A holistic approach to designing *for* learning: a vision for the future

Annual International CODE Symposium, Chiba, Japan, 18th February 2010

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Abstract

The pace of current technological advancement is phenomenal. In the last few years we have seen the emergence of ever more sophisticated gaming technologies, rich, immersive virtual worlds and new social networking services that enable learners and teachers to connect and communicate in new ways. The pace of change looks set to continue as annual Horizon reports testify (http://www.nmc.org/horizon) and as encapsulated in the following quote from the NSF-report on cyberlearning:

> Imagine a high school student in the year 2015. She has grown up in a world where learning is as accessible through technologies at home as it is in the classroom, and digital content is as real to her as paper, lab equipment, or textbooks. At school, she and her classmates engage in creative problem-solving activities by manipulating simulations in a virtual laboratory or by downloading and analyzing visualizations of real- time data from remote sensors. Away from the classroom, she has seamless access to school materials and homework assignments using inexpensive mobile technologies. She continues to collaborate with her classmates in virtual environments that allow not only social interaction with each other but also rich connections with a wealth of supplementary content… (Borgeman et al., 2008: 7).

Clearly new technologies offer much in an educational context, with the promise of flexible, personalised and student-centred learning. Indeed research over the past few years, looking at learners' use of technologies, has given us a rich picture of how learners of all ages are appropriating new tools within their own context, mixing different applications for finding/managing information and for communicating with others (Sharpe and Beetham, 2010).

This paper explores the question: "What is likely to be the impact of an increasingly 'open' technologically mediated learning environment on learning and teaching in the future? In a world where content and expertise is often free and where services are shifting to the 'cloud', what are the implications for education? Materials for the paper and the presentation at the conference will be made available via our Cloudworks site for learning and teaching (http://cloudworks.ac.uk/index.php/cloud/view/2695.html) along with a set of questions for consideration. The paper draws on research at the Open University, UK. In particular, our work on:

- Learning Design (where we are developing tools and resources to help teachers design better learning experiences)

- Open Educational Resources (through our OLnet initiative which provides a global research network for those interested in using Open Educational Resources).

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Introduction

Technologies are having an increasing impact on all aspects of our lives. In this paper I want to look critically at technologies in an educational context. I begin by casting an eye over the current digital landscape and argue that we need to redefine our understanding of ICT (Information and Communications Technologies). I argue that we are seeing changes in practice arising as a result, which have profound implications for education. I focus on some paradoxes caused by the nature and underlying force of change inherent in this digital landscape and then consider the specific educational dilemmas, which arise as a result. I draw on a range of recent foresight and future trend reports, and case studies of how technologies are being use for learning. Drawing on international research I provide a summary of current trends in technological developments and consider what these might mean for learning and teaching.

I highlight some of the technological paradoxes, which arise and in particular the educational dilemmas these lead to. I argue that despite the fact that new technologies appear to offer much for education and appear to provide an opportunity to facilitate good pedagogical approaches; there is little evidence of their actual impact in practice. I argue that there is a gap between the promise of technologies and their actual use in practice. I explore some of the reasons for this gap; which are complex and multi-faceted. I argue that we need to adopt a design-centred approach; we need to design *for* learning and provide an overview of the work we have been doing in the Open University Learning Design Initiative (OULDI).

A changing digital landscape

There can be little doubt that digital technologies now infiltrate all aspects of our lives; electronic plane tickets, ubiquitous wifi, and the miraculous i-phone are basics not luxuries. Most of us have an expectation of a certain level of digital connectivity; and indeed rely on it, feeling cheated and feeling that we are working below par without it. The annual Horizon reports (L. Johnson et al. 2009) show that the pace of change is unlikely to slow down, and arguably there are more fundamental changes coming as mobile technologies, ubiquitous networking and cloud computing begin to have an impact. A cyberlearning report from the states (Borgman et al. 2009) considers the implications for learning and makes a series of recommendations that have far reaching consequences for education if they are taken up. Two recent reviews by the Institute of Perspective Technologies Studies considered the impact of web 2.0 technologies on formal, informal and non-formal learning contexts. This

includes a database of case studies, associated theoretical perspectives and recommendations (Redecker 2008; Ala-Mutka 2009).

The new technologies that have emerged in recent years collectively give rise to a number of fundamental changes:

- A shift from the web as a content repository and information mechanism to a web that enables more social mediation and user generation of content.

