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What would learning in an open world look like? A vision for the future

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EdMedia 2010 keynote

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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>). 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, forthcoming).

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? The paper takes a particular position on the notion of "openness"; considering it from a broad perspective covering four major phases of the academic lifecycle: design, delivery, evaluation and research:

- *"Open design"*: what would a vision of a truly open approach to design mean; beyond open educational resources towards a more explicit representation and sharing of the whole design process? A scenario of the future might be as follows: "A newly formed course team brainstorm their initial ideas for the course, using visual representations which make conveying and sharing the essence of their ideas easy. They share this openingly with others, through appropriate web 2.0 technologies. They invite comments – from other subject experts, from past students, from potential students. They use the web 2.0 space to continue to develop and refine their ideas, incorporating peer critique and leaving a visible audit trail of their design decisions and development process."
- *"Open delivery"*: what would adopting a more open approach to delivery mean? What will be the impact of mixing institutional systems and freely available services? How can a more dialogic engagement for learning and

- teaching be fostered, starting as part of the design process described above but then carried forward during the delivery process?
- *“Open evaluation”*: How can we harness and utilise the data we collect about learners on our course? How can we build on the understanding developed as part of the learner experience research work and the associated new methodologies? What new methodologies and approaches might we develop to gain new insights into the impact of a changing technological context for learning?
 - *“Open research”*: What will be the impact of the Open Access Movement for learning? How can we capitalise on the rich research data, which is now being made available on a global scale?

Introduction

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 increasingly free and where services are shifting to the ‘cloud’, what are the implications for education? The paper takes a particular position on the notion of “openness”; considering it from a broad perspective covering four major phases of the academic lifecycle: ‘open design’, ‘open delivery’, ‘open evaluation’ and ‘open research’,

The paper will consider these four aspects of openness and will suggest some underlying principles to adopting an “open” approach, reflecting on perceived benefits and challenges. It will draw 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 and in particular articulation of the associated set of Open Educational Practices around the creation, use and management of OER.
- Changing patterns of user behaviour and discourse through a new kind of social networking space, Cloudworks.

Characteristics of new technologies

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).

The 2010 *Horizon Report* (NMC, 2010) identifies four trends as key drivers of technology adoption for the period 2010 through 2015 pointing to:

- The abundance of online resources and relationships inviting a rethink of the educators' role in sense-making, coaching and credentialing.
- An increased emphasis on, and expectation of, ubiquitous, just-in-time, augmented, personalised and informal learning.
- The increased use of cloud computing challenges existing institutional IT infrastructures and leading to notions of IT support becoming more decentralised.
- The work of students being seen as more collaborative in nature and therefore there is potential for more intra- and inter- institutional collaboration.

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, forthcoming).

Pea et al. (Cited in Borgeman et al. 2010) have identified a number of phases of technological development. The first was early communication mechanisms. The second was the emergence of symbolic representations such as language and mathematical notation. The third was the first wave of technological media – such as radio and television. The fourth was the emergence of networked and Internet-based technologies. And finally they argue that we are entering a fifth phase, which they term 'cyberinfrastructure' which refers to the distributed, global power of today's technologies. What is evident is that users and tools co-evolve overtime, as users become more confident at using the tools and begin to appropriate them more and more into their daily practice. Think back for example to early use of email and compare that with today's use. Many users use email not just for sending and responding to messages, but as a form of online filing.

As a way of exemplifying the potential impact of new technologies I am going to concentrate on the so called 'Web 2.0' technologies (O'Reilly, 2005) that have emerged in recent years. However the central argument I want to make, i.e. that new technologies have a set of unique affordances that have the potential to impact on

and change practice could equally be applied to other new technologies – such as mobile devices, smart technologies virtual worlds or gaming technologies.

We have recently completed an extensive review of Web 2.0 technologies and their use in Higher Education (Conole and Alevizou, 2010). The term Web 2.0 indicates a shift from the Web as a static medium, to the Web as a dynamic, interactive and participatory medium. Web 2.0 technologies enable users to easily share images, videos and documents, provides mechanisms for new forms of content production, communication and collaboration and offers new forms of interaction through rich immersive virtual worlds. Key characteristics are evident (See Conole, 2010a for a more detailed discussion), such as:

- User participation – Web 2.0 technologies means that anyone can easily publish and share information.
- Openness and sharing – the power of Web 2.0 technologies comes through adopting open approaches, connecting at scale and sharing across different communities. It encourages serendipitous encounters and transfer of knowledge across traditional boundaries.
- Multi-modal and distributed content – content and information can be distributed and representing in a multitude of ways.
- Peer critiquing – many Web 2.0 technologies enable commenting and indeed peer critiquing has become a standard feature of the blogosphere.
- 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.).
- Community formation - the connectivity and rich communicative channels now available on the web provide an environment for supporting a rich diversity of digital communities.
- Digital personas - each of us has to define our own digital identity and how we present ourselves across these spaces.

