Abstract

Following the significant investment made by education systems and individual schools to introduce computer-based technologies to teaching and learning, the emphasis on online learning has appeared as a new wave of priority. Online learning practice is an emerging area, characterised by rapid growth, and driven by political, commercial and 'inevitability' pressures, both locally and internationally. Much is promised in terms of cost savings, collaborative benefits and flexible course provision, beyond even the promises surrounding the integration of computer-based technologies in general. The paper presents an appraisal of the developing range of practices occurring in NSW and at a national level, set against the emerging trends in recent literature from school-based studies.

Background

Since the first appearances of computers in school classrooms in the 1970s, and in Australia in the 1980s, there has been a rapidly growing body of writing and opinion about their use, implementation and their potential for transformation of education. The provision of Internet services to schools presents education systems with significant new challenges in all aspects of their work - from infrastructure support, to industrial issues for staff, to curriculum decisions and regulatory requirements. All of which add to the centralised nature of the decision making. The normalisation of Internet use has not occurred in school sector education as rapidly as many other sectors of society. Some would suggest that for many teachers it hasn't really occurred at all.

Throughout this paper I will use the situation of NSW to exemplify patterns and issues familiar to teachers in all Australian states and territories, making links, in particular to national directions and trends.
Where are we at in NSW schools?

A major boost to computer-based learning in NSW arrived with the Labor Government's *Computers in Schools Policy (CISP)* 1995-99. The initial focus was on 'using computers to improve learning in all curriculum areas' with the expectation that all teachers would henceforth be 'teachers of IT'. The normalisation of computers as an 'educational tool' was the primary aim.

The work of researching and developing this approach soon revealed the need to identify computer-based capabilities that would be essential if students were to be active participants in a technologically convergent world. The shift to an emphasis on the development of technological capabilities has been reinforced, largely in response to workforce demands and the perceived shortage of IT workers (NSW Government, 2001). This resulted in a set of parallel aims presented to teachers:

- to utilise computer-based learning strategies to enhance students' experiences in all curriculum areas;
- to provide opportunities for students to develop capabilities in the use of computer-based technologies.

This is a cross-curriculum agenda that involves more than just the development of skills to 'use' computer hardware and software. The intention is to promote methods of thinking and working in new ways, with a developing critical view of computer-based technology uses, progressively refined throughout a student's school education, starting from the earliest years.

The computer-based capabilities for students represent a relationship between attitudes, knowledge and skills, that includes an understanding of the cultural and social relevance and impacts of technological activities and change. They aim to build understanding of the uses and impacts of computer-based technologies across the breadth of human activity, including in the home, workplace and wider community.

These two imperatives are mirrored at a national level through both Commonwealth's strategic action plans: *Learning for the knowledge society: An education and training action plan for the information economy* (DETYA, 2000) and its school sector subsidiary *Learning in an online world: School education action plan for the information economy* (Education Network Australia (EdNA), 2000). As in NSW, two goals are identified; one related specifically to students' acquisition of skills and knowledge to equip them to be "confident and effective users of new technologies"; the second, advocating schools' integration of computer-based activities to enhance student learning, provide flexible delivery of content and to improve the efficiency of educational business. Interestingly the order is reversed, with students' ICT skills taking the pre-eminent position, being derived from the current national goals for schooling (MCEETYA, 1999).

The NSW *Computers in Schools Policy* has provided significant investment in infrastructure, improving access to computer-based technologies in every NSW government school. Whilst the use of access measures does little to accurately describe or predict the importance of computer-based technologies in learning (Cuban, Kirkpatrick et al. 2001) it is a tangible indicator of the priority given to the use of computer technology by the NSW Department, and the accompanying expectations held for the impact on learning.

Both anecdotal, and more systematic analyses of the impact of local initiatives reveal huge variations in the uptake and successful use of computers in learning (Meredith, 1999; Audit Office, 2000; Hayes, Schuck et al. 2001). Variations occur across and between learning area
delineations, as well as from teacher to teacher within subjects. Approaches taken in all learning areas largely focus on teaching students how to use the hardware/software, albeit in subject specific ways, but predominantly in the context of conventional tasks. There is little focus on appraisal of technological activity or impacts, or on the development of critical views. Extending learning and the use of computer-based technologies into new and more complex ways of doing and knowing does not feature strongly, to date. This may be a product of the 'place in time' in which we find ourselves, and the pace of change that can be expected.