- New practices of sharing content (for example: images: Flckr; video: YouTube and presentation slides: Slideshare), and mechanisms for content production, communication and collaboration (through blogs, wikis and micro-blogging services such as Twitter).

- An increase in social networking sites for connecting people and supporting different communities of practice (for example Facebook, Elgg and Ning).

- A network effect is emerging as a result of the quantity of information available on the web, the multiplicity of connectivity and the scale of user participation. New possibilities for sharing and 'network effects' are possible as a result.

Much has been written about the characteristics of these new technologies and in particular so called web 2.0 practices (OReilly 2005; Alexander 2006;(P. Anderson 2007) but for the purposes of this paper I want to focus in particular on the following:

- *Peer critiquing* – the ability to comment on other people's work. This has become standard practice within the blogosphere. Many journalists are now active bloggers, writers often have a blog where they invite their readers to comment on the evolving plot for a new book, academics use blogs as a form of research diary and in a teaching context students may be asked to keep a reflective learning journal or to contribute to a collective cohort blog.

- *User generated content* – there are now many different tools (many free) for creating content (ranging from those which are primarily text-based, through to rich multimedia and interactive tools), meaning that the web is no longer a passive media for consumption but an active, participatory, productive media. Sites such as YouTube, Flickr and Slideshare facilitate simple sharing of user-generated content and embedded code functionality means this content can be simultaneously distributed via a range of communication channels.

- *Collective aggregation* - hierarchy and controlled structures make little sense in an environment that consists of a constantly expanding body of content that can be connected in a multitude of ways. Collective aggregation refers both to the ways in which individuals can collate and order content to suit their individual needs and personal preferences, as well as the ways individual content can be enriched collectively (via tagging, multiple distribution, etc.). Social bookmarking,

tag clouds and associated visualisation tools, tagging, RSS feeds and embedding code all enable collective aggregation to occur.

- *Community formation* – the connectivity and rich communicative channels now available on the web provide an environment for supporting a rich diversity of digital communities. Boundaries of professional and personal identity are eroding. The notion of tightly knit Communities of Practice (Wenger 1998) are giving way to a spectrum of communities from individualistic spaces through to loosely bound and often transitory collectives, alongside more established and clearly defined communities (See (Dron & T. Anderson 2007) for a more specific discussion of collectives, networks and groups in social networking for e-learning).

- *Digital personas* – each of us has to define our own digital identity and how we present ourselves across these spaces. The avatars we choose to represent ourselves, the style of language we use and the degree to which we are open (both professionally and personally) within these spaces, gives a collective picture of how we are viewed by others and can have unintended consequences.

The learner perspective

Research in recent years, focusing specifically on learner use of ICT, has given us a rich picture of how learners of all ages are appropriating new tools within their own context, mixing different applications for finding and managing information and for communicating with others.

Sharpe and Beetham provide a summary of recent research looking at the learner perspective and in particular how learners are using technologies (Sharpe & Beetham 2010). It is evident that today's learners are immersed in a technologically rich learning environment. They see technologies as an essential part of their tools for learning. They appropriate technologies to suit their own learning styles and use them to support all aspects of their learning. However despite having grown up in a technological environment, not all students are able to use technologies effectively in an academic context. For example they may be comfortable using Google, but not competent at critically evaluating different resources and using them for their learning. Indeed for the weaker students the complexity of the range of digital tools and resources available to them means they are more likely to get confused and lost.

In Sharpe and Beetham's edited collection, De Freitas and Conole (De Freitas & G. Conole 2010) consider some of the key characteristics and trends associated with new technologies and demonstrate how these relate to different types of pedagogical drive (Table 1). They argue that:

> The description above paints a picture of a rich and exciting technological environment to support learning; with a multitude of mechanisms for: rendering content, distributing information and communicating. There seems to be a tantalising alignment between many of the social capabilities of the tools and practices evident with new technologies and what has emerged as 'good' pedagogy in recent years.

Table 1: Technologies and associated pedagogies (reproduced from De Freitas and Conole, forthcoming)

Trends in the uses of applications and tools	Pedagogical drive
New Web 2.0 practices	From individual to social
Location aware technologies	Contextualised and situated
Adaptation & customisation	Personalised learning
Virtual and immersive 3D worlds	Experiential learning
Google it!	Inquiry learning
User generated content	Open Educational Resources
Badges, World of Warcraft	Peer Learning
Blogging, peer critique	Reflection
Cloud computing	Distributed Cognition

However despite this, there is a fundamental gap between the potential and actual uptake in the use of technologies in practice:

- A lot of content seems to be the same; there is little evidence of innovative use of the new technologies.
- There is a spectrum of learners; good learners are able to harness and appropriate technologies effectively, whereas weak learners – confronted with so much choice - are even more lost.
- Despite the rhetoric around the notion of the 'net generation' immersed in technology (Oblinger and Oblinger, 2005) in reality many learner's don't have a good grasp of technologies – particularly not in terms of how technologies can be used for academic purposes.

