Summary Report for Cloudworks Development Phases-one and two

"We plan to develop a website to foster the growth of an evolving set of user-contributed learning design tools, resources and examples of learning activities. We aim for the site to be used by Open University course teams who want to collaborate on aspects of the design of their courses as well as by people outside. We want to promote the community-based aspect of the site both as a place for people to showcase their designs and related work, and also as a place to obtain inspiration and share advice when creating new designs. We believe that different people will want to use a variety of different tools for designing learning activities in different contexts and at different stages of the design process, and therefore that the site should not be tied to any specific tool but allow people a choice of formats for design (such as CompendiumLD maps, LAMS sequences and text-based formats)"

Cloudworks mission statement February 2008

Report Contents

Introduction

The purpose of this report is to provide an interim summary of the development of the Cloudworks site (www.cloudworks.ac.uk) across development phases-one (February 2008 to June 2009) and two (July 2009 to August 2010), including an overview of the theoretical frameworks considered and the decisions made. We will also report on findings from initial evaluations and investigations, and provide links to a series of reports and papers written by the team during this time. These are listed in Appendix 1 and available on the project website http://www.open.ac.uk/blogs/OULDI/?page_id=33.

The development of Cloudworks is part of a broader set of research work – the JISC funded Open University Learning Design Initiative (OULDI). The project aim is to develop and implement a methodology for learning design composed of tools, practice and other innovation that both builds upon, and contributes to, existing academic and practioner research. Tools produced include *CompendiumLD* (http://compendiumld.open.ac.uk), which is a visualisation tool for design, and the site reported here, *Cloudworks* (http://cloudworks.ac.uk), a social networking site for sharing and discussing learning and teaching ideas and designs. The OULDI-JISC work is underpinned by an ongoing programme of empirical work, aimed at getting a richer understanding of educational design processes.

We are interested in providing support for the entire design process; from gathering and sketching out initial ideas, through consolidating, producing and using designs, to sharing, reuse and community engagement. These are complex and challenging processes that involve a range of stakeholders with different interests, and issues, and representations will be different depending on whether design occurs at the level of individual activity, course or curriculum. Our vision is of a learning design methodology and suite of practical tools and resources - that include Cloudworks - and which bridge the gap between good pedagogic practice and effective use of new technologies.

1. Cloudworks overview

Cloudworks is a social networking site that uses social media to provide a space for education professionals to share, discuss and find learning and teaching ideas. The site combines practices such as sociality, sharing and co-creation common in social networking platforms, wikis and social media, with different forms of dialogue, debate and peer commenting. The site allows for a range of social functions, such as 'tagging', 'favouriting', RSS feeds, 'follow and be followed', and activity streams for different aspects of the site. Collectively these features provide a range of routes through the site, and enable users to collaboratively improve pages in a number of ways. Unlike many professional social networking spaces, the site is entirely open and is *object-*, rather than *person-,* centred. We believe that these factors help to enable transient but repeated and interest-focused collaborative activity within, across and between groups from more established education

and research Communities of Practice (see Galley et al, 2010a, Alevizou et al., 2010a and Conole et al 2010b).

The core objects in the site are 'Clouds' which provide a space for anything to do with learning and teaching. Clouds can be grouped into clusters of interest called Cloudscapes. These might be around a particular event such as a workshop or conference, or a Community of Interest such as a course team or student cohort, or around a topic such as a research theme or project. The functionality of a Cloud is extensive: Clouds can act like blogs, in that material can be added to appear as series of sequential entries; users can post comments as they would in a discussion forum, and Clouds can also enable aggregation of resources such as links, videos, slideshows, images, documents and academic references. We are starting to see patterns of activity which suggest that the site's ability to provide a link between other channels of web-communication (particularly Twitter and blogs) has pushed the dimensions of serendipity and association seen in other social sites, to create opportunities for self-oriented and collective aspects of open, cross-boundary engagement. As functionality has been developed and added to complement blended communicative practices in physical events (such as workshops, seminars and conferences), more examples of activity have emerged pointing to self-actualisation through archiving of personal reflection (Alevizou et al, forthcoming).

We have used a mix of theoretical perspectives for both the design of the site, and the analysis of the way in which it is being used. Conole and Culver (2009a and 2009b) describe the theoretical perspectives which informed the initial design of the site and Alevizou et al. (2010b) describe recent work drawing on broader theoretical frameworks in order to understand emerging patterns of use and behaviour. In particular Engeström's notion of social objects (Engeström, 2005) has formed the basis for the design of Cloudworks around 'Clouds' as social objects. Similarly Bouman et al.'s framework for sociality (Bouman, et al., 2007) has provided a useful framework for the design and development of the site, based around the construction of environments that both mimic existing practices, but which also provide opportunities to expand and shift to new patterns of behaviour. We have 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. Galley (forthcoming) has developed a Community of Indicators framework as a mechanism of analysing interactions on the site, and we have begun to explore how this might be used for analysing evaluation case studies (Alevizou et al., forthcoming).

Applying a broad range of theoretical perspectives is proving necessary because of the unique structure and functionality of Cloudworks. A core principle of the site is that it is totally open; anyone can see anything in the site. Serendipity has been built into the site in a variety of ways; these enable individuals 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. We are beginning to see that the affordances of Clouds arising from their general layout and functionality (i.e. the initial Cloud entry plus collective additional entries, embedded content, links and references, coupled with a social space for discussion) seem to promote new and interesting forms of social interaction. For example, one of the distinctive features of Cloudworks (in comparison to other social networking sites) is the way in which it enables and facilitates not only connections within existing communities but between them, enabling different stakeholders (policy makers, researchers, teachers, learners, etc.) to interact professionally in this social space.

The table below, taken from Alevizou et al. (forthcoming), summarises the emerging patterns of activity we have seen, and points to new types of use as the site evolved over time.

Core types of activity	Evolutionary trajectories in use/activity
Events (supported and serendipitous) • workshops • conferences • virtual seminars/conventions Audience/interest group targeted Cloudscapes for specific research idea/project or teaching topics & pedagogies Topic/Question oriented sociality	• increased number of requests to the Cloudworks team for setting up pre-designed spaces for events (from Summer 2009) • a richer record of events in relation to a) embedding chapters and presentations; b) audience responses and dialogic interchanges (back-channels) • increased number of users setting up ad-hoc spaces for back-channel activities (from Autumn 2009) • increased numbers of users outside of the team contributing to the site (71% of Cloudscapes, 79.2% of Clouds and 89.7% of comments in October 2010 were created by users other than the Cloudworks team) • aggregation of topics with more followers; increased personalisation and projected topic-oriented sociality (from Autumn 2009) • essentially dialogic in nature – Clouds or Cloudscapes which raise questions and issues, and provide a shared space for users to discuss. • a new pattern of activity sparking 'flash debates' is evident from Summer 2009. • provocative questions and polling style activities – often transferred from the blogs and twitter – generate rich and immediate discussions • aggregation - a record and focal point of discussions in a public space
'Open Research Reviews' Closed community activity in open spaces	• researchers start posing their research questions and aggregating relevant resources, but also inviting others to contribute and discuss (Autumn, 2009) • examples of emerging use of the open Cloudworks space for typically closed community activity such as agreeing agenda items and schedules for meetings, development of community targets etc. (Summer 2010)

Table 1: Core patterns of activity and evolutionary trajectories (from Alevizou et al, forthcoming)

2. Technical development

In terms of developing the site, we have adopted an agile development approach (Cockburn, 2001). We have gathered feedback on the evolving site through a range of mechanisms and events, including web statistics, observations, discussions and surveys. This ongoing and multi-faceted evaluation strategy is further described in section 3 below and has enabled the Cloudworks team to make informed design decisions at each development phase, thus

ensuring an alignment between technical developments and user needs – we have called this approach 'Socio-technical co-evolution' (Conole, 2010b).