The NSW experience is consistent with the growing body of evidence within the literature, questioning the ability of current ICT initiatives to deliver the promised improvements in student learning (for example, Collis, 1996; Schacter, 1999; Cuban, Kirkpatrick et al. 2001).

A new set of promises

Such findings have done little to date, to dampen the enthusiasm of education systems to continue their investment in maintaining and extending technological infrastructure in schools. Increasingly investment is directed to the provision of Internet facilities and online learning, with a renewed set of promises, as a major part of political visions for schools in the coming years.

The NSW situation, again, reflects activity in other Australian states and territories. In reporting on progress in implementation of the School education action plan for the information economy, each state and territory has emphasised the introduction of online delivery and online learning content, as major new priority areas (Education Network Australia (EdNA), 2001). It is predicted that Internet or web-based activities will be an integral part of all students' learning, bringing with it new promises of radical changes in schooling. Much is promised in terms of cost savings, collaborative efficiencies and flexible course provision. The School education action plan for the information economy [op. cit, p.1] articulates the extreme expectations placed on educational uptake of (especially online) technologies:

"Harnessing these technologies for learning is vital. Australia’s future as an equitable, imaginative and economically strong knowledge society depends upon it."

Australian experiences also reflect the trends reported in other western education contexts: investment by central governments and local school authorities, focussing on 'connectedness', numbers of computers, professional uses and digital content. These are articulated in initiatives such as the U.S. national educational technology goals (U.S. Department of Education, 2000), the eLearning initiative of the European Commission (European Union, 2001) and Britain’s National Grid for Learning (NGfL) strategy (British Educational Communications and Technology Agency, 2001).

Initial forays into online activities for schools appeared to occur in a somewhat organic manner, with much development undertaken by individual schools, school districts or commercial and quasi-commercial organizations. Throughout the 1990s enthusiasts and early adopters explored the new possibilities offered, and generated class-based tasks, communications projects and various innovative activities; many of which were corralled to provide ideas and inspiration to other teachers (Curriculum Support Directorate, 1998).

More recent attempts to formalise innovation at a systemic level have shifted the emphasis to investment in major initiatives, sometimes justified as a method of obtaining maximum benefit from the substantial investments already made in hardware and software. The benefit of these moves is to let activity grow beyond the school-based 'expert' or enthusiast,
to provide valuable resources for all teachers. The down side is the perennial problem with a system as large as NSW - that programs that arrive 'from the top' are seldom as successfully implemented.

The pressure to rapidly embrace online learning has produced a range of initiatives to quickly develop online materials. To date, this has been founded on a narrow and limited research base. This speed of development and promotion of online learning in the public policy arena is forcing resource development activity to take place simultaneously to further research (McRae, 2001).

A variety of online projects are currently in progress or under development, as part of the NSW Department's ICT Strategic Plan (NSW DET, 2001). Loosely, the current initiatives fall into three large bundles: structured course materials delivered entirely or predominantly in an online environment, online resources for class-based use, and the infrastructure provision that will enable delivery to schools.

In each case projects are both exploratory, examining the impacts of online learning for teachers and students and testing the potential of online delivery to extend curriculum offerings for all students, and a way of meeting immediate needs within the system by increasing access to high-quality resources.

**Online course delivery**

With anticipated shortfalls in secondary teachers, schools are currently faced with losing enrolments if they cannot provide a substantial curriculum offering. Online alternatives are sought to cater for students where a class cannot be formed within staffing allocations, or timetable restrictions. Varying modes of delivery are being explored - ranging from entirely web-based materials completed within a linear structure by individual students, to remote teaching models using a hub school or teacher, where lessons are made available online and the teacher communicates with students via email, regular telephone conferences and at periodic face-to-face class meetings.