Paradoxes created by the digital

This section considers some of the paradoxes which arise as a result of new technologies; for although clearly they have affordances which can offer new ways of interacting and communicating, they have unintended consequences associated with them as well. To illustrate this subtle balance of tensions Table 2 looks at five common effects associated with new technologies and suggests some of the consequences or paradoxes that arise as a result.

Table 2: Cause and effect in digital space

Cause	Effect
Expansive knowledge domain	Death of expertise/everyone an expert
Hierarchy & control less meaningful, content can be distributed and located in different ways	Multiple (co-)locations/loss of content integrity
Increasingly complex digital landscape	Beyond 'digital space'/New metaphors needed
Power of the collective, collective intelligence	Social collective/digital individualism
Free content & tools, open APIs and mash ups	Issues re: ownership, value, business models

- *Knowledge expansion.* Firstly, it is a fact of modern society that knowledge is expanding. Digital technologies amplify this effect by providing easy access to information, new ways of aggregating resources and multiple ways of disassembling and recombining information. In a world of increasing complexity and knowledge, it is no longer possible to know everything about a domain. Whereas a century ago a professional Chemist could have a pretty good grasp across all the main sub-domains of Chemistry; today's Chemist struggles to keep up with their own area. Some celebrate this expansion, pointing to the 'wisdom of the crowds' where everyone had the potential to be an expertise to access and use knowledge. Why seek the advice of a doctor, when information on any particular set of symptoms is available in abundance on the net, from multiple sources, described in a variety of ways? Surowiecki coined the term 'wisdom of the crowds' (Surowiecki 2004) arguing that collective aggregation of information can lead to better decisions than those any individual might make. Others caution against this, lamenting the death of expertise. Keen in particular cautions against the 'cult of the amateur' (Keen 2007):

  > I call it the great seduction. The Web 2.0 revolution has peddled the promise of bringing more truth to more people – more depth of information, more global perspective, more unbiased opinion from dispassionate observes. But this is all a smokescreen. What the Web 2.0 revolution is really delivering is superficial observations of the world around us rather than deep analysis, shrill opinion rather than considered judgement.

  He talks of the 'sheer noise of a hundred million bloggers; simultaneously talking about themselves' and argues that we are decimating our 'cultural gatekeepers' (critics, journalists, editors, etc.)

- *No hierarchy or control.* Secondly, given the above, it is also no longer possible (or advisable) to try and categorise and control. The long held tradition of

catalogues is being eroded. It no longer has meaning or value in a fragmented digital space. Weinberger's book 'Everything is Miscellaneous' (Weinberger 2007) describes how we have shifted from physical objects, which require space and a unique location to digital objects, which can be fragmented and multi-located. So for example a physical book has to be stored in one place, on one shelf at any one time, the digital equivalent can not only be located in multiple places, but can be disaggregated and indeed partially combined with other digital artefacts. This offers greater flexibility in how the 'book' can be used and how it can be located. A downside is the increased complexity this brings, and in particular there is a danger that content will lose its integrity.

- *Increasingly complex digital space.* Thirdly, the general increasingly complex digital landscape is challenging our existing vocabularies and means of description. The very terms digital spaces and landscapes hark back to a time when the digital was considered as a mere extension of the real. Terms such as 'virtual universities' and 'virtual cafés' give the impression of the digital as a 'bounded place'. Whereas the kinds of patterns of behaviour we are now seeing in the digital realm, the distribution of content and tools, the multi-faceted and inter-connected nature of the digital means that the vocabulary of 'time' and 'space' is no longer adequate. We need new vocabularies and metaphors to describe what is happening. I have argued previously that:

  > There is a need for new approaches to help navigate through the digital environment and also to help make sense of it and the impact it is having on our lives. Simplistic descriptions of the digital environment replicating physical spaces are no longer appropriate, it is necessary to take a more holistic view and describe technologies and users together emphasising the connections between them (Conole, 2008).

  And put forward two addition dimensions to the existing use of spatial and temporal concepts; namely functional and connected (Gráinne Conole 2008).

