many courses or anything. … The only ones I’ve been to have been in the school. … I went along and learnt these things but I think when I started doing these things I didn’t have the computer at home and so it would just fade. (Interview with Bruce, Knights Point SC, 2003)

When asked how he would proceed if there was something he knew that was possible on the computer and he wanted to learn how to do it, Bruce replied, “Oh, I’d probably ask someone [in the school] who knew” (Interview with Bruce, Knights Point SC, 2003).

In a world that is characterised by change, and where that change seems to be intensifying in terms of technology that is used at schools, at home and at work, a view of teacher professional learning that foregrounds the role of informal solutions, improvisation, and taking advantage of available expertise (whether from colleagues, students or the community), and, through this, being an active part of the current of change, seems critical to the continued professionalisation of teachers. The 2003 interview data paints a picture of teachers who are not insecure about their ICT skills,
who are not intimidated by “experts”, and who are able to respond effectively to new
situations, and to their new learning needs, as they arise.

Shifts in concerns: From nuts-and-bolts to pedagogy, student learning and
social justice

As illustrated above, the teachers we interviewed in 2003 seemed less perturbed by ICT
and more able to respond effectively as teachers in ICT-rich contexts than those
teachers observed and interviewed in earlier studies. They also seem less fixated on a
need to master particular software packages, more confident in terms of their capacity
to manage ICT-rich classrooms, and more assured in their identity as teachers who use
ICT. We have described this shift as related to an acceptance of impermanence and an
understanding that change is constant. And we have explored notions of teacher
professional learning in the context of these understandings. However, we are not
saying that teachers do not have concerns in relation to ICT and school learning. To the
contrary, they showed quite earnest concerns. However, the substantive foci of these
cconcerns are different to those previously documented. They are not so concerned about
technology breaking down, or about whether they can get their students into the most
technologically advanced classroom, or about whether the students might know more
about the tools they use than they do. We argue that the concerns held by the teachers
interviewed are more significant than those previously held because they are primarily
pedagogical in nature. In fact, they are concerns and interests which we ourselves hold.
In this section, we explore three foci of concern:

- Pedagogical considerations, or how does technology change learning and
  learning relationships
- “Computer addiction” and new literacies, or can computer use harm learners?
- Access and equity, or which students benefit? Which students are
disadvantaged?

Pedagogical considerations

The teachers interviewed in 2003 expressed interest in, and positive assessments of, the
implications of classroom ICT use teaching. Mary, at Green Acre PS, described a new
approach to using ICT in classrooms, more focused on student learning than earlier
approaches:

“IT’s learning through technology, rather than just having whiz bang…sort of like oh
we’re going to play on the computer today. Alright so sometimes but that
shouldn’t be the focus. It’s a tool to learning… I think now we’re moving more
into generating learning situations and getting in there and supporting those
learning generated situations but at the same time doing it within the activity.
(Interview with Mary, Green Acre PS, 2003)

While Bruce, at Knights Point SC, described positive qualitative changes he perceived
in the classroom learning environment, and to his approach to teaching, due to the
facility of having computers present for student use:

When you’ve got everyone using the computers, it’s a totally different style of
teaching you know. I mean, you can break it up, you can have a whole class
section, but mostly it does give you more chance for one-to-one if you like. … it
does create a totally different classroom. … I like to have individual consultations,
conferencing with students about their work and that is really much easier to do if they’ve got a computer in front of them and they just make the corrections instantaneously, and then go on with something and you can move onto someone else. Having a computer actually makes that easier. (Interview with Bruce, Knights Point SC, 2003)

As an English teacher, Bruce particularly appreciated the convenience of word processing compared with pen and paper technologies because of the instantaneity effect of teacher-student interactions on students’ products, and the time-saving and efficiencies afforded:

You can actually bring about change pretty quickly. You might just go along to someone and they need to say something and you just push a key and you turn away for someone else you talk to for five minutes. But I think you get a more instantaneous effect. … I think word processing is really valuable. It’s something that everyone should learn and it’s very valuable to me personally, and just the idea of keeping records of your work and being able to make corrections and so on without rewriting a whole piece. (Interview with Bruce, Knights Point SC, 2003)

“Computer addicts”

However, Bruce in particular was also concerned about risks he associated with student computer use. Specifically, he described a type of student (mostly boys) who he described as addicted to computers.

But there are some students who are just addicted to the computers and often they are the ones who are not producing much work and you’re not looking, or your back is turned, or something like that, you see that they are actually playing a game or something like that. I mean, sometimes a game itself can be educational, but when they’re supposed to be producing or doing something for specific research, it can be a distraction. (Interview with Bruce, Knights Point SC, 2003)

While surreptitious gaming can be seen as an extension of other surreptitious activities undertaken by students in the classroom, Bruce saw this as part of a larger and potentially more serious problem where computer use can be used by students as an avoidance strategy and as a way of disguising learning difficulties:

So you know you have to hold exercises and tests and situations where just using the computer is not an option. Otherwise a person can slide through it and they can actually disguise sometimes quite severe literacy problems by using the computers. (Interview with Bruce, Knights Point SC, 2003)