We identified ten types of Web 2.0 technologies:

- Media sharing. Creating and exchanging media with peers or wider audiences.
- Media manipulation and data/web mash ups. Using web-accessible tools to design and edit digital media files and combining data from multiple sources to create a new application, tool or service.
- Instant messaging, chat and conversational arenas. One-to-one or one-to-many conversations between Internet users.
- Online games and virtual worlds. Rule-governed games or themed environments that invite live interaction with other Internet users.
- Social networking. Websites that structure social interaction between members who form subgroups of 'friends'.

- Blogging. An Internet-based journal or diary in which a user can post text and digital material while others can comment.
- Social bookmarking. Users submit their bookmarked web pages to a central site where they can be tagged and found by other users.
- Recommender systems. Websites that aggregate and tag user preferences for items in some domain and thereby make novel recommendations.
- Wikis and collaborative editing tools. Web-based services that allow users unrestricted access to create, edit and link pages.
- Syndication. Users can ‘subscribe’ to RSS feed enabled websites so that they are automatically notified of any changes or updates in content via an aggregator.

As the table below shows, there appears to be a good match between the characteristics of Web 2.0 technologies and what is considered ‘good pedagogy’.

Table 1: Mapping Web 2.0 technologies to pedagogical approaches

Pedagogical approaches	Web 2.0 technologies
Personalised and contextualised learning	Ability to personalise your digital environment, use of RSS feeds and mash ups
Situated, experiential, problem-based learning, role play	Location aware devices, virtual worlds, online games
Inquiry or resource based learning	Google, media sharing repositories, tools to support user generated content
Reflective learning	Blogs and e-portfolios
Collaborative learning, project-based learning, dialogic learning, vicarious learning	Wikis, social networking tools
Research-based learning	Distributed collection of data, access to distributed data sets, new ways of organising and representing multiple data sets, new tools for organising and interrogating data
Creativity	New forms of co-creation and publication, new means of presenting ideas, use of rich multi-media

However, Web 2.0 technologies also give rise to a set of associated paradoxes and hence dilemmas for educators. So for each listed characteristic or potential benefit of new technologies there is an associated effect. For example, the open, distributed nature of the Internet means that we now have access to vast quantities of information at the click of a button. But this has given rise to some arguing that it means we no longer need individual expertise. In an educational context, where the teacher is traditional the ‘expert’/keeper of knowledge, this therefore has an impact on the teacher role within this new context. Conole (2010) provides more details and discussions about each of these factors.

Table 2: The paradoxes created by Web 2.0 technologies

Cause	Effect	Educational dilemmas
Expansive knowledge	Death of expertise/everyone	Challenges the traditional

domain	an expert	role of the teacher
No hierarchy or control, content distributed in different ways	Multiple (co-) locations/loss of content integrity	Need to rethink the design process and provide guided learning pathways for learners
Increasingly complex digital landscape	Beyond 'digital space'/New metaphors needed	There is a widening skills gap between the 'tech savvy' and those without the necessary digital literacy skills
Power of the collective, collective intelligence	Social collective/digital individualism	Potential for new forms of social learning and interaction
Free content & tools, open APIs and mash ups	Issues re: ownership, value, business models	Little evidence of uptake of free tools or use/reuse of free resources

Case studies in openness

Having provided an overview of the digital landscape and some of its characteristics I now want to return to the question posed at the beginning of the paper. Namely what would adopting more 'open' approaches mean? I will consider this by describing some of the projects we are currently involved with that are exploring these issues.

Open Design

The "*Open design*" strand of our research considers the question: what would a vision of a truly open approach to design mean; beyond open educational resources towards a more explicit representation and sharing of the whole design process? A scenario of the future might be as follows: "A newly formed course team brainstorm their initial ideas for the course, using visual representations which make conveying and sharing the essence of their ideas easy. They share this opening with others, through appropriate web 2.0 technologies. They invite comments – from other subject experts, from past students, from potential students. They use the web 2.0 space to continue to develop and refine their ideas, incorporating peer critique and leaving a visible audit trail of their design decisions and development process." We have been exploring this in particular through our work on Learning Design, through two projects – the OU Learning Design Initiative and Design Practice.

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. Conole (2009) provides a reflection on the origins of OULDI and the benefits of adopting this approach. The aim is to provide a design-based approach to the creation and support of learning and teaching, and to encourage a shift away from the traditional implicit, belief-based approaches to design-based, explicit approaches. This will encourage sharing and reflection. The tools and resources are designed to help guide decision making. 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. Conceptualisation – the development of a range of conceptual tools to help guide the design decision making process and to provide a shared language to enable comparisons to be made between different designs.
2. Visualisation – use of a range of tools to help visualise and represent designs.
3. Collaboration – mechanisms to encourage the sharing and discussing of learning and teaching ideas.