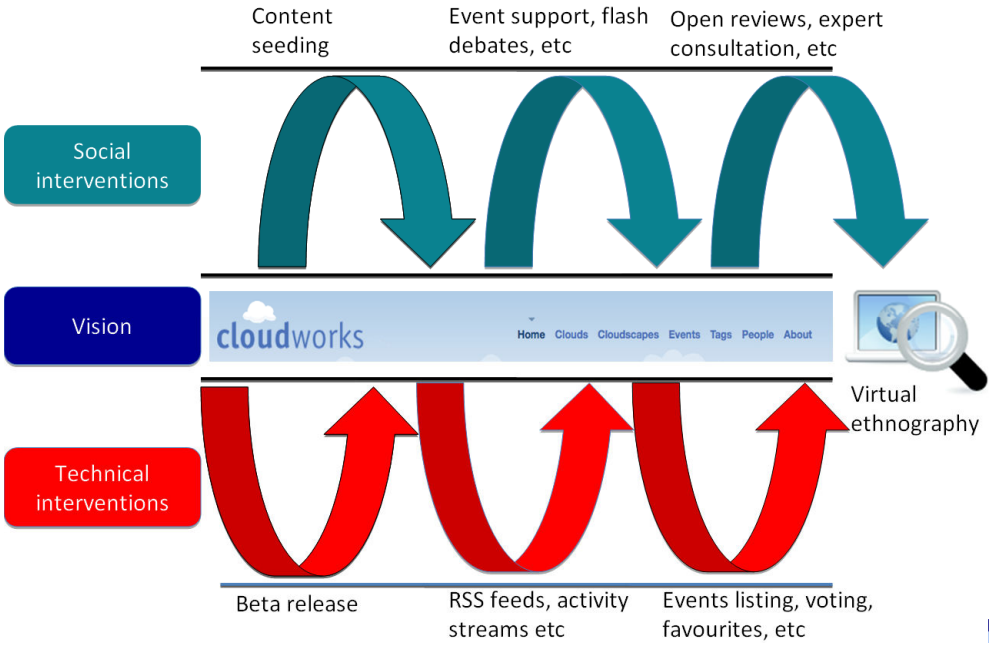


Figure 1 Socio-technical co-evolution process (from Conole, 2010b, p.13)

The data, and particularly user feedback, has given us a rich understanding of how the site has evolved and how it is being used.

2.1 Phase-one

Phase-one development of the site began in February 2008 with a visioning workshop, and a first release was available by June 2008, with a second major release in December 2008.

Figure 2 Brainstorming initial ideas for Cloudworks

Druppel, an open source content management platform (http://drupal.org/), was chosen as the basis for Cloudworks, as we wanted to rapidly prototype and test the site. This provided us with a proof of concept, and a mechanism for testing out its structure and functionality. Development through this phase is reported in detail in Conole and Culver (2009a and 2009b).

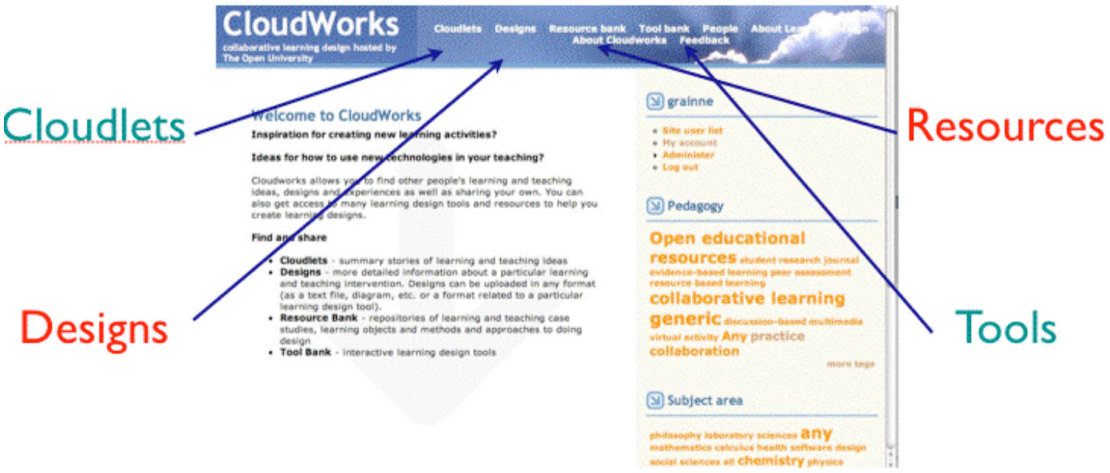


Figure 3 The initial prototype of Cloudworks built using Druppel

In the early stages of development, the focus was on adding content and encouraging registration and use. The site was seeded with illustrative examples of learning and teaching ideas and problems, resources and tools. These included 44 case studies carried out at the Open University about how the Moodle Virtual Learning Environment (VLE) tools were being used in different courses, examples of visual CompendiumLD designs, learning design case studies from the AUTC Learning Design site (AUTC, 2009), and relevant pages from the Phoebe pedagogical planner (2009). We also included links to repositories of information on educational tools, learning objects, and Open Educational Resources (2009).