- *The power of the collective.* Fourthly, as touched upon above, a key feature of web 2.0 technologies is the power of the collective; the potential to tap into a collective mass. This suggests 'expertise at one's fingertips' as well as a collective endeavour to tackle problems, where the 'sum will be greater than the individual parts'. Why tackle an issue with one mind, when one can use hundreds or thousands, with different perspectives and different types of expertise? This gives rise to the concept of 'collective intelligence' i.e. a shared or group intelligence that emerges from the collaboration and competition of many individuals. Although this is a well-established field of enquiry, the sheer capacity of the Internet means that huge numbers of people can now work together on a shared problem, and at the same time utilising the vast quantity of information and tools available on the Internet. Levy for example argues that

  > The evolution of contemporary technology, primarily communications technologies, suggests other approaches [to maximising the enhancement of human quality's],

which were inconceivable ten or twenty years ago. This will profoundly affect the range of possible solutions to the problems of managing the social bond and maximizing human qualities. (Levy 1997, p.40)

However this social collective co-exists with what Wellman terms networked individualism (Wellman 2001), i.e. the notion that there is a shift away from tightly bound groups to loosely knit networks of individuals.

- *Free content & tools, open APIs and mash ups.* Finally the apparent utopian drive towards an internet where tools and content are free, and where open source principles, Application Profile Initiatives (APIs) and mash ups appear to offer an evolving, collectively improved set of content and tools, which can be used in a multitude of ways, may not be all that clear cut. Such practices challenge existing ideas around quality and ownership and do not fit in with current Business Models for commoditising knowledge. This suggests that there is far more to do in terms of understanding these and redefining our ideas around ownership, quality and business models.

Educational dilemmas

Having given a general overview so far, I now want to concentrate on what are the implications of this in an educational context. I argue in this section that the above trends and paradoxes give rise to some specific dilemmas for education. Table 3 reconsiders the causes outlined in the last section, but now focuses specifically on what educational dilemmas arise as a result.

Table 3: Educational dilemmas arising as a consequence of new technologies

Cause	Educational dilemma
Expansive knowledge domain	Challenges the role of the teacher
Hierarchy & control less meaningful, content can be distributed and located in different ways	Need to rethink the design process, offers the potential for new learner pathways,
Increasingly complex digital landscape	Widening skills gap between 'tech savy'/others
Power of the collective, collective intelligence	Potential for new forms of learning
Free content & tools, open APIs and mash ups	Little evidence of uptake

The expansion of the knowledge domain and the consequential 'death of the expert' naturally challenge the traditional role of a teacher. It can no longer be assumed that the teacher is expert or that the focus should be on transmission of knowledge. Whilst such a shift away from didactic to constructivist approaches has been a dominant discourse in education for many years, the Internet as amplifier of this cannot be underestimated. Multi-located/fragmented content and the potential for

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multiple pathways through content have an impact on how educational interventions are designed. And although such multiplicity offers increased choice, in an educational context this also has the potential to lead to confusion. Hence there is an opportunity for teachers to play an important new role in terms of providing pedagogically grounded learning pathways, to help learners navigate their way through this complexity. The digital divide has long been a prominent topic of debate in educational technology research (Warschauer 2004;(P. Norris 2001)(C. Norris et al. 2003). However with the increasingly complexity of the digital landscape the gap between the 'tech savvy' teachers and students and those who are not engaged is ever deeper. This is exacerbated particularly because you don't really 'get' web 2.0 technologies without engaging with them. A definition of Twitter and even a hands-on demonstration does not really help you fully understand the power of the tool. Technically Twitter is simple; type in 140 characters and press return, but in reality practical use of Twitter requires you to understand how to appropriate it for your own use, to adapt it to your own style or 'digital voice'. Twitter is also about being part of a wider network, so is only any use if you are connected to (following) people you are interested in.

The power of the collective has clear potential in a learning context. The ability to connect with others opens up the possibility for both dialogic and situated learning, and also inquiry-based learning. Twitter for example enables you to have 'just-in-time' learning moments. Learners can posed queries and get almost instant feedback from other learners or tutors. Similarly, a student cohort can gather and comment on course-related resources using a social bookmarking tool. The user-focussed, participatory nature of web 2.0 practices has immense potential educationally, for shifting the locus of control from the teacher to the learner, and for enabling constructivist pedagogical approaches.