In terms of conceptualisation we have developed a range of tools to help guide the design process. One of the key aspirations is to enable teachers to shift away from a focus on content and subject matter to thinking more holistically and laterally about the design process. The conceptual tools are also designed to promoting thinking on adopting different pedagogical approaches and using technologies effectively. To illustrate this five conceptual tools are described here:

- The Course View
- The Course Dimensions view
- The Pedagogy Profile
- The Learning Outcomes view
- The task swimlane view

The course view map provides an overview of a course at a glance and enables teachers to think about the design of the course from four meta aspects; namely ‘Guidance and Support’, ‘Content and Activities’, ‘Communication and Collaboration’ and ‘Reflection and Demonstration’.

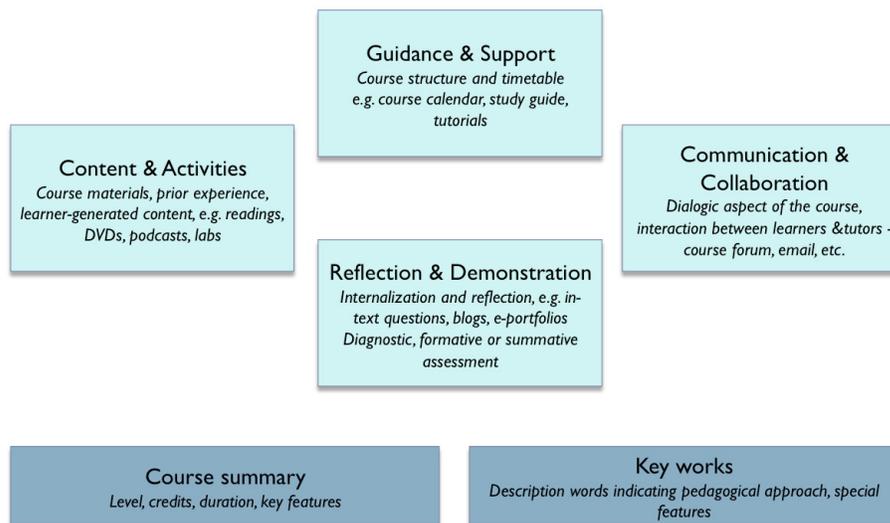


Figure 1: The Course view

The second is a refinement of the course map. **The Course dimensions views** gives a better indication of the nature of the course and how it is supported. For example, it indicates to what extent the course is online, how much it is tutor-guided and the amount of collaborative or activity-based activities are included.

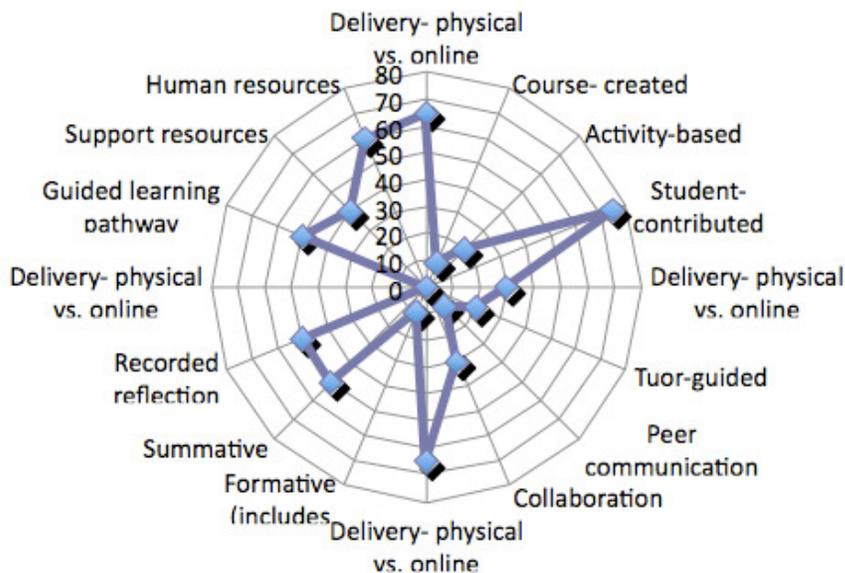


Figure 2: The Course Dimensions view

The third view, the Pedagogy Profile, looks at the balance of the types of student activities (See Conole, 2008 for the full learning activity taxonomy this is based on). These are:

- **Assimilative** (attending and understanding content)
- **Information handling** (gathering and classifying resources or manipulating data)
- **Adaptive** (use of modelling or simulation software)
- **Communicative** (dialogic activities, e.g. pair dialogues or group-based discussions)
- **Productive** (construction of an artefact such as a written essay, new chemical compound or a sculpture)
- **Experiential** (practising skills in a particular context or undertaking an investigation).
- In addition the tool looks at the spread of **assessment** across the course