Early pilot projects are characterised by self-contained unit or project structures utilising combinations of resource materials, self-correcting interactive activities and teacher managed communications via e-mail or related facilities. There is an assumption of teacher support provided in a class or school context, even though this support may be very different to traditional teaching norms.

These initiatives have largely been driven by the need to provide alternative methods of delivering learning opportunities to students - to remain competitive in the secondary school market, especially at senior levels. The choice to use online delivery, and where, is primarily concerned with providing access (curriculum guarantee), rather than promoting new and different ways of learning that may be offered by the technologies.

This is not to say that these projects are not providing a testing ground for the development of online materials and experiences. A major purpose of the pilot initiatives is to explore how valuable learning experiences can be provided online, that meet the needs of students and fulfil the requirements of syllabuses, and that do challenge and extend pedagogical approaches.

The growth of the virtual schooling style of provision challenges established educational structures. In NSW this is not yet occurring to the degree seen in many parts of the United States and Canada (Clark, 2000; Manitoba School Divisions, 2002; Consortium for School Networking (CoSN) 2002). The efforts of "Net Grammar" to be registered as a NSW high
school a few years ago, despite being unsuccessful, caused a flurry of activity and forced both the Department and Board of Studies to seriously examine the roles and structures of 'a school' and how alternative participation can fit within them.

Certainly the agendas that must accompany the pilot projects in NSW include examination of the issues that immediately emerge with the introduction of new methods (Clark, 2001; Muirhead, 2000):

- the organisational impacts on teachers, both industrial and personal - defining and valuing changing roles, time demands, equivalence of workloads, pedagogical challenges in construction of activities and experiences;
- experiences and needs of learners - new demands on students, nature of learning and learning management, etc.
- at a systems level - the considerable issues surrounding staffing allocations, recognition of student achievement, ensuring support for students and changing relationships to distance education structures and requirements; all of which are yet to be resolved.

To date the focus has been firmly been on secondary schools where virtual schooling can occur in parallel to face-to-face classes, within the organisational structure of the school. The potential of web-based courseware may well expand to the K-6 arena, especially as it offers a boon to home schoolers, as evidenced already in North America (Clark, 2000)

The online landscape for the majority of students, especially in primary schools, comprises an expanded range of resources for classroom programs.

**Online resources and class-based activities**

The Internet's characteristic feature is the ability to be 'connected' - to information, people and products.

In schools, most frequent use is currently made of the connection to information (online encyclopaedia, web searching, WebQuests) and the associated learning activities and issues (Wyld and Eklund, 1997; Audit Office, 2000; Cooper, Jamieson-Proctor et al. 2001).

There is growing interest in, and demand for educational products that will provide teaching and learning resources for direct use by students. It is here that online resources or 'learning objects' are expected to provide new opportunities and promote new ways of learning, as well as filling current resources gaps. Some of the potential benefits of learning objects lie in their ability to model complex concepts, simulate events that are beyond the scope of the school, and to provide self-paced pathways through sequences of materials (Australian Education Systems Officials Committee (AESOC) 2001).

The move to development of online resources requires particular technical expertise as well as substantial financial resources. Major investments are required to produce online content applicable to all subject areas and levels of schooling, if we are seeking to provide all students with access to a 'rich repository of digital content'. Such investment is beyond the scope of individual systems and, if undertaken at a state level, would result in high levels of duplication and waste. The solution is a collaborative, national strategy to develop and deliver online content for all schools.

*The Le@rning Federation* has been established by the Ministers for Education in Australia and New Zealand, as a major response to the *School education action plan*. With a five-year investment of some $68.4m the intention of the initiative is to both produce online content for
mainstream school use, and establish protocols and standards of operation to underpin ongoing activities of an educational multimedia industry.

The federation has established criteria for a standard of educational quality in learning materials that emphasise student-centredness and integrity of subject domain (Learning Federation, 2002), but has narrowed the variety of content to be pursued, taking a firm 'learning objects' approach. This may expedient in terms of production processes, but may reduce the usefulness of the resources provided.

The market research project undertaken by the Learning Federation itself (examining current views of online learning materials), highlights the persistent issue raised by teachers about online learning resources:

"...(the materials) did not provide that "extra something" (interactivity) that traditional materials cannot provide." (Cooper, Jamieson-Proctor et al. 2001).