Some students will resist working with a pen and paper and they’ll try to do – we’re quite flexible, and they’ll try to do all of their work in some sort of – they’ll do something. I’ve got a boy in Year 9 now, and it’s very hard to get any hand written work out of him, and so … what he produces on this last big assignment was four slides on Powerpoint. It’s very cleverly done, but it wasn’t – it’s only a fraction of what they’re supposed to achieve and I don’t see any written work. … Obviously, I’m trying to fathom it out. It’s what I call addiction to the computer, but certainly his knowledge of computers is great. There’s been times when things haven’t been working and he can just go and get them going. But, if there’s options, that will be the first place he will go. And, if he has to work at something, any writing, he’ll resist it, or he’ll only do a few sentences and that’s it. (Interview with Bruce, Knights Point SC, 2003)
The area of multi-literacies is a source of uncertainty and ambivalence for this teacher. He understands that his students are developing new skills for production and analysis that he has little understanding of, but he also strongly believes that the more traditional skills and knowledge associated with print are of value and ought not to be diminished due to the rise of digital technologies:

I think it’s like he’s learning a different and important language … I can remember showing some video and he has criticism of the production of the video and he’s seeing the use of colours in it. So I mean he’s seeing a different video to what I’m seeing. I’m just sort of saying, ‘Oh, this will be a good way of summarising Romeo and Juliet’, or something like that. But he’s seeing it as a technical piece, and it’s not going to help in terms of what I wanted him to do in the end, which was write some critical analysis of powers at play or something like that. It’s not really helping him with that. He’s not getting some of the skills that I think are still important because they’re kind of thinking skills. (Interview with Bruce, Knights Point SC, 2003) Access and equity

Importantly, the teachers interviewed expressed concerns for particular groups of students in terms of access to ICT and to the skills that would support their school learning at a time when computers are fast becoming a normal part of everyday school work. Mary identified students from economically poorer families, who do not have a computer at home, as disadvantaged in their schooling, and she saw this effect as compounded when it intersected with particular ethnic groups who were less likely to emphasise ICT as a source of educational value:

If you have a family at home who value computers, who use computers. You just take it as normal part of life. And I don’t think there’s much we can do to overcome it. I mean we do actually try very hard not to disadvantage children who don’t have access. For instance I think you have to be highly aware that if you’re setting a project it must be typed on the computer. Or you’ve got to find time for them to do it at school. Doesn’t necessarily have to be done at lunch time or in their time but there’s got to be somewhere where they get a chance to go and do it. … I mean you have to be a bit careful about putting people in boxes. But yeah I would agree that children who don’t have access as a general rule long term, it does disadvantage. (Interview with Mary, Green Acres PS, 2003)

Elsie, a Health teacher and welfare coordinator at Knights Point SC [same school as Bruce], also expressed concern about students who she believed were disadvantaged because there families could not afford to provide a computer at home, and those students who because of their socio-cultural backgrounds were not proficient users of computers. She identified specific ethnic groups, newly arrived refugees and students who lived independently, as particularly disadvantaged in this respect:

We’ve got a girl who was in Year 11, who wanted to do IT and is living independently. She’s having dreadful problems with housing and her life generally through no fault of hers. (Interview with Elsie, Knights Point SC, 2003)

It’s a bit sad when you come across kids in the classroom who want to come into the system a little bit. The ESL girl I was telling you about who’s come to IT late, so she’s struggling with English and then she’s on a bit of a learning curve [with the computers as well]. (Interview with Elsie, Knights Point SC, 2003)

Yeah, but a lot has got to do with where you come from. If you come from a refugee family, now I don’t think there’s a lot of computers in Somalia. I might be
wrong. The even haven’t got enough food to eat; they wouldn’t be spending money on IT. (Interview with Elsie, Knights Point SC, 2003)

These concerns were reiterated by Bruce:

Not many kids need any help to use the internet. You’ve got to watch too that you don’t discriminate [against] those that don’t have a computer and don’t have that internet access. … In my Health class there was quite a lot of stuff that required research on the internet and some people said we haven’t got the internet at home, so I couldn’t expect them to look up these web sites at home if they didn’t have it. (Interview with Bruce, Knights Point SC, 2003)

Conclusion

During the past several decades, technology has been a moving target. The speed of development and rate of implementation in schools and elsewhere has removed the need to master any one product, and led to an emphasis on the value of skills in thinking, problem-solving, team-work, evaluation, and reflection. This shift effectively means that the technology itself is no longer a target that warrants a centre-stage position; movement is relative, and if teachers position themselves as “in flow” in their professional work, then technology as an object of concern solidifies and, relative to it, other (in our minds long stagnant) ground becomes fluid. Our most recent interviews with teachers suggest that, in their minds, the shifting ground is no longer ICT, but pedagogy and outcomes for learners. Like the Hanged Man [One], they can see that many of the things that previously caused them concern were mere distractions. No longer are they concerned with accumulating the “stuff” of computers, or becoming expert users, or being “masters” of their classrooms. Instead, they are attuned to the effects of technology use on learning relationships and pedagogy, they are making very astute observations about the new skills of their learners, they are asking critical questions about effects of technology use on learning, and they are concerned about sources of learner disadvantage.

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