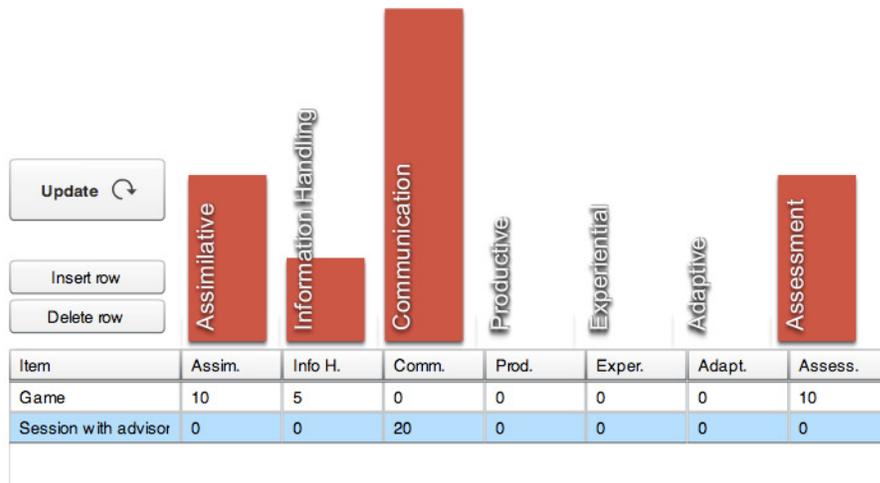


Figure 3: The Pedagogy Profile

The Learning Outcomes view enables the teacher to judge to what extent there is constructive alignment (Biggs, 1999) with the course, i.e. it looks at how the learning outcomes map to the student activities and to the assessment tasks.

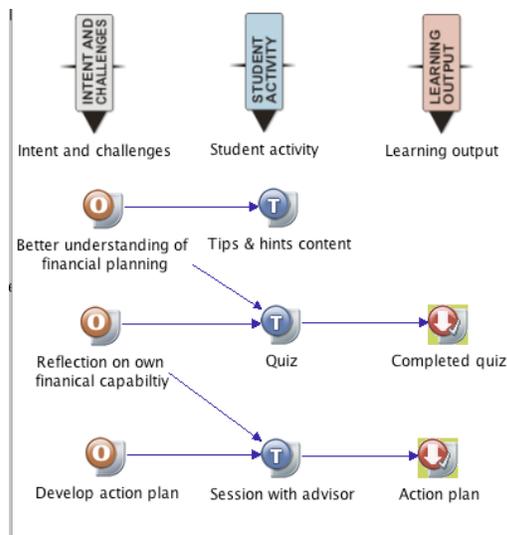


Figure 4: The Learning Outcomes view

Finally, the task swimlane view enables a teacher to map out the details on an individual learning activity; indicating what the student is doing when and what tools and resources they are using.

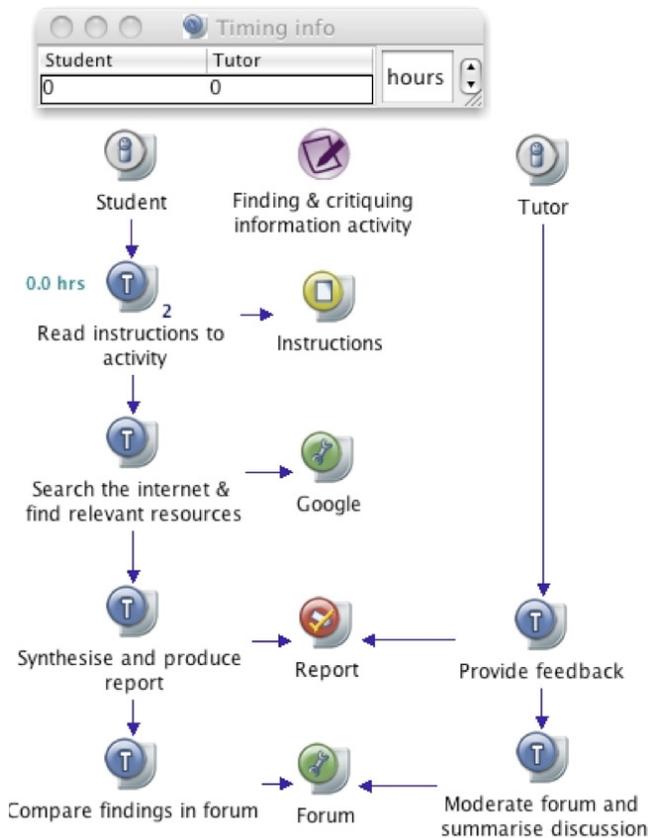


Figure 5: The Task swimlane view

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. In addition we have been using an Excel spreadsheet as a means of capturing and representing these conceptual views. However the power of the conceptual tools is that they work equally well as discussion points or as simple pen and paper exercises. In essence they are Mediating Artefacts to guide thinking and foster dialogue.

We have also developed a social networking site (<http://cloudworks.ac.uk>) for sharing and discussing learning and teaching ideas. Cloudworks is a powerful new form of social networking tool: particularly suited for sharing, debating and co-creation of idea (Conole and Culver, 2010). The site combines a mix of Web 2.0 functionality and enables new forms of communication and collaboration and cross-boundary interactions between different communities of users. The core object in the site is a 'cloud', which can be aggregated into community spaces called 'cloudscapes'. In the Cloudworks site a cloud can be anything to do with learning and teaching (a description of a learning and teaching practice, an outline about a particular tool or resource, a discussion point).