A growing number of authors see content as valuable only in terms of how it is used (Spender and Stewart, 2002; Young, 2002).

"Thus, providing teachers with a pool of online learning objects will not of itself assure rich learning outcomes for students." (Cooper, Jamieson-Proctor et al. 2001)

The ability to connect to people provides another dimension to learning activities, particularly mainstream class-based activities. Online communications activities include direct e-mail contact between students and others, participation in online discussions or mailing lists, and development of more complex online projects which frequently promote collaborative activity between students or groups of students. While project-based learning has been a feature of many classrooms for many years, the addition of an online dimension has spawned a significant increase in the number and availability of projects, accessible to all classes connected to the Internet (Professional Support & Curriculum Directorate; oz-TeacherNet, 2000; EdNA Schools Project, 2001).

Online projects promote connection of students to places, people and events occurring away from the school; participation in projects with students in other places; contribution to real-world activities (investigations, cultural events...) They currently occur in enthusiastic pockets of schools and classes both in Australia and elsewhere (Serim and Koch, 1996; Ingarvarson, 1997; Ponting and Fendall, 1997; Goldman, Williams et al. 1999; Berger, 1998). In communications projects, student activities take centre stage; the technologies themselves (the computer and the network) recede further into the background of complex learning tasks, perhaps more so than in the other styles of online activity.

Online projects were amongst the first telecommunications activities to emerge as schools became connected, first to electronic bulletin boards (Keylink projects) and then to the World Wide Web. There has been a steady presence of teachers at conferences throughout the 1990s, recounting their positive experiences of participation in online projects and the benefits to students (for example, Robertson, 2000; Brunsden, 2000). Yet they receive far less attention from systemic decision makers, in terms of promotion and financial support. NSW continues to run a small range of online projects, but only because of the lobbying power of a few strong advocates. Anecdotal evidence of their value is not yet well supported by research into the experiences of learners or evidence of outcomes achieved.

Because of its national support and the significant contribution being made by each educational system, The Learning Federation is likely to dominate the directions for online content development in the near future. There is a danger that 'electronic resources' will
dominate the national agendas. Issues persist at a state system level about how objects will be located, accessed and utilised by teachers, and how "educational soundness" or quality is ensured. Further consideration is required in this debate, about the value and practicality of including a wider range of activities that more fully use the information and communications capacities of online facilities.

**Internet service and products**

Essential to success of all of these approaches to online learning is the infrastructure that enables access to relevant resources, connection to other people and places, and participation in learning experiences as part of a course or class activities.

The Department's *Internet Services and Products (ISP) Project* is designed to provide a comprehensive suite of online services for every student and teacher (amounting to some million plus personal 'e-learning accounts'), including e-mail, chat facilities, forums and web publishing. The aim is to improve access of all teachers and learners to all that the Internet has to offer, ensuring a delivery system for the courses and resources being developed locally and nationally.

**So what's problematic about these initiatives?**

"Society has embraced computer technology and allowed it to reinvent the ways in which we create, find, exchange, and even think about information. Unable to ignore such a deeply permeating innovation, school districts often bow to societal pressure to fund technology without having a thoughtful plan for implementation." (Pierson 2001)

Pierson describes a situation that is widespread throughout the developed world - and one that strikes a particular chord for me and my colleagues in NSW schools, particularly in the prioritising of infrastructure development, before learning design is considered.

In this discussion I will highlight three areas where the questions loom larger than the answers: motivations and drivers of current innovation, the role of educational research, and how we can tell if the goals for students are being achieved anyway.

**What's driving online activity?**

Education has always had at its core the desire and the requirement to prepare students for the world in which they live. Much has been written about the challenge of shifting educational practice to reflect the demands of contemporary society, resulting in suggestions of new skills, and new understands of how such education can be achieved. A growing number of researchers and educationalists (individuals and groups) describe variations on a common range of desirable attributes. Students need to be able to motivate and direct their own learning, engage in creative, productive activities that are relevant beyond the classroom. They need to be well-equipped to think critically, make decisions and be sensitive to multiple cultural and world views (Fiske, 1998; Windschitl, 1998; Young, 1998; Goldman, Williams et al. 1999; Papert, 1999; CEO Forum on Education and Technology, 2001; Bertelsmann Foundation, 2002; Resnick, 2002; Spender & Stewart, 2002). Invariably the ability to creatively and responsibly use information technologies appears as a requirement.