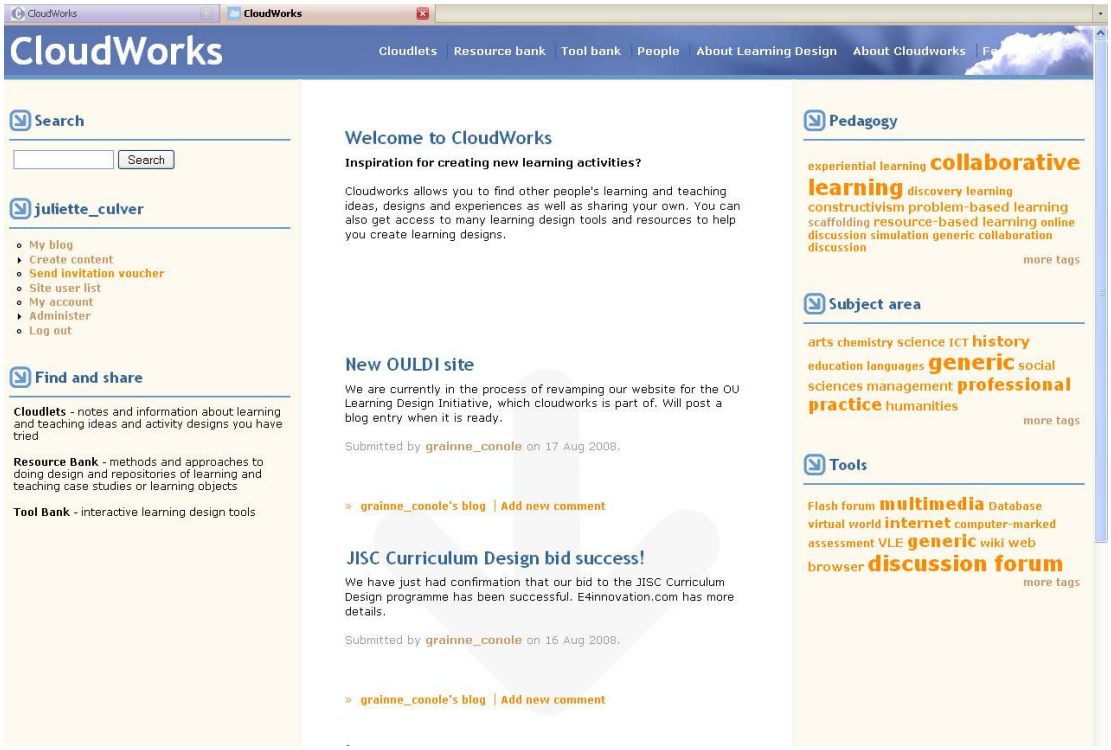


Figure 4 Screenshot of the home page Spring 2008

The initial version of the site had five types of 'Clouds':

1. **Clouds:** Short descriptions of examples of learning activities and simple ideas of teacher practice, through to more detailed design plans.
2. **Stormclouds:** Problems or requests; an educational problem that someone is seeking help on.
3. **Resources:** Learning objects, Open Educational Resources, design templates and case studies and links to sites providing information on different tools and how they can be used.
4. **Tools:** These could include learning design tools - that guide the user through the design process or pedagogy tools - which instantiate particular pedagogical approaches.
5. **People and communities:** Each user has an associated profile and any clouds they created automatically appeared on their profile page.

However, feedback from users at this early stage suggested that the five categories of Clouds were confusing, so they were merged to give a sole core object or 'Cloud' in the second release in December 2008.

Figure 5 Screen shot of Cloudworks home page March 2008

The 'Cloudscapes' feature was also introduced at this time, to enable users to aggregate clouds around a particular purpose or event. The new site was used during the Ascilite 2008 conference and the Hewlett foundation conference on OER in Monterey in March 2009, and proved a surprisingly good mechanism for collective live blogging. The site's use at conferences and events is discussed in section 4.1 below.

2.2 Phase-two

Phase-two development started in July 2009 with the launch of the Beta version, which was this time built in Codeigniter, a PHP open source Web Application Framework (http://codeigniter.com/). During this phase we shifted attention to community building and sustainability, and began to explore interoperability and connectivity with other related sites through embeds, links and gadgets. The new release had a completely new look and feel, and offered more advanced features including tailored and tabbed activity streams to enable users personalise the site, the ability to add additional and embedded content (such as images, videos and presentations), the ability to add web links and academic references

to Clouds, RSS feeds, email alerts, follow and following concepts, events listings and voting. In addition, a number of mechanisms were added to promote curiosity and serendipity. For example the ten most active Clouds appear on the home page, along with a selection of featured and popular Clouds and Cloudscapes and a list of events. The site activity stream, which is constantly changing, has also helped to give a dynamic and evolving feel to the site.

Figure 6 Cloudworks homepage featuring streamed and evolving activity (most active Clouds on the right, featured Cloudscapes at the top with popular Clouds/ Cloudscapes below, and events listings below and left)

Since the launch of the Beta version in July 2009, Cloudworks has been attracting comment that indicates a growing sense of interest and a 'buzz'. The work is receiving considerable interest internationally, as is evident by the number of invited keynotes and workshops which have occurred. Clouds are being set up not only in English but in Dutch, Danish, German and Greek. A Greek interface option has been added which now means that other language interfaces can easily be developed (this work has been funded by the EU Design-Practice project). There is a sense that the site is offering something unique which works well in conjunction with other tools, and is intuitive and easy to use:

"As the Multiliteracies moderator I am looking with interest on the changing shapes of clouds and wondering which will gain traction and carry us forward into the future. In [institution] we were thinking our Big Innovation this year would be Wave (last year it was Ning). But Wave is a bit complicated with the invitation hassle (at the moment). This one is quite simple. Unlike either of the other two, you don't have to be a member of the group to converse. You simply have to have a Cloudworks ID and you can say what you like anywhere."

Comment posted on Cloudworks

3. A multi-faceted evaluation methodology

User questionnaires and interviews, usage data, distribution of activity, and a log of the types of interactions and comments posted have all been used to provide a holistic and multi-faceted view of the site. The critical success factors for Cloudworks identified in the OULDI-JISC Evaluation plan are as follows:

Critical success factors	Key questions
Critical success factor 1: *A body of evidence sufficient to demonstrate that the Cloudworks website has created real enhancement in the professional knowledge and understanding of participants and increased their sense of belonging to a professional community.*	○ Enhancement of professional knowledge and understanding: do participants believe there been a gain in their professional knowledge and understanding of participants as a consequence of using Cloudworks? ○ Positive shift in culture towards sharing: is the level of self-reported activity of posting and viewing increasing? Are people more engaged in posting and viewing/? Is it seen as more central to how they get ideas and report practice? ○ Community identity increased: have participants experienced an increase in their sense of belonging to a community? ○ Positive shift in attitudes towards sharing: are people more willing to share to larger networks? Has the value attached to online sharing of user-generated content increased? ○ Positive impact on practice: have discussions and content on Cloudworks supported users in improving efficiency, flexibility and innovation in their designing?
Critical success factor 2: *A community of sufficient size and/ or a sufficient annual programme of community engagements that ensure the site will continue to be used frequently without intervention from the project team.*	○ Increase in usage statistics: has there been a quantifiable increase in the amount of activity, numbers of users and frequency of use? ○ High enough level of engagement to support sustainability: are communities likely to continue after project involvement, especially in respect to the pilots? What is the rate of retention and activity over time of Cloudscapes? What is the rate of retention of users? What are the projections for use in Year 4? Who will continue to use Cloudworks after the project ends? ○ The 'critical mass' [1] threshold has been surpassed: what are the indications that a critical size or mass has or has not been reached?
Critical success factor 4: *Resources and guidance that are regarded by users as clearly and effectively supporting them in the intended task/ skills/ knowledge acquisition and*	○ Have the resources and guidance produced been useful to users? ○ Have they clearly and effectively supported users in completing the intended task/skills/knowledge acquisition? ○ What other resources are demanded?

[1] For the purposes of this project 'critical mass' is defined as being the minimum amount of user activity required to maintain a chain reaction which ensures that the site becomes self-sustaining in terms of both registrations and content.

guidance that are regarded by users as clearly and effectively supporting them in the intended task/ skills/ knowledge acquisition.	
Critical success factor 5: *A software product that is regarded fit-for-purpose, for install and use in diverse university settings and that have either been used by, or inspired use in, several of these settings*	○ Are the software products fit-for-purpose? ○ Can and have they be installed and used in other institutional settings?

Table 2 Critical success factors and key questions (from the OULDI-JISC Evaluation Plan, 2009)

Through both phases we have been seeking to establish conceptual and methodological strategies that while informed by the theoretical frameworks that underpin development of the site, also enable us to more systematically position transactions and emerging patterns of activity, so that we can reliably evaluate these in relation to developing a) productive communities, b) professional knowledge and c) sustained participation (Galley et al., forthcoming, Alevizou et al., 2010b, Conole et al, 2010a).