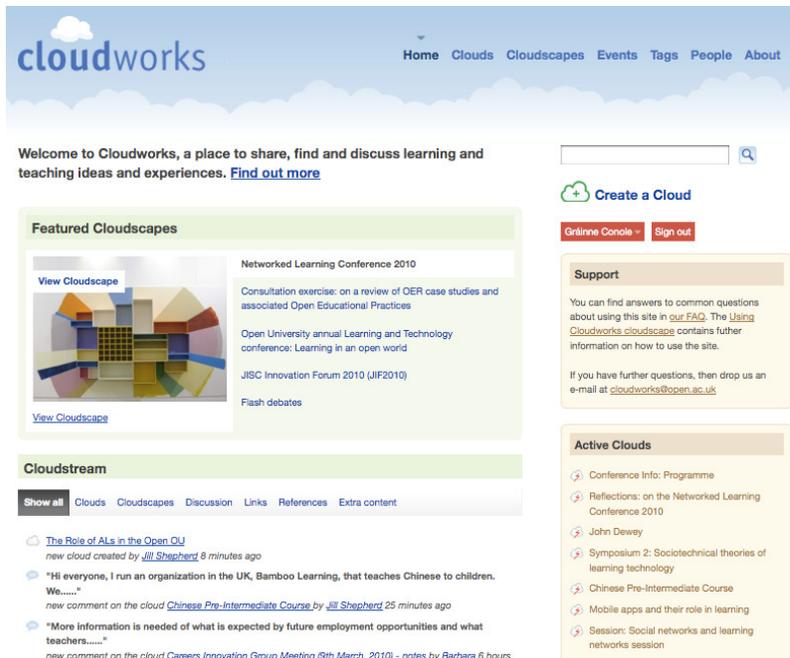


Figure 6: The Cloudworks homepage

Clouds combine a number of features of other Web 2.0 technologies. Firstly, they are like collective blogs, i.e. additional material can be added to the cloud, which appears as series of sequential entries under the first contribution. Secondly, they are like discussion forums, there is a column under the main cloud where users can post comments. Thirdly, they are like social bookmarking sites, i.e. links and academic references can be added. Finally they have a range of other functionalities common on Web 2.0 sites, such as ‘tagging’, ‘favouriting’, RSS feeds, the concept of following, and activity streams. Collectively these features provide a range of routes through the site and enable users to collectively improve clouds in a number of ways. The homepage of the site, in addition to providing standard navigation routes (such as browsing of clouds, cloudscapes and people and searching), lists currently active Clouds and five featured Cloudscapes. All recent activities on the site (newly created clouds and cloudscapes, comments, additions, etc) are listing in a site cloudstream. Although the first use of the tool has been to support educators, it can be used to support any communities where sharing and discussing of issues and ideas is valuable. The site was launched in July 2009 and now has had more than 60,000 unique hits from 165 countries. One of the most power features of the site is that it facilitates boundary crossings between communities, enabling different stakeholders (policy makers, researchers, teachers, learners, etc.) to interact in unanticipated ways.

One of the key distinctive features of cloudworks and its advantage over other social networking sites is the way it enables and facilitates not only connections within communities but between them. It enables crossing of boundaries between communities. There is something distinctive about the general layout/functionality of clouds – which in essence are a kind of mix of collective blog, discussion forum,

social bookmarking, addition of links and embeds. This mixed functionality seems to be promoting new and interesting forms of social interaction. It has a genuine global reach with different kinds of stakeholders. For example in the current site researchers are interacting with teachers, policy makers, learners, etc. A core principle of the site is that it is totally open, anyone can see anything in the site. This means it has genuine global reach and ensures that it harnesses the best of web 2.0 practices and affordances. Serendipity has been built into the site in a variety of ways, this enables individual's to cross community boundaries and make unexpected connections. The site offers powerful mechanisms for supporting social networks in a range of ways and at different levels.

The site already has a rich set of web 2.0 functionality; such as collective improvement of clouds via additional content, tagging, links and academic references, embedding of different types of content (such as blogs, video clips, voxpops etc), sequential discussion space, activity streams called cloudstreams (for the whole site, individual cloudscapes, and individual users), functionality to 'follow' people – their activities on the site then appear in a personalised cloudstream, voting and recommender tools, a personalised bookmarking feature 'My Favourites', and automatic embedding of Twitter streams on cloudscapes. There are multiple routes through and ways of connecting, so that individuals can personalise the use of the site to their own preferred ways of working. We now have a dynamic and self-sustaining community, with the emergence of individual champions and local colonisation of sections of the site. We have a lot of experience now as to how to foster and build this form of self-sustainability. One of the rich features of Cloudworks is the way in which there is a mixture of different types of activities occurring in the same space – events, reading groups, flash debates, online consultations, online research reviews.