Finally a paradox; despite the wealth of free educational resources and tools that are now available it is sobering to note that in reality these are not used extensively. The reasons for this lack of uptake are complex and multi-faceted but to a large extent are because teachers do not have the necessary skills to take advantage of the affordances of new technologies (Dimitriadis et al. 2009; G. Conole et al. 2010). The next section considers what these skills are and what it means to be digital literate.

Digital literacies

Lankshear and Knobel provide a useful summary of the way in which the term 'digital literacies' is being used (Lankshear & Knobel 2006). Definitions include ' the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers' (Gilster cited in Lanksear and Knoble, 2006). Goodfellow argues that this is much more complex term:

> with strands and tribes like: multiliteracies, situated literacies, new literacy studies, academic literacies, digital literacies, etc. etc. (See broader discussion of which this is part at http://cloudworks.ac.uk/cloud/view/2669)

John Seely-Brown has written extensively on the topic of digital literacies (Brown 2000; Brown 2001). He describes a number of shifts in terms of the nature of how digitally savvy kids learn (Figure 1) (Brown 2001, p.71).
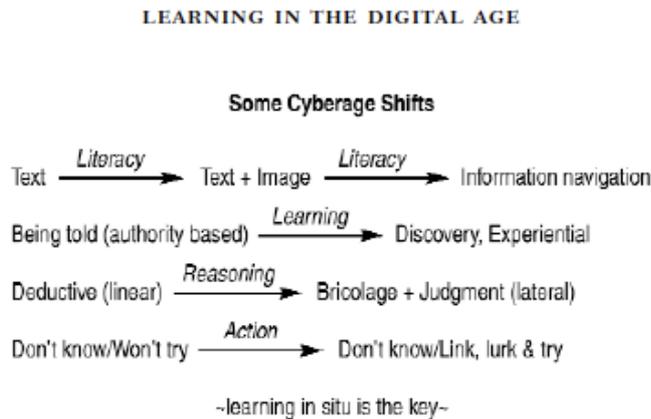
LEARNING IN THE DIGITAL AGE

Some Cyberage Shifts

Text —*Literacy*→ Text + Image —*Literacy*→ Information navigation

Being told (authority based) —*Learning*→ Discovery, Experiential

Deductive (linear) —*Reasoning*→ Bricolage + Judgment (lateral)

Don't know/Won't try —*Action*→ Don't know/Link, lurk & try

~learning in situ is the key~

Figure 1. Dimensional shifts describing kids in the digital age.

Figure 1: Learning in the digital age (reproduced from Brown, 2001: 71)

The first is concerned with the evolving nature of literacy, from text-based through to rich multimedia environments. This includes not only being able to interpret these multimedia environments but also being able to interact with them and to navigate around them. The second is the shift from authority-based learning to learning through experiential learning and discovery. The third is about reasoning, young leaner have a rich array of resources available to them via the web and so can use these to develop their own understanding; they can triangulate different definitions of a concept with concrete examples. The final dimension is related to the fact that young learners tend to learn by doing; they don't read a manual, instead they learn by trial and error, by trying things out. In other words they learn in situ, with and from each other.

Therefore it is evident that 'digital literacies' are much more than simply being about understanding information available in a digital context. It is also about skills of interpretation of multiple representations, the ability to develop a holistic and interconnected perspective and to understand how to be part of and interact with a wider participatory community.

In a recent white paper, 'Confronting the Challenges of Participatory Culture: Media Education for the 21st Century' Jenkins argues that there are twelve skills needed for full engagement in today's participatory culture:

- Play - the capacity to experiment with one's surroundings as a form of problem-solving
- Performance - the ability to adopt alternative identities for the purpose of

> improvisation and discovery

- Simulation - the ability to interpret and construct dynamic models of real-world processes
- Appropriation - the ability to meaningfully sample and remix media content
- Multitasking - the ability to scan one's environment and shift focus as needed to salient details
- Distributed Cognition - the ability to interact meaningfully with tools that expand mental capacities
- Collective Intelligence - the ability to pool knowledge and compare notes with others toward a common goal
- Judgment - the ability to evaluate the reliability and credibility of different information sources
- Transmedia Navigation - the ability to follow the flow of stories and information across multiple modalities
- Networking - the ability to search for, synthesize, and disseminate information
- Negotiation - the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms
- Visualization - the ability to interpret and create data representations for the purposes of expressing ideas, finding patterns, and identifying trends (Jenkins 2009)

This list clearly shows the multifaceted nature of digital literacies. Jenkins defines participatory culture as being about involvement and participation, about being able to create and share work and about peer mentorship and support. He goes on to suggest that this has immense potential educationally; providing opportunities for peer-to-peer learning, diverse cultural expression, skills development across different contexts and a changing attitude to the notion of intellectual property. Furthermore he indicates that embracing this participatory culture is essential:

> Access to this culture functions as a new form of the hidden curriculum, shaping which youth will succeed and which will be left behind as they enter school and the workspace.