If students are to develop these abilities, then educational experiences need to be practical and issue-oriented, providing environments where students are challenged to identify questions of significance and complexity, develop solutions and present results, working
both independently and in collaboration with others. These are the expectations reflected in the public policy positions taken by governments worldwide (UK Department for Education and Skills, 2001; European Union, 2001; U.S. Government, 2001). Local versions are articulated through Departmental strategic plans (NSW Department of Education and Training, 2002), and the national goals for schooling, and are reinforced by public declarations such as the Australian Council of Deans of Education charter for change, which demands that we create "a kind of person, with kinds of dispositions and orientations to the world, rather than simply commanding a body of knowledge." (Australian Council of Deans of Education, 2001)

Again, the dual role of computer-based technologies is present. The (IT) skills to achieve new forms of working are essential, but the real power comes from teachers and students harnessing for themselves, "new forms of intelligence and new functional capabilities" to actively participate in the creation of educationally purposeful and novel learning opportunities. The discussion has moved from stated expectations being assisted by the use of computer-based technologies, especially the Internet, to being reliant on their use (Dede, 2000; Fiske, 1998; Papert, 1999; Resnick, 2002; Australian Council of Deans of Education, 2001).

Yet much of the online learning development, both in NSW and nationally, is being driven by political, commercial and, what might be called 'inevitability' pressures. The need to embrace (online) technologies is presented as self-evident. Teachers are exhorted to embrace 'difficult' new practices that have not evolved from the needs or interests their students, but from a position that suggests "they are the way of the future", justifiable ends in themselves. Added to this are whole-of-government agendas that promote an 'electronic delivery of information' policy across the public sector (NSW Government, 1997), in which educational aims do not easily sit. If online learning is about delivery and the learning focus is 'more of the same', then skilling of students is concerned with being able to use online technologies - logging on, chatting, using e-mail. Higher order uses become the bonus rather than the main purpose.

There is surprisingly little political criticism of the significant resources being expended, especially as we run up to an election. It could be suggested that Oppositions do not draw attention to this area of educational provision, because there is little they would change in the overall approach - it is self-reinforcing, self-justifying. No one would argue with the need to invest in the technological future of our children. Would either side of politics do anything differently?? If the investment in ICT is just about achieving the same things then questions must be raised as to whether it is money well spent (Audit Office, 2000; Cuban, Kirkpatrick et al. 2001; Bober, 2002).

I am a strong believer that school communities, and the school curriculum, should reflect the world in which we all live - particularly that of students. But reflecting a changing world is vastly different from altering practices because there is a perceived need to somehow keep up. Online learning is not so much being 'sold' to education as it's being 'assumed'. Assumed to have a place, and assumed to be a 'solution' - often before the problem is known or the appropriateness of application is assessed.

The ability to participate in subjects, courses, activities that are otherwise not offered at a local school level is seen as a strong (political) reason for moving into an online environment. E-mail and other web-based services are being provided for students and teachers, not because many teachers have been calling out for e-mail access for several years (although some have been, loud and clear) but because it was as an 'innovative thing to do', a way NSW could 'lead the way' and because it was announced in the Sydney Morning Herald. So a solution was indeed required - a solution to a political problem, at least
as pressing as any educational one. The most cynical would suggest that we're providing an
infrastructure and now searching for things to do with it.

Recent investments have emphasised infrastructure provision, delivery services and even
'online content' as ends in themselves, rather than reflecting any measures of the quality of
online learning. There is an alternative view: one that puts student need and learning at the
forefront, with teachers seeking ways to appropriate the power and effectiveness of web
environments. While there may be few truly novel features of the web, small success
stories demonstrate that it can enable activities that could occur in other ways, but do not.
However, at present, the rhetoric far outweighs the evidence.