An open source version of the site will be available this Summer, which means it can be customised and the benefits of being part of the wider cloudworks development community. We have a proof of concept working in terms of embedding Google gadgets, two have been developed so far: People recommender and a Cloud recommender. An Applications Profile Interface is currently being developed, which will mean that data can be passed between the Cloudworks site and other social network sites.

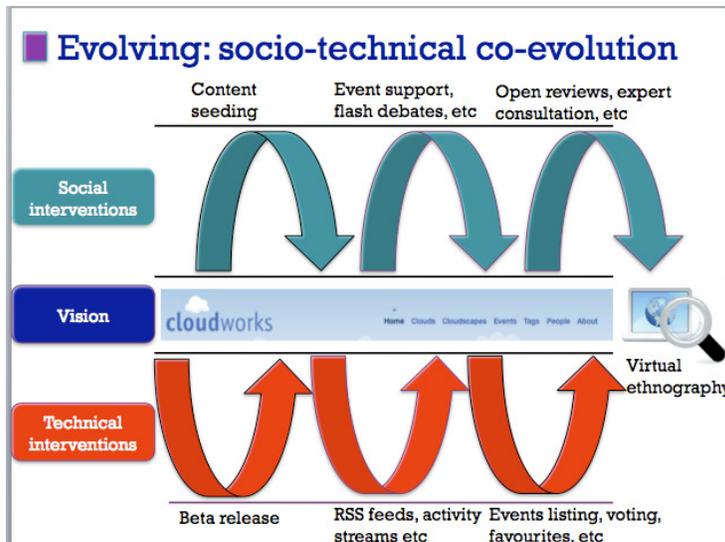


Figure 7: The approach to development and evaluation of Cloudworks

The site has been developed through a process of socio-technical co-evolution. In essence two parallel strands of intervention are ongoing – one technical and one social. Along side this we have put in place a reach virtual ethnographic approach to evaluation of the use of the site and identification of emerging user behaviours.

Use and development of the site is being monitored in a number of ways (Conole and Culver, 2010). Data collection has included web stats and Google analytics, analysis of site activities and discussions, collation of references to Cloudworks elsewhere (such as in the blogosphere and Twitter), and use and evaluation of the site at numerous workshops and conferences. A Cloudworks questionnaire is also available online. This multi-faceted evaluation strategy has gathered data that has then been used to inform the next design phase, thus ensuring an alignment between technical developments and user needs. The data, and particularly the user feedback, has given us a rich understanding of how the site has evolved and how it is being used. At key points we have commissioned an expert review of the site and have to date undergone three site redesigns, commissioning an expert external designer.

A range of standard statistics is gathered routinely, along with an administrative Cloudstream, which in addition to listing activities on the site chronologically (in the way that the main site Cloudstream does), it also documents when new users register with the site (the site is open, but users need to register if they wish to post anything or create Clouds or Cloudscapes) and when users choose to ‘follow’ others. We will also be capturing on a 6 monthly basis: the number of users who have posted clouds, the number of users who have posted comments, and the number of unique users posting a cloud or comment in last 60 days. To measure sustainability and longevity of contribution, we are also capturing: the number of registered users who have posted a cloud or comment at least one month after registration (this way we don’t count the initial use of the site for say a conference or workshop) and the number of registered users who have posted a cloud or comment at least a year after registration.

Table 3: Statistics

Aspect	Everyone	Team	Non-team
Cloudscapes	289	100	189
Clouds	2408	1214	1194
Comments	3414	1012	2402
Links	3268	1678	1590

The site is also linked to Google analytics, which shows the growth of the site since its launch in July 2009. As is evident with other Web 2.0 sites, the number of active contributors to the site (currently 2376 registered) is less than the number of unique visitors (63, 118 visits from 165 countries). The top five countries are UK, United States, Canada, Australia and Italy).