The Open University Learning Design Initiative

In the first part of this paper I provided an overview of new technologies and discussed the implications for learning and teaching. I argued that there is a gap between the potential of new technologies and their actual use in practice. In the second part of the paper I outline the Open University Learning Design Initiative (OULDI), which is developing a suite of tools and resources to help teachers make more effective use of technologies.

OULDI aims to bridge the gap between the potential and actual use of technologies outlined in the introduction, through the development of a set of tools, methods and approaches to learning design, which enables teachers to making better use of

technologies that are pedagogically informed. The work is underpinned by an ongoing programme of empirical evidence which aims to gain a better understanding of the design process and associated barriers and enablers, as well as an ongoing evaluation of the tools, methods and approaches we are developing and using and in particular to what extent they are effective. There are three main aspects to the work we are doing:

1. Representing pedagogy – identifying and using a range of representations to describe the design process and in particular exploration of how new forms of visualisation can be used.
2. Guiding and supporting the design process – providing different levels and forms of support to guide the decision making process in design, through in-situ help and templates within tools, via pedagogical schema and through a range of face-to-face structured events and workshops.
3. Sharing designs – exploitation of the affordances of Web 2.0 technologies to enable new forms of communication and sharing of learning and teaching ideas and designs, blended with a range of face-to-face events and workshops.

Conole (2009) provides a reflection on the origins of OULDI and the benefits of adopting this approach. As part of our work on representing pedagogy we have developed a visualisation tool (CompendiumLD) for designing learning activities (Conole et al. 2008). CompendiumLD is a type of mindmapping or concept mapping tool that can be used to design a learning activity. Figure 2 shows a 'task swimlane representation'. There are two roles (student and tutor) and for each there is a 'task swimlane' showing the tasks they need to undertake, alongside any associated tools and resources. The total time for the tasks is automatically calculated and displayed at the top of the diagram. CompendiumLD includes in-built help to guide the design and the maps produced can be exported in a range of formats. Evaluation of the tool shows that users find it easy to use and say that it helps them make their designs more explicit and sharable.
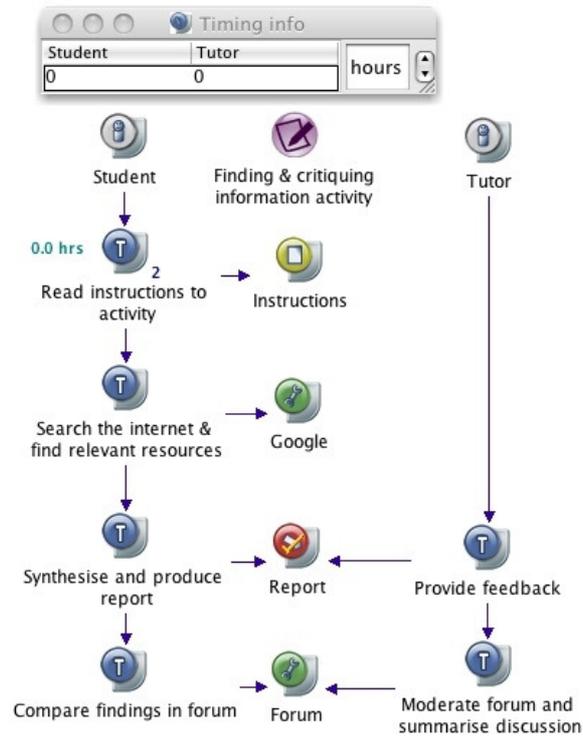
Figure 2: The task swimlane representation mapped in CompendiumLD