Critical success factor 1 in particular focuses on concepts such as 'sense of belonging' and 'enhancement in professional understanding' which although clearly key to gauging the success of the site, are not easy to reliably and critically evaluate. We have therefore developed a framework to direct our inquiry and empirical investigation, especially in relation to understanding the nature of community, communication and interaction among groups or individuals that are part of relational networks, and come together to discuss core themes in research and practices. The framework has been informed by a review of the online-communities literature and combines perspectives on Computer Mediated Communication (CMC) and facilitation and mentoring in online learning environments, and consists of four broad aspects or indicators which appear to influence the development of productive, participatory activity. We argue that the aspects interlink and have a multiplicative effect on the others, in that if one is missing, the others will be significantly reduced; however it is useful to consider them separately as lenses through which to view activity.

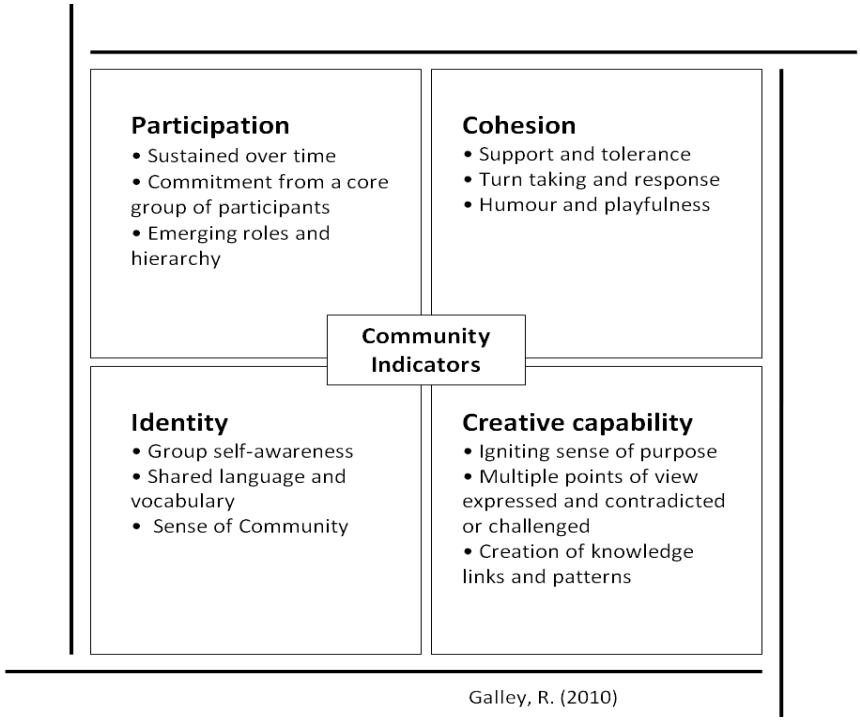


Table 3 Indicators of community framework (from Galley et al., forthcoming)

	Participation	Cohesion	Identity	Creative capability
Indicators	○ Sustained participation ○ Commitment from a core group of participants ○ Emerging roles and hierarchy	○ Support ○ Tolerance (Walzer 1997, p 11). ○ Reciprocity (Herring, 2004; Erickson, 1997 Putnam, 2000) ○ Humour and playfulness	○ Group self-awareness ○ Membership (Erickson, 1997) ○ Shared language (Baym 1998, p62) ○ Sense of community	○ Igniting purpose (questions, visions, task) (Gratton, 2007) ○ Multiple points of view, traditions and interests (Engestrom, 2001) ○ Contradiction (Engestrom, 2001) ○ Creation of knowledge links and patterns
Observation criteria	***Sustained*** - Measured over time. ***Core participants*** identified on the basis of frequency of posting and rate of response received to messages posted, or via text-based social net-work analysis.(Herring, 2004, p. 356) ***Role****s* and ***hierarchy*** can be adduced through participation patterns and speech analysis (e.g., Herring & Nix, 1997, which considers the different acts performed by group leaders and non-leaders).	Observed verbal ***humour*** (Baym, 1995), jokes, banter and playfulness. Sociality characterized by combination of work and play (Wittel, 2001) ***Support***(Herring, 1994) ***and tolerance***(Walzer 1997) through speech act analysis focusing , for example, on acts of positive politeness openness, curiosity, and respect - a willingness to listen and learn ***Reciprocity*** through analysis of turn initiation and response (Rafaeli & Sudweeks, 1997)	***Self-awareness*** can be manifested in its members' references to the group as a group ***Shared language*** Baym identifies 4 types of 'consistent and distinctive language practices' that indicate the emergence of a coherent online community: group specific vocabulary; forms of non-verbal communication; genres; and humour (Baym 2003, p1016)	***Igniting purpose*** - Areas of significantly higher activity indicating flashpoints of interest and engagement (Gratton, 2007, Engestrom, 2007) ***Contradiction****s* in terms of experience and knowledge. ***Multiple points of view*** expressed and contradicted or challenged. Evidence of *networks of relationships* cross teams, disciplines, function and organisations. ***Knowledge links and patterns*** made, referred to and developed

Evaluation questions	**Clear roles and hierarchy:** Did participants take on any special roles over the course of the review? What was the hierarchical structure? Were these effective in promoting and supporting collaborative activity? **Commitment from a core group of participants:** Was there a core group of participants, who contributed regularly? How far did a core group of participants encourage the engagement and activity of others? **Sustained engagement:** How far did participants make repeated contributions? Did they continue to contribute into the wider Cloudworks space?	**Support and tolerance:** Were people polite and friendly to others? Was there evidence of a willingness to listen and learn from others? Were less confident participants encouraged to participate further? Can this kind of behaviour be seen to impact on engagement? **Turn taking and response:** Did participants take turns in discussions and respond to each others' comments? Did participants ask or answer questions of others?	**Shared language and vocabulary:** Did participants use similar vocabulary and phraseology? Was a similar tone and style used? Was the style and tone used inclusive or exclusive of other groups? **Group self awareness:** Do participants use "us verses them" language? Particularly in statements such as, "We do things this way here" (implying an awareness that they might be done differently elsewhere)	**Crossing organisational/ role boundaries:** Were multiple points of view expressed? Did people from different types of roles and workplaces contribute? Did people find participating exciting, interesting and relevant to them? **Creation of knowledge links and patterns:** Were links made between concepts and ideas? Did participants attempt to connect their knowledge and experience to that of others? **Create or develop new knowledge and practices:** Did participants challenge existing knowledge and practices and work with others to conceive alternatives? **Sense of purpose:** Did visitors to the site understand the purpose of what they were doing? Did they feel drawn to participate and get involved?

Table 4 Evaluation and observation criteria mapped to the Community Indicators (from Galley et al, forthcoming)

3.1 User surveys

Users of Cloudworks have been encouraged to complete an online survey after workshops and conferences, and in April 2010, 299 people registered on the site were randomly chosen to participate in a survey:

> **User survey report**, Phase-two: http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/End-of-phase-2-Cloudworks-user-survey-May-to-June-2010.pdf

In total, approximately 100 surveys have been completed during phase-one and two. All data used from the surveys is anonymous.