**Where does educational research fit in?**

There is no shortage of educationalists eager to reinforce the assumed benefits of online
learning and the promised 'revolution' in educational practice. Implicit is the claim that, unlike
earlier uses of computer-based technologies, online technologies are not being used to
simply replicate existing functions, albeit with greater efficiency or economy.

It is claimed that Internet-based activities offer different experiences, where students are
challenged to undertake more realistic and demanding activities (Honey and Henriquez,
1993; Serim and Koch, 1996; Ingvarson, 1997; Ponting and Fendall, 1997; Goldman,
Williams et al. 1999). This style of argument is comparatively widespread, suggesting that
moving online will transform the role of computer-based technologies, from supporting
existing practices and norms of schooling, to promoting innovative practices. As yet, there is
little evidence in school-based research, to support or refute this hopeful position. As de
Castell et al. note:

"..it is remarkably traditional content that we deliver by computer, on CD-ROM or via
the Web, using few of the tools of the computer or the Web beyond their capacities
for display and distribution." (de Castell, Bryson et al. 2002, p.3)

Much of the literature related to use of the Internet in school education still reflects the
immaturity of the area, being dominated by studies that track usage patterns (Schoolsnet
2000; Lenhart, Simon et al. 2001); describe and promote potential uses, encouraging uptake
(for example, Serim and Koch, 1996; Ingvarson, 1997; Ponting and Fendall, 1997; Goldman,
Williams et al. 1999); or uncritically map early activities (Carr, 2001, Heflich, 1996). In each
of these cases there is little attention given to learning effects or achievements of students,
or how these might be determined.

Mioduser and his team of researchers (Mioduser, Nachmias et al. 2000) go a step further in
their analysis of the characteristics of 'web-based learning environments', their relationship
to the claims being made about learning potentials, and what they may teach us about
further development of web-based learning. Their findings revealed similarly disappointing
results as for non-web computer technologies - little evidence of the promised shifts in
pedagogy or learner interaction and little evidence of the potentials of web learning being
realised.

Mioduser is disappointed with this "one step ahead for technology, two steps back for
pedagogy" result and suggests that a cultural lag is evident in the uptake of web-based
learning. As a result, two options are proposed: to conclude that Web technology has little to
offer; or to "...reflect on the character of this transitional stage and generate new possible
models and trends based on educational needs" requiring practitioners to go through a
"complex maturation process until new languages and unique qualities are developed" and
until relevance and social constructs and supports are obvious.
A response to this challenge is required - looking for ways that 'a different kind of work' can be achieved. There is a real need to demonstrate good reasons for, good methods and good practices in the use of online technologies, that centre around that which is demonstrably of benefit to students (and teachers). The lesson that should have been learnt from the earlier introduction of computing into schools, is that without a solid platform of teacher support, uptake is not assured. Issues of time- and cost-effectiveness, teacher comfort and support, unfulfilled expectations and insufficient payoff in educational terms, stand as firm barriers to teachers realising the promises.

As a practitioner having recently entered the world of research, I was looking for direction and support that would help shape the support strategies implemented for teachers. What I've found is that the research cannot keep up with the rapid development of practical projects, let alone inform them.

It seems that activities are running ahead of the research needed to guide the changes in practice. Playing the technology game in schools comes with risks - high costs and commitments too great to wait for several years before research results are available. Perhaps this is a problem, or perhaps it is a symptom of the phenomenon, of rapid IT development; one that must be acknowledged and accepted as a condition of the field. Education systems and research communities urgently need to work together to develop models of investigation as an essential part of innovations in practice.

**How do we know what's being achieved?**

The other major aspect that demands attention in this rapidly changing educational landscape builds on the changing expectations of schooling discussed earlier. There is a growing recognition that assessing, describing or measuring student achievement is difficult - both for the student's benefit and for evaluation of the web-based initiatives themselves.

As mentioned earlier, much of the literature has shied away from a focus on learning or student achievement, even though it is an increasingly important question (Bennett and Lockyer, 1999). Given that schools have only recently become 'connected' in a widespread sense, it is not surprising that the tendency to describe what is occurring in class activities without focussing on the learning that is taking place, is dominant at this early stage of online implementation (Windschitl, 1998).