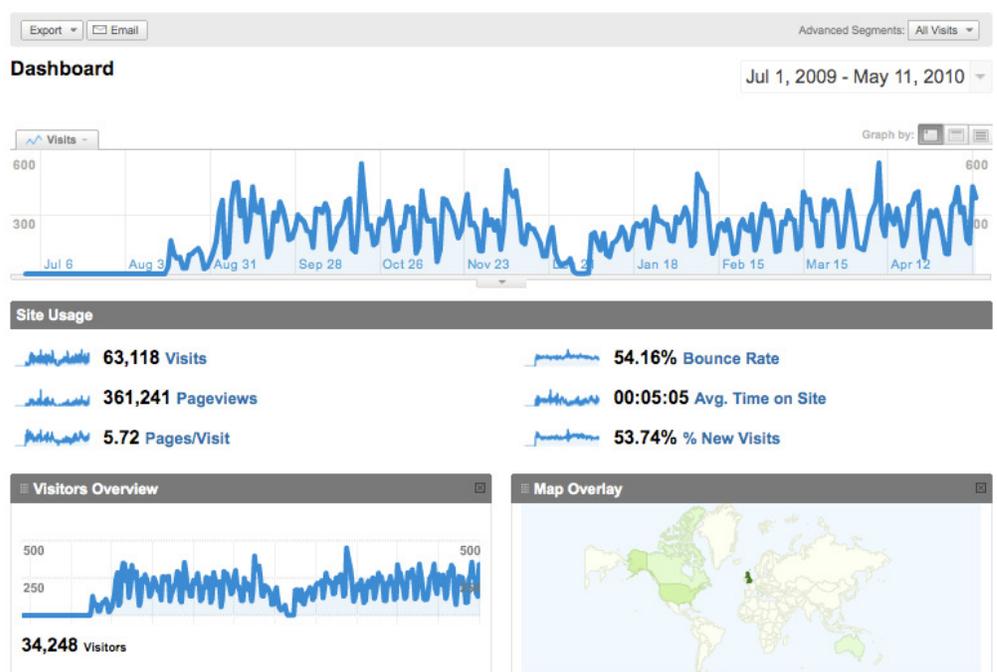


Figure 8: Google Analytics

We have also undertaken a number of qualitative studies of the use of the site; including explorations around how the site is being used by a particular community or theme and through a series of interviews with users. Alevizou et al. (2010) describe the range of theoretical frameworks that are being used to guide the design and analysis of the site. Galley has developed a Community of Indicators framework as a mechanism of analysis interactions on the site and has used this as the basis for undertaking a series of case study evaluations of the site (Galley et al, 2010).

The EU-funded Design-Practice project is applying the tools and resources created as part of OULDI to two different contexts: teachers in Greece and Cyprus. We have now mapped out a detailed Learning Design Taxonomy (Conole, 2010b), mapping all the tools, resources and activities we have produced to date. We have identified a

number of guided pathways through this space, depending on users interests and levels of expertise, these include:

- An LD-lite workshop (for example ‘Using technology to support learning and teaching’) – where a selection of tools, resources and activities are used but there is no explicit mention of Learning Design. We are planning to run something like this with our Design-Practice colleagues.
- Design challenges – using a range of the tools, resources and activities to support teams as they work through creating a course in a day. We have run a number of these both within the OU and externally with our partners on the JISC OULDI project.
- A masters level unit including materials on the theoretical underpinnings for the Learning Design work
- A free format – where the user choose what they want to use and in what order.

Open Delivery

The question associated with the “*Open delivery*” strand of work is: what would adopting a more open approach to delivery mean? What will be the impact of mixing institutional systems and freely available services? How can a more dialogic engagement for learning and teaching be fostered, starting as part of the design process described above but then carried forward during the delivery process?

Core to this work is our research on Open Educational Resources (OER). This has included the development of a repository of free educational materials from the OU, OpenLearn (<http://openlearn.ac.uk>) and a global support network for users and researchers of OER, Olnet (<http://olnet.org>). The OPAL project is exploring the notion of Open Educational Practices (OEP), which are defined by the set of practices around the creation, use and management of OER. The hypothesis is that better articulation and use of the notion of OEP will lead to improvements in both the quality and innovation of OER. Recently, as part of the OPAL project we have gathered over 60 case studies of OER initiatives and from this abstracted a set of OEP dimensions. At the time of writing there is a major online consultation activity around this work (<http://cloudworks.ac.uk/cloudscape/view/2105>)

We think this work is important because despite the considerable momentum generated by the OER movement, teachers or learners are not extensively used OER. This is in part because taking someone else’s OER, understanding it, deconstructing it and then recontextualising it is a complex cognitive process (Conole, McAndrew and Dimitridis, 2010). Add to this potential technical and organisational barriers and perhaps the lack of uptake is not so surprising. Would shifting away from a focus on the resources to the associated surrounding practices help? i.e. if we can better understand how teachers and learners are creating and using OER perhaps we can get a better idea of what the associated barriers and issues might be and hence put in place mechanisms to address these. The eight OEP dimensions we have identified are:

- Strategies and policies: Opening institutional, national and regional policies to promote the use of OER to result into better and improve quality.
- Quality Assurance models: Open forms of assessment, open quality assurance frameworks.
- Partnership models: Sharing experiences and content in order to learn and improve institutional practices.
- Tools and tool practices: Employing tools, repositories and building competencies to easily integrate OER in practice.
- Innovations: What innovations are evident with OER?
- Skills development and support: Opening educational practices demand for certain pedagogical and learning skills and competencies.
- Business models/sustainability strategies: Are open educational practices economic viable - and if so: how?
- Barriers and success factors: What can we learn from past initiatives and cases throughout the world?

Open Research

The “*Open research*” strand focuses on the question: What will be the impact of the Open Access Movement for learning? How can we capitalise on the rich research data, which is now being made available on a global scale?