3.2 User Interviews

A series of interviews have been conducted, these include some short unstructured three-minute interviews asking for perceptions of the site (where permission was given these are publically available here: http://cloudworks.ac.uk/cloudscape/view/1900). Other more in-depth, semi-structured interviews have also been conducted particularly with established users, with a focus on exploring how Cloudworks is used, and the perceived advantages of using the site. As we move into phase-three we will add to this data by asking a small

number of regular users to complete a log of their use of Cloudworks, and the other social communication tools they use professionally.

3.3 Usability testing

We have commissioned the Learning and Teaching Development team (LTD) in The Open University's Institute for Educational Technologies (IET) to undertake two expert user reviews of the Cloudworks website, one in February 2009 and one in October 2009.

> **Expert Usability Testing Report**, phase-one: http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Cloudworks-Usability-Testing-evaluation_AnneJelfs.pdf
>
> **Expert Usability Testing Report**, phase-two: http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Usability-testing-Sep-09.pdf

The testing was undertaken by Dr Anne Jelfs using a Heuristic evaluation approach, i.e. an expert review of a website based on a heuristic set of protocols. This type of testing is generally conducted at the early stages of a website development, so that changes can be made with the least impact on the end user and as an aid to reducing the costs of re-engineering websites. Expert usability testing can be conducted at the paper prototype stage where there have been no electronic developments or at an early wire-frame stage again before the website is at the later stages of development. It is important to conduct this type of testing, particularly when there is little or no budget put aside for end user testing. The value is that most errors or difficulties that end users face can be identified by the expert thereby ensuring the product is usable, fit for purpose and of acceptable quality. It allows not only for quality assurance but quality enhancement of the end product. Cloudworks was viewed to look for navigational issues, consistency of web pages, how easy it was to recover from errors made by the user, how easy was is to 'learn' the metaphors used on the website as well as the colour contrast and visual appearance. All recommendations have been acted on.

In June 2010, towards the end of phase-two, a detailed accessibility audit was conducted in preparation for the release of the open-source later in the year:

> **Accessibility Audit Report**, phase-two: http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Cloudworks-accessibility-June-2010.pdf

This review was conducted by Dr Chetz Colwell from the Accessibility in Educational Media, and Learning & Teaching Development teams, Institute of Educational Technology.

Most of the recommendations produced by the audit were acted on immediately; those remaining have been integrated into the phase-three development road map (Appendix 2).

3.4 Reflective logs

The Cloudworks team have kept reflective logs throughout phases-one and two, documenting the process of development and use. These reflections are available in public

blogs and links to the full postings have been included where extracts have been used in reports and evaluations. Occasionally users will also discuss their perceptions of Cloudworks in their own publicly available blogs or on the site itself, where these have been referred to direct links have not been made in our reports or papers as we recognise that our use of the postings in this way could not have been anticipated when the posting was made. In these cases we have also removed names and any identifying information.

3.5 Usage data

User activity data has been collected from the site relating to:

- **content:** number of Clouds in the Cloudscape, items of extra content, embeds, comments and links
- **people:** number of followers, distinct people contributing, number people marked as attending
- **views:** number of views of the Cloudscape page, number of distinct people logged in and viewing Cloudscape Clouds, number of distinct guests (i.e. distinct IP addresses) viewing Cloudscape Clouds

The OULDI-JISC project plan set the following usage targets:

> *"We would like to see a steady increase in use of the site with up to 500 clouds produced in the first year, 1500 by the end of year two and 4000 by the end of the project"*
>
> **OULDI-JISC project plan March 2009**

The data has been analysed to discover patterns of use across time, and of specific groups within the Cloudscape. This numerical data is publicly available on the site.

3.6 Analysis of interaction

Types of interactions have been collected and analysed, with a focus on those that may indicate increases of knowledge and understanding, and sense of community. Interactions will be categorised into the following types:

- **informational** (sharing of resources, links, annotations of presentations, live blogging, etc)
- **practical** (sharing of practice or experience)
- **social** (information modes of address, personal narratives, suggestions to recommendations), that lead or relate to:
    - **discursive** (affirmations, welcome notes, supportive interchanges, humour and word plays, etc)
    - **deliberative** (instigating debates, asking probing questions etc)

It is expected that a Cloud may contain different types of interactions but that a single comment or post is likely to have a primary purpose. Again, this data is publicly available but names and personal references have been removed for reporting and evaluation purposes.

3.7 Activity distribution

The problem of how to visualise the distribution of activity has been considered by Cross (2010b) in his investigation of spheres of sharing in Cloudworks. His aim is to unpack and examine patterns of engagement and, in order to help support this process, he has developed a representational form that seeks to give an instant overview of which Clouds the subscriber contributed to, what they contributed, how much, the time between contributions, and, importantly, how all this fits in to the wider sequence of contributions to these Clouds by others. Where appropriate, activity distribution graphs have been used which have been adapted from Cross's model, and used alongside pie and bar charts to provide a holistic view of activity distribution in the space.

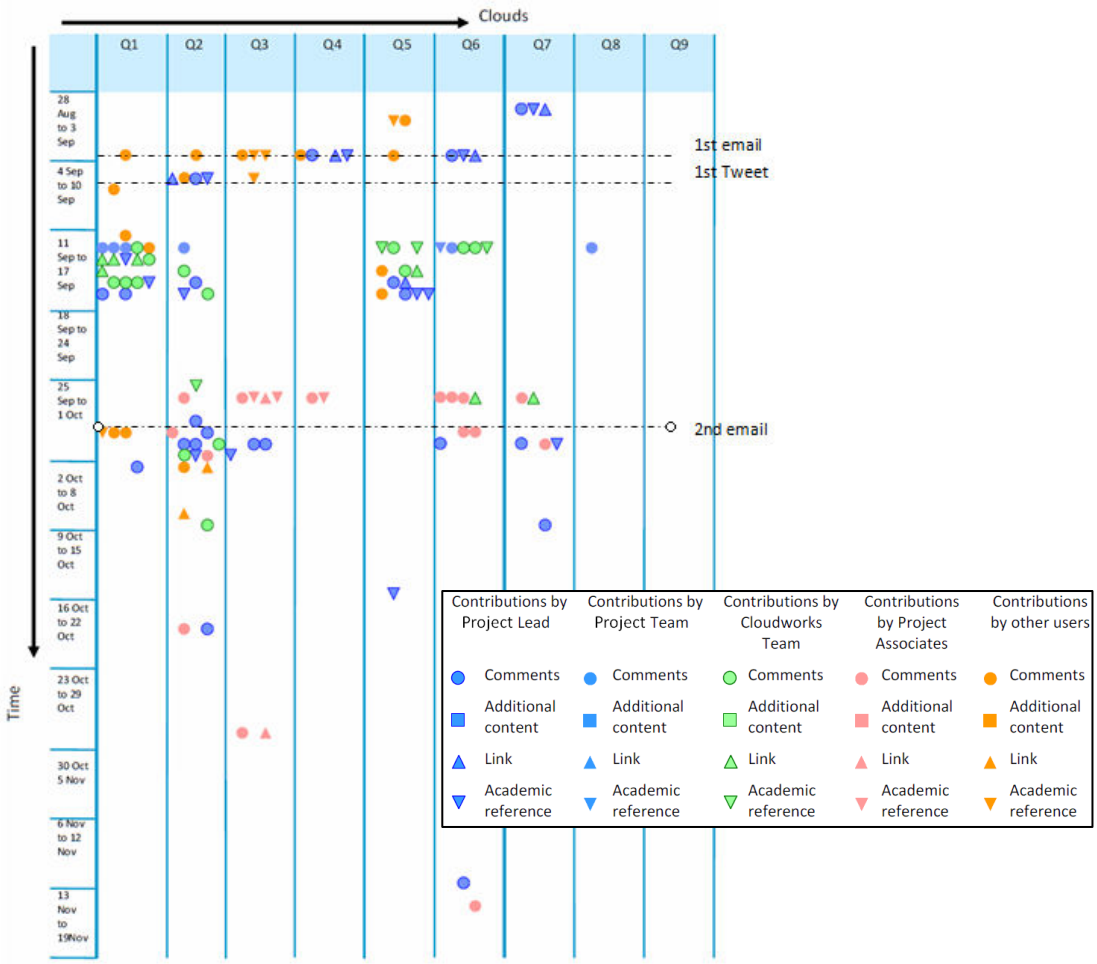


Figure 7 Chart showing activity patterns across a single 'Open Literature Review' Cloudscape (from Galley et al., 2010a)