Where it has occurred, assessing student learning in technologically-oriented learning environments continues to be problematic. Early studies that focused on measuring student outcomes were dominated by the use of test-score performance on discrete information and skills, closely related to the content of the instructional packages (Kulik, 1994). They were not able to provide information on the development of higher order skills such as "thinking creatively and critically and to learn to use their minds well and deeply" (Honey, McMillan et al. 1999).

Studies that have sought to demonstrate the success of computer-based learning programs through the use of (knowledge) content measures, even if able to do so (such as Butzin, 2000), still fall short by looking only for achievement in conventional terms. McDougall highlights the problem that arises if it is assumed that the curriculum is unchanged despite the introduction of the technologies. She asks

"If a task can be done without ICT by a control group, how much better does an experimental group need to perform to justify the use of expensive technologies?".
McFarlane in her account of the lacklustre case for ICT enhancing learning, points to the second failing: "Does this mean then that ICT has little contribution to make to teaching and learning, or that this contribution is not captured by standardised tests?"

Assessment that is dominated by content-oriented measures (of whatever variety), only deals with part of the picture (Bransford, Brown et al. 1999; CEO Forum on Education and Technology, 2001; Means and Olson, 1995). The wider aspects of learning, claimed as the potential outcome of well-designed computer-based activities, are not well addressed.

Where complex learning environments utilising ICT are evident, the diversity of learning outcomes, as Cuttance & Nicholson (2000) identify "...are either not easily accounted for, or are ignored by, traditional assessment instruments."

Honey summed it up well in her early, large-scale National Survey of Telecommunications Projects when she noted the "...mismatch between what teachers 'know' kids can do and what traditional assessments show." (Honey and Henriquez, 1993). There has been little to refute this position in the intervening years.

The shortcomings of commonly used, content-based measures (McFarlane, 2001; (CEO Forum on Education and Technology, 2001) have led to calls for a new definition of student learning (e.g. ibid; Heinecke, Blasi et al. 1999; Means, Penuel et al. 2000).

"What are needed more than anything else are a new set of clear learning outcomes for students who must live in a complex world. New learning outcomes must focus on the demands of the new world environment." (, p.5)

The challenge presented is to find better ways to respond to the clear identification of the need for more relevant and meaningful standards or new definitions of student achievement.

**Responding to a problematic online future**

The use of Internet-based facilities is still in its early days in school contexts. The existing literature in both general computing and Internet-based aspects highlights the need for qualitative, in-depth studies that focus on student learning and challenge the current methods of describing or measuring the learning.

This complements the needs of practitioners - to be provided with evidence of worthwhile outcomes from student engagement with specific forms of online activities. But it needs to occur in tandem with the implementation of innovative practices.

Within the commercial sector, extending beyond educational applications, there is a growing realisation that online services are part of the solution, rather than the whole. Industry commentator, Simon van Wyk, describes recent moves within e-commerce (post dot.com bust) back to the basics of good (online) business, including the need to "use the Internet for what it's good at - providing information and enhancing communication." (van Wyk, 2002)

Increasingly, questions about the role and purpose of schooling are posed, especially in terms of the educational requirements of a globalised world. Lankshear, et al (2000, p.xiv) suggest that this is one of the beneficial outcomes of the pressure on schools to "technologise learning", that it may force a reconsideration of the important questions of purpose and priorities in learning. How online learning activities may provide new opportunities, and in what form, constitute much of the current debate.
I fear there are more questions raised, than are answered. But that is exactly the place where teachers and education systems currently find themselves. The promises are enticing, the driving forces are compelling, and new issues and uncertainties emerge with every step forward.

Again this may reflect a point in time in the development and evolution of understanding about how Internet facilities can truly expand the range of learning options for students - within and beyond conventional classrooms. Current initiatives are pragmatically driven - in an attempt to provide solutions for pressing issues within a large and under-funded system. At the very least this offers the opportunity to explore some possibilities - so long as the necessary research accompanies implementation.

References