We have also developed a social networking site (http://cloudworks.ac.uk) for sharing and discussing learning and teaching ideas. Conole and Culver describe the development and evaluation of Cloudworks (Conole & Culver 2009a) and in a related paper the theoretical underpinnings to the site (Conole & Culver 2009b).
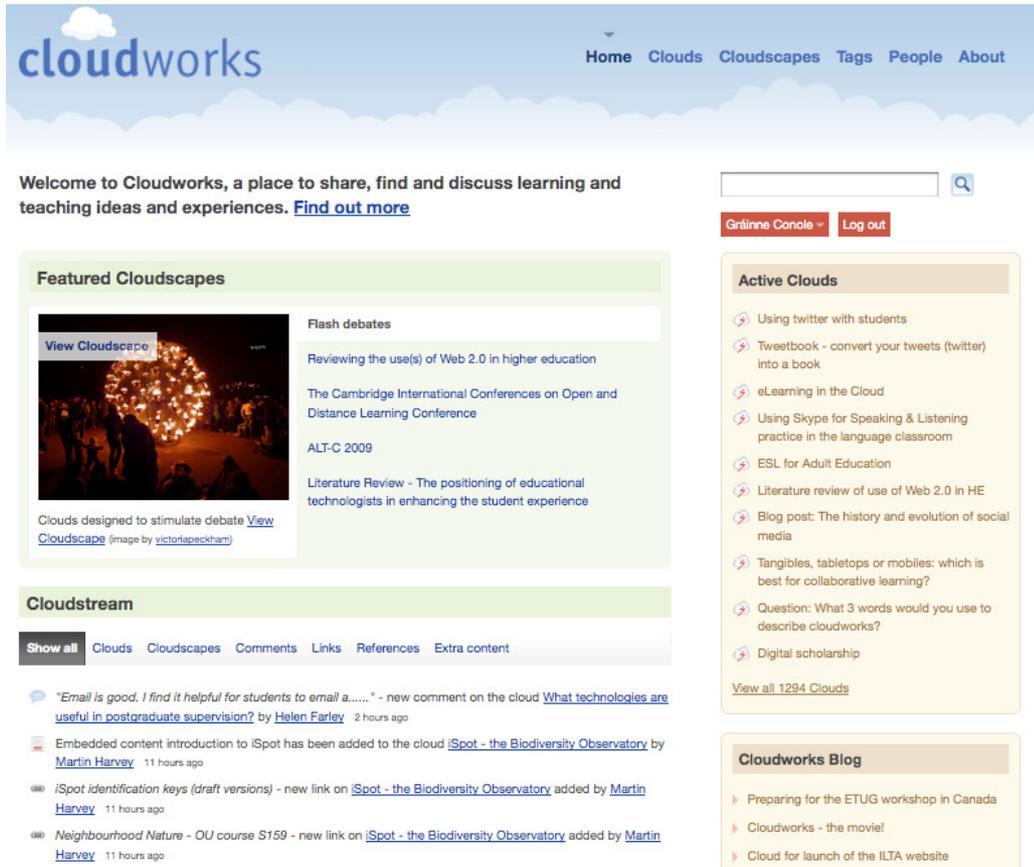
Figure 3: The Cloudworks homepage

Through our OLnet initiative we are exploring how the OULDI tools and resources can be used to promote better use and repurposing of Open Educational Resources (OER). CompendiumLD is being used to help make explicit the inherent designs associated with OER and Cloudworks is being used to support both real and virtual workshops and events for OER users and researchers, as a forum for them to share and exchange ideas. The conference presentation will provide an up to date summary of the OULDI and OLnet work and some illustrative examples of the tools and resources we have developed.

Conclusion

So what are some of the grand challenges that face education within this context of an ever richer technologically enhanced context? The following five I think are particularly important:

- The digital divide between the 'tech savvy' and 'non-tech savvy' is ever increasing. How do we deal with this? How can we bring the majority on board or should we even try?

- To what extend are we seeing evidence of Jenkin's twelve digital literacies? How can we help those in education develop these more? How might we facilitate the development of these skills in learners?

- How can we study these kinds of complex, fast evolving technological systems? What new methodologies might be needed?

- What theoretical insights should we be drawing on to make sense of the co-evolution of tools and users that we are increasingly seeing?

- Is there evidence of new pedagogies emerging?

Reflecting back on the initial list of digital paradoxes and associated educational dilemmas I content that we are poised on the brink of potential radical change in education. New technologies have much to offer, but harnessing them effectively is a true challenge. Through our Learning Design Initiative we are developing a suite of tools and resources to help teachers make effective design decisions about how to use new technologies to enhance the learner experience.

References

AJET 25(5) Conole and Culver (2009) - Cloudworks: Social networking for learning design. Available at: http://www.ascilite.org.au/ajet/ajet25/conole.html [Accessed November 24, 2009].