4. Emerging patterns of use

To date, we have identified eight ways in which the site is being used (Conole, forthcoming):

1. Events
2. Debates
3. Resource aggregation
4. Courses
5. Reading circles
6. Learning Design
7. Expert elicitation and consultation
8. Open reviews

4.1 Events

The use of Cloudworks for conferences, workshops and seminars was one of the first patterns of user behaviour to emerge on the site. The site provides a new type of mediation space to support interactions and communications before, during and after events. The discussion space associated with Clouds provides a forum for users to discuss issues and to collectively live-blog. The ability to add links, references and embedded content fosters collective intelligence (Lévy, 1997) and crowdsourcing (Howe, 2006). Because events have become such a dominant pattern of behaviour on the site, we now provide a dynamic list of events (http://cloudworks.ac.uk/events/events_list). By July 2010, 47 events were listed for forthcoming events – December 2010, and 85 Cloudscapes had been labelled as past events.

Using Cloudworks to support conferences has been a particularly effective way of introducing new users to the site, and showcasing functionality. During phases-one and two of development, Cloudworks was used for ca. 60 conferences. Four conferences were chosen for detailed review:

> **Case-study: Using Cloudworks at conferences**, phase-2: http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Case_study_Using-Cloudworks-at-Conferences.pdf

- Ascilite, Melbourne, AUS, 30th November – 3rd December 2008
- OER Meeting, Monterey, CA, USA 3rd March 2009
- ALT-C, Manchester, UK, 8th September 2009 - 10th September 2009
- JISC Innovation Forum 2010 (JIF2010), Surrey, UK 27 July 2010 - 28 July 2010

These conferences were chosen because they were spread through phases-one and two of the development of the site, and each made use of new functionality as it was added. The review showed that most often, conference Cloudscapes were set up by delegates as an informal 'backchannel' to a conference, rather than by conference organisers. These Cloudscapes tended to grow organically as participants added Clouds and related materials as they needed to, and consisted, primarily, of informational postings and archival content – for example live-blogs and links to papers. Occasionally, 'flash debates' (see below) emerged where delegates collected around a short but intense discussion, usually sparked by some

controversial statement. These discussions were seen to move back and forth across and between a variety of platforms, for example Twitter, blogs, Facebook and Cloudworks.

Where conference Cloudscapes were set up by conference organisers, they tended to be structured more logically, with 'placeholder' Clouds set up ready for live-blogging and discussion. This made it easier for conference organisers to 'brand' the Cloudscape and present conference information in a clear, findable way. Interestingly though, although these 'official' Cloudscapes received a higher percentage of the delegates as visitors than an 'unofficial' conference Cloudscape might, active participation rates were lower (with the exception of conferences where use of the site was explicitly built into conference activities). Our evaluations of these Cloudscapes indicated that the space was considered useful and a popular means of passing on information before an event, and as an archive afterwards, but that it was not entirely successful at engaging activity before or during an event (i.e. although many people visited the space, few engaged in sustained participation at these times). Both the emerging and formally constructed conference spaces could be seen to be of particular value to people interested in, but not attending, the conference, and as a space for delegates and virtual participants to continue discussions after the event.

Feedback from a range of conferences has told us that the majority of delegates who used Cloudworks at the conference, found the site easy to use and intuitive. However, despite the introduction of an improved search function, tags, and events listings there still seem to be issues with navigation of the site for a minority of users; these users say they can't easily find what they are looking for. Further usability testing in phase-three will help us explore exactly what the issues are for these people.

4.2 Debates

A number of Cloudscapes have now been established acting as discussion spaces. 'Flash debates' began to appear on the site in September 2009, and are sparked from questions that aim to provoke. Most typically a range of comments and activities will erupt almost immediately after initial postings, and will cross a variety of different communication platforms (e.g. Twitter, email lists, blogs, Facebook). The Flash Debate Cloudscape (http://cloudworks.ac.uk/cloudscape/view/1896) includes a range of topical issues such as 'Citizendium versus Wikipedia', 'Has Twitter already peaked?', or 'What will the University of Tomorrow look like?' The first example of this use was a cloud entitled 'Is Twitter killing blogging?' (http://cloudworks.ac.uk/index.php/cloud/view/2266). This was set up following a Twitter posting on this topic and has had 719 unique views to date. Quickly the Cloud became a shared space for people to discuss the topic and to aggregate resources. Many of them then went to their own personal websites such as blogs to write more individual reflective pieces, posting links back in the Cloud:

> *"Twitter is increasing the connections between us and in effect bringing more people into the conversation which can only be a good thing. The recent VLE-PLE debate is a*

> *great example of this. XX kicked off the latest round on his blog but it was his (& others) use of Twitter that brought people into the conversation, some of whom went on to blog, including myself, with that blog post I'd saving up since April (see above)!*
>
> *The blog-twitter discussion was an appetiser for the Great VLE-PLE Debate™ at ALT-C 2009. Having eaten too much of the appetiser I opted out of that session but what has been great is the way I have been able to re-visit it thanks to Cloudworks".*
>
> **Flash debate participant blog posting**

A number of Open University people have volunteered to facilitate a Flash Debate and this programme started in October with 'The change nature of conferences' debate http://cloudworks.ac.uk/cloud/view/2577 . We have also been exploring how the site can be used to facilitate timed, topic-based discussions, see for example 'Spotlight on OER' (http://cloudworks.ac.uk/cloudscape/view/2105).

4.3 Resource aggregation

Cloudscapes have been established that act simply as aggregators around particular topics or resources. In this way Cloudworks is used as an alternative to a bookmarking tool. Examples include 'The Horizon Report' Cloudscape (http://cloudworks.ac.uk/1957), the 'Online Research Tools Cloudscape (http://cloudworks.ac.uk/cloudscape/view/2046) and the 'Learning Design toolbox' (http://cloudworks.ac.uk/index.php/cloudscape/view/1882). A course team at the Open University is exploring how Cloudworks might be used by work-based learners as a means of aggregating course-related resources, and in particular shared professional practice.

Some resource aggregation Cloudscapes will be of use to practitioners engaged in learning design. Examples of these include' Using Twitter with Students' (http://cloudworks.ac.uk/index.php/cloud/view/2398), 'Examples of mind-mapping in teaching' (http://cloudworks.ac.uk/index.php/cloud/view/2201) or 'Is anyone using audio feedback?' (http://cloudworks.ac.uk/index.php/cloud/view/2675).