Work on this area is still relatively new, but includes the iSpot initiative (<http://ispot.org.uk/>), which is an online site where users can share and discuss nature findings. The site is an excellent example of collective intelligence and harnessing the power of the masses, as it enables the capture of sighting on changing’s in patterns of nature that can then feed into ongoing research activities. Once registered, a user can add an observation to the website, suggest an identification, or see if anyone else can identify the species. Users can also contribute to existing observations and there is a forum to stimulate debate. Despite the overall look and feel of the site being focussed on ‘fun’ it feeds directly into real research activities and also enables users to transfer their informal learning/interests into more formal educational offerings if they wish.

Open Evaluation

The “*Open evaluation*” strand focuses on: How can we harness and utilise the data on our projects and working practices? How can we promote and support more interdisciplinary approaches to research? How can we adopt more scholarly and reflective practices? What new methodologies and approaches might we develop to gain new insights into the impact of a changing technological context for learning?

As part of the X-Delia project we have developed a Design and Evaluation framework (Clough et al., 2010). The framework is designed to provide an ongoing, critical reflective lens on project activities and aims to support interdisciplinary approaches to research.

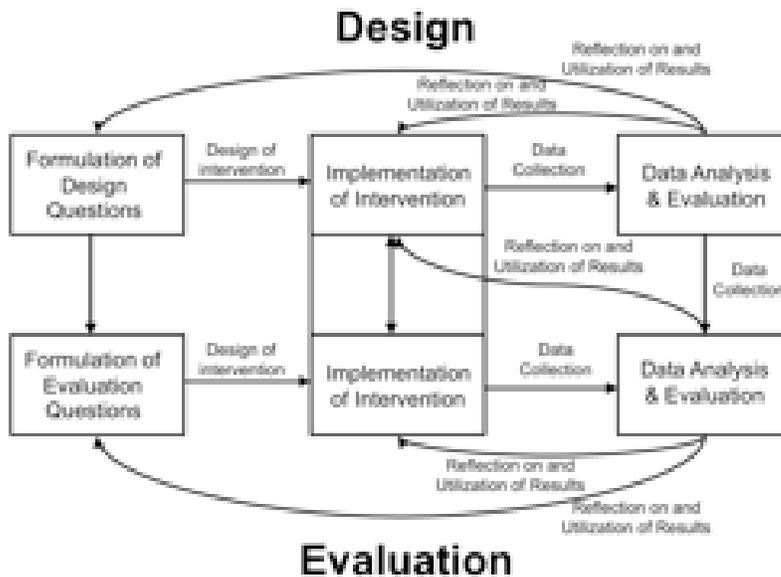


Figure 9: The Design and Evaluation Framework

The D&E Framework consists of two layers – a Design layer and an Evaluation layer. The design layer represents the research questions, interventions and analysis from the perspective of the research activity, for example, a workshop to brainstorm methods preliminary research interventions. The evaluation layer represents these same aspects from the evaluative perspective. An evaluation layer intervention might include video of the workshop activities, interviews with the participations, pre and post questionnaires and debriefing sessions. Both design and evaluation activities formulate their research questions in the left most box, with the evaluation research questions guided, to some extent, by those of the design layer. The intervention is then implemented in the centre box. Data is collected and analysed and the analysis then feeds back into the interventions and research questions. The D&E Framework represents an iterative process, in which the evaluation findings feed back into the project over time.

Theory and methodology

Overall the approach we are adopting is social-cultural in nature, drawing on a range of theoretical insights to both guide our development activities and structure our analysis. In particular, Cultural Historical Activity Theory (CHAT) (see the following edited collections (Engeström et al. 1999) (Cole et al. 1997)(Daniels et al. 2007) has been used extensively in Networked Learning particularly as a descriptive lens. A key idea in CHAT is the notion of *mediation by artifacts*, which are broadly defined ‘to include instruments, signs, language, and machines’ (Nardi, 1995). In my own work I have drawn on this extensively in terms of exploration of the range of mediating artefacts that can be used to support the learning design process (Conole, 2008). Engestrom’s so-called ‘triangle’ representation (Engestrom

2001) has been used extensively to describe particular instances of networked learning interventions, as it helps consider a focus on subject-object with associated outcome supported through mediating tools in the context of a wider community context and associated rules and divisions of labour (Joyes 2008) (Waycott et al. 2005).

Conole (2010c) provides a more detailed discussion on theory and methodology in Technology Enhanced Learning (TEL) research and Conole et al., (2010) describe a series of interviews with key TEL researchers focusing in particular on their perspectives on the nature of interdisciplinarity in the field.

Conclusion

The paper has attempted to give a broadbrush overview of a new research programme, Learning in an Open World. It has described the vision behind the programme and provided examples of some of the research sub-themes. Findings from the research to date are promising, indicating that this is a fruitful area for development. However it is clear that there are also a number of challenges associated with this work. More needs to be done to consolidate the theoretical basis for the work and to identify which methodological approaches are going to be most fruitful.

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