Ala-Mutka, K., 2009. *Learning in and from ICT-enabled Networks and Communities. Final report of the study on Innovations in New ICT-enabled Learning Communities*, Seville: IPTS.

Alexander, B., 2006. Web 2.0: A new wave of innovation for teaching and learning. *Learning*, 41(2), 32–44.

Anderson, P., 2007. What is web 2.0. *Ideas, technologies and implications for education*, 60.

Borgman, C. et al., 2009. *Fostering Learning in the Networked World: The Cyberlearning Opportunity and Challenge, US National Science Foundation (NSF) publication*, National Science Foundation (NSF). Available at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08204 [Accessed November 24, 2009].

Brown, J.S., 2000. Growing up digital: How the web changes work, education, and the ways people learn. *Change*, 10–20.

Brown, J.S., 2001. Learning in the digital age. In *The Internet and the University: Forum*. pp. 71–72.

Conole, G. & Culver, J., 2009. Cloudworks: Social networking for learning design.

Australasian Journal of Educational Technology, 25(5). Available at: http://www.ascilite.org.au/ajet/ajet25/conole.html [Accessed November 24, 2009].

Conole, G., McAndrew, P. & Dimitriadis, Y., 2010. The role of CSCL pedagogical patterns as mediating artefacts for repurposing Open Educational Resources'. In *in F. Pozzi and D. Persico (Eds), Techniques for Fostering Collaboration in Online Learning Communities: Theoretical and Practical*.

Conole, G. et al., 2008. A new methodology for learning design. Available at: http://oro.open.ac.uk/15269/ [Accessed November 24, 2009].

Conole, G., 2008. New Schemas for mapping pedagogies and technologies. *Ariadne magazine*, (56). Available at: http://www.ariadne.ac.uk/issue56/conole/ [Accessed November 24, 2009].

De Freitas, S. & Conole, G., 2010. Learners experiences: how pervasive and integrative tools influence expectations of study. In *Rethinking learning for the digital age: how learnes shape their own experiences*. R. Sharpe, H. Beetham and S. De Freitas (Eds.). London: Routledge.

Dimitriadis, Y. et al., 2009. New design approaches to repurposing Open Educational Resources for collaborative learning using mediating artefacts. In Auckland: ASCILITE.

Dron, J. & Anderson, T., 2007. Collectives, networks and groups in social software for e-Learning. In *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education Quebec. Retrieved Feb*. p. 2008.

Jenkins, H., 2009. *Confronting the challenges of participatory culture: Media education for the 21st century*, Mit Pr.

Johnson, L. et al., 2009. The 2009 Horizon Report: K. *Austin, Texas: The New Media Consortium. Cover photograph:"Chapped Lips" by Vox_Efx on Flickr (http://www. flickr. com/photos/vox_efx/3186014896/). Creative Commons*, 3.

Keen, A., 2007. *The cult of the amateur: how today's internet is killing our culture*, Currency.

Lankshear, C. & Knobel, M., 2006. Digital literacies: Policy, pedagogy and research considerations for education. *Nordic Journal of digital literacy*, 1(1), 226.

Levy, P., 1997. *Collective Intelligence* 1st ed., Basic Books.

Norris, C. et al., 2003. No Access, No Use, No Impact: Snapshot Surveys of Educational Technology in K-12. *Journal of Research on Technology in Education*, 36(1), 15–

28.

Norris, P., 2001. *Digital divide: Civic engagement, information poverty, and the Internet worldwide*, Cambridge Univ Pr.

OReilly, T., 2005. What is Web 2.0: Design patterns and business models for the next generation of software. Available at: http://oreilly.com/web2/archive/what-is-web-20.html.

Redecker, C., 2008. *Review of Learning 2.0 Practices*, Deliverable.

Sharpe, R. & Beetham, H., 2010. *Rethinking learning for the digital age: how learnes shape their own experiences*, London: Routledge.

Surowiecki, J., 2004. The Wisdom of the Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations: Doubleday.".

Warschauer, M., 2004. *Technology and social inclusion: Rethinking the digital divide*, the MIT Press.

Weinberger, D., 2007. *Everything is miscellaneous: The power of the new digital disorder*, Macmillan.

Wellman, B., 2001. Physical Place and Cyber Place: The Rise of Networked Individualism. *International Journal of Urban and Regional Research*, 25(2), 227-52.

Wenger, E., 1998. *Communities of Practice. Learning, Meaning and Identity. Learning in Doing: Social, Cognitive, and Computational Perspectives*, Cambridge University Press, Cambridge.