4.4 Courses

As detailed above, the site is being used to some extent to support student activities, especially where students are in-service education or social-care professionals. For example students on the Masters in Open and Distance Education course at the OU have been exploring the site by taking part in a Cloudquest challenge (http://cloudworks.ac.uk/index.php/cloud/view/2699), contributing course flash debates (http://cloudworks.ac.uk/index.php/cloudscape/view/1937) and using the site to find relevant resources for particular teaching contexts (http://cloudworks.ac.uk/index.php/cloudscape/view/2057). In addition to these, there are a number of Clouds aggregating resources for informal professional development/ teacher

education courses both across the HE and FE sectors. We recognise that use of the site in such courses will be important in supporting sustainability and use.

We see Cloudworks as a space which offers excellent opportunities to engage learners in the learning design/ re-design process through sharing visualised designs and pedagogical discussion, checking assumptions and collaborative, co-creative development.

4.5 Reading Circles

A relatively new type of Cloudscape to appear on the site are 'Reading Circles'. For example the 800-strong ELESIG community of researchers interested in exploring students' use of technologies have set up a space to aggregate and discuss relevant readings from the field (http://cloudworks.ac.uk/index.php/cloudscape/view/1968).

4.6 Design cloudscapes

Part of the original aspiration around the development of the site was to act as a space which stimulated debate and collaboration around design practices, and in some ways this aspiration has been achieved. A number of Cloudscapes have now been established that are focusing on learning and teaching issues.

> *"The appeal of Cloudworks is that the focus shifts away from sharing course resources (repositories) to representing teaching designs, practices, and resources in a way that is context rich and reusable by others. Moreover, members' contributions are open and available for others to build on in a number of interesting ways".*
>
> **Cloudworks user blog posting**

These include spaces for those involved in designing courses (see for example http://cloudworks.ac.uk/index.php/cloudscape/view/1919) as well as those who have a tutoring role in delivering courses (http://cloudworks.ac.uk/index.php/cloud/view/3342). There are also some good examples of design collaboration (for example see http://cloudworks.ac.uk/index.php/cloudscape/view/688), however these examples have all been stimulated by a face to face learning design event, and are not yet happening spontaneously.

We have always recognised that different people will want to use a variety of different tools for designing learning activities in different contexts and at different stages of the design process, and that therefore the site should not be tied to any specific tool, but allow people a choice of formats for design (such as CompendiumLD maps, LAMS sequences and text-based formats). Part of our project funding has been allocated for collaborative work with LAMS and the LAMS Community to contribute to the overall goals of the project. To date, although there has been a great deal of very productive sharing of 'snippets' of practice on Cloudworks (discussing and sharing a new teaching tool, or a teaching and learning experience, or asking a tricky and interesting pedagogical question) there has been little

sharing of what might be described as 'worked designs'. We have worked with the LAMS community to explore how Cloudworks might be used as a 'pedagogical wrapper' for LAMS sequences, supporting the sharing of ideas across professional boundaries and facilitating collaborative design, evaluation and critical reflection (Galley et al., 2010b). There have been two distinct aspects to this work:

- Development of a new "embed" function necessary to allow a sequence that is uploaded to the LAMS Community to be embedded into any other web page.
- Recommendations about the sort of information, or pedagogical 'wrapper', teachers may find useful when using or repurposing someone else's sequence and how the Cloud may be presented and structured to promote discussion, collaboration and reciprocal sharing of new designs.

This work will progress into phase- three development of the site where increased functionality will allow for a greater range of embeds, and more seamless interaction with other design and communication platforms (i.e. GoogleDocs, Prezi, Elluminate etc).

We understand that getting teachers to share aspects of their learning design process, and ultimately their worked designs, remains a significant challenge. For many, sharing designs in this open way requires a paradigm shift, which moves them away from an implicit belief based process of design, to an explicit, evidenced-based and co-creative practice.

4.7 Expert elicitation

Clouds are often set up to ask questions in relation to teaching and learning. Invariably these questions do not have a quick and easy answer, and focus on some of the common themes and issues that face educators across the sector. These might centre on the ethics of a particular approach (http://cloudworks.ac.uk/cloud/view/2267), how to foster the motivation for sharing (http://cloudworks.ac.uk/cloud/view/1921), or what makes good design (http://cloudworks.ac.uk/cloud/view/2199).

Another example of 'expert elicitation' is presented and explored in Alevizou et al. (forthcoming). Alevizou provides a narrative and narrative analysis of a Cloud that was set up to share a teaching idea about creativity and openness for a course relating to new media and ICT: 'Integrating multimedia work into assessment'. The Cloud generated 465 views, and 9 comments. It included descriptive content, an embedded video showcase and a link to a video that provided the inspiration for repurposing. Six months later, the same lecturer repurposed this Cloud as an entry for a virtual conference on teaching and learning that was organised by the Open University, and which was supported by Cloudworks. The new Cloud: 'Experimenting with the pedagogy of creativity and openness' has generated 256 views, and contains 9 comments, 3 embedded videos, and 6 references and links. This use of Cloudworks is similar to use observed on other social sites. Twitter for example enables 'just-in-time' learning moments where a query can be posted and several suggestions or

explanations posted in response within minutes. This kind of interaction replicates the important and informal 'coffee conversation' that is such a core part of teacher practice. Sharing ideas and short snippets of practice is a very valuable way that teachers get new ideas, develop their practice and inform their learning designs (Conole, 2009).

4.8 Open reviews

Cloudworks has also been used for more formalised forms of expert elicitation activities. For example, in August 2009 a project group decided to use the site for an 'open literature review' with the aim of using the expert elicitation affordances of Cloudworks to identify key themes in the literature relating to the 'Positioning of educational technologists' within educational organisations. The team had originally planned a desk-based literature review, with some online engagement of an established and specific Educational Technology Community of Practice to synthesise the literature (probably through a mailing list). However, it was decided that the project would be modified to encourage the wider HE community to identify the literature they judged to be key to the debate, and Cloudworks seemed to them the most appropriate or convenient tool to do this. This team's use of Cloudworks for 'open review' has been written up as an HEA commissioned case study (Galley et al., 2010a).Other examples include a review of the use of Web 2.0 tools in HE (http://cloudworks.ac.uk/cloudscape/view/1895) and a review of pedagogical models (http://cloudworks.ac.uk/index.php/cloudscape/view/2009). Typically, research questions are set up as Clouds and used as a basis for discussion and aggregation of resources. Drafts of the evolving review are then used to refocus discussion and introduce the themes to new participants.

5. Levels of activity

We are beginning to see evidence of the site being self-sustaining, with the emergence of Cloudworks champions both from within the university and outside who are actively using the site within their community. Use of the site has increased significantly; by the end of phase-two (end of July 2010) there were ca. 3000 registered users, on average 4000 unique visitors per month from up to 165 countries each month. There has been steady increase in interest in Cloudworks across development phase-two with numbers of registered users moving from 1005 to 2997 between the launch of the Beta version in July 2009 to the end of phase-two in July 2010 (up more than 198%). The Cloudworks team have gradually reduced their facilitation and moderation of the site over the year, and as can be seen below activity levels have been maintained (not withstanding the seasonal fluctuations over the winter and summer breaks), with non-team members increasingly taking on 'champion' roles:

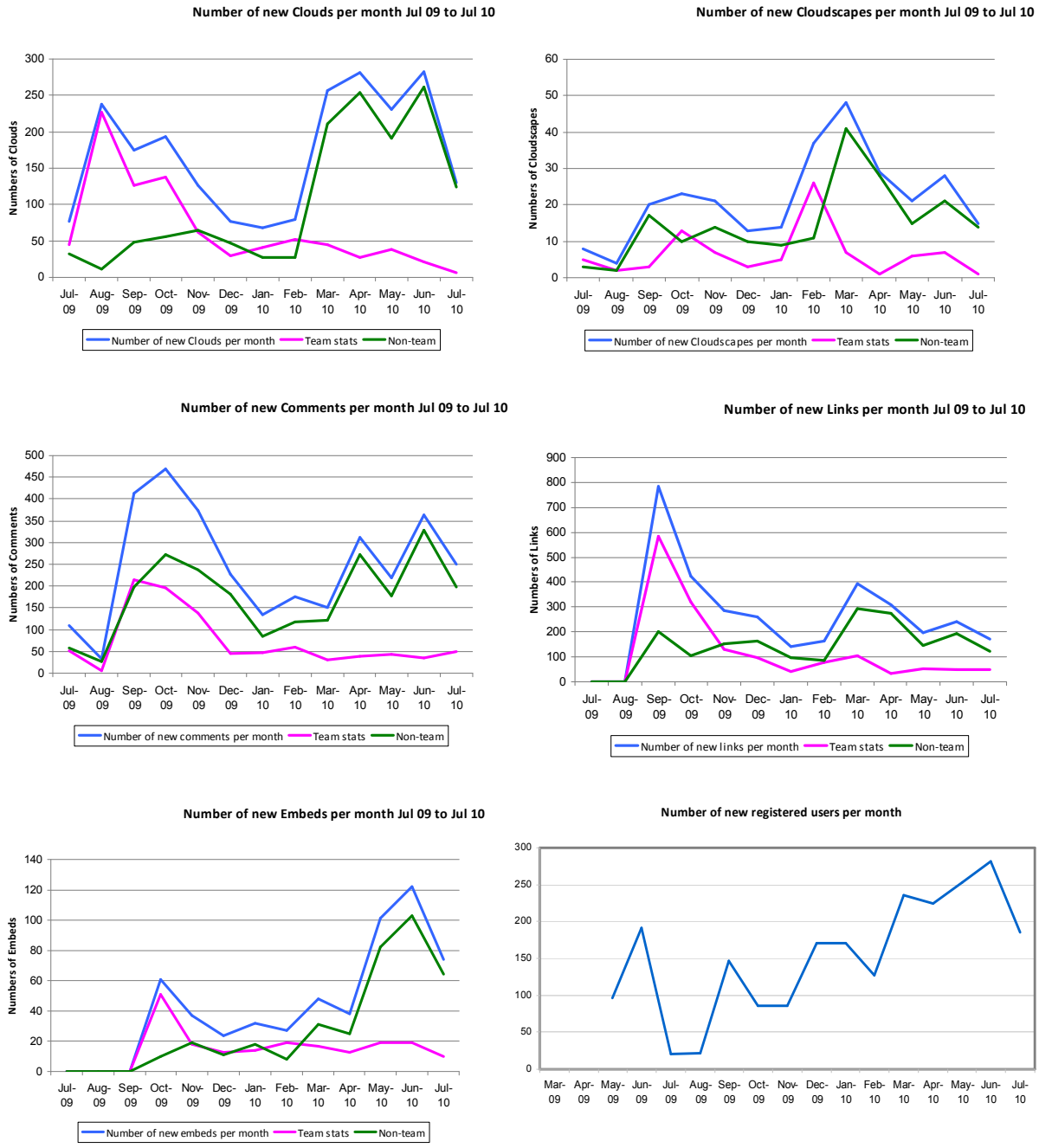


Figure 8 Activity charts showing Cloudworks team activity and the activity of other participants across development phase-two

The charts above show monthly activity across phase-two for the Cloudworks team, other users and total activity (unfortunately this data wasn't collected in phase-one). As this data is representative of just one year's activity it is not yet possible to see what activity might be judged 'seasonal' and which are peaks and troughs caused by other factors. However, we can say with some confidence that the conference season can be seen to impact positively on activity whereas in the summer and winter breaks, activity drops off quite significantly.

Cloudworks team intervention has been much reduced across phase-two and activity has not been significantly impacted but the activity charts above seem to suggest that Cloudworks team activity continues to impact on non-team activity - for example, when the team is active in creating Cloudscapes and comments in one month, non-team activity can be seen to rise in the following month. Although in-month activity cannot be seen to be increasing significantly overtime, it is sustained, and we are also seeing good levels of non-participatory activity with between 200-400 visitors to the site on weekdays:

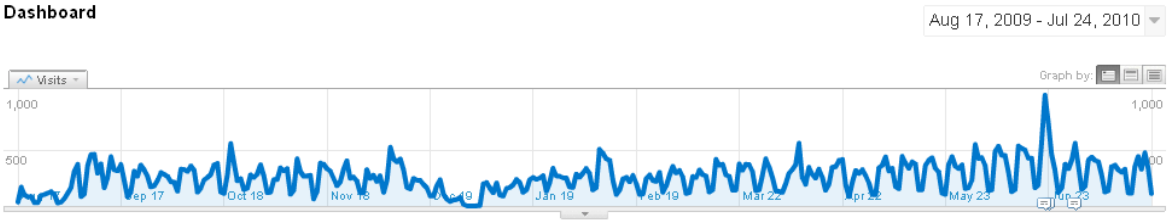
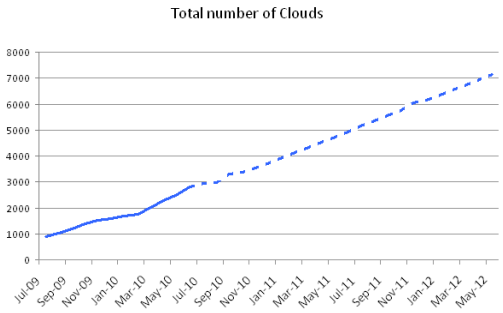
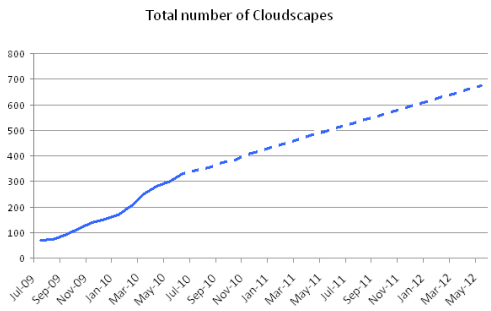


Figure 15 Google Analytics graph of all website activity across development phase-two

The data does not yet indicate that we have achieved 'critical mass'[2] however we believe the site to be performing well and, if cumulative activity continues to grow at the rate it has through phase-two, the site is likely to have registered over 5000 users and supported over 7000 Clouds by the end of the OLDI-JISC project in May 2012 as can be seen in the predictive charts below:





[2] For the purposes of this project 'critical mass' is defined as being the minimum amount of user activity required to maintain a chain reaction which ensures that the site becomes self-sustaining in terms of both registrations and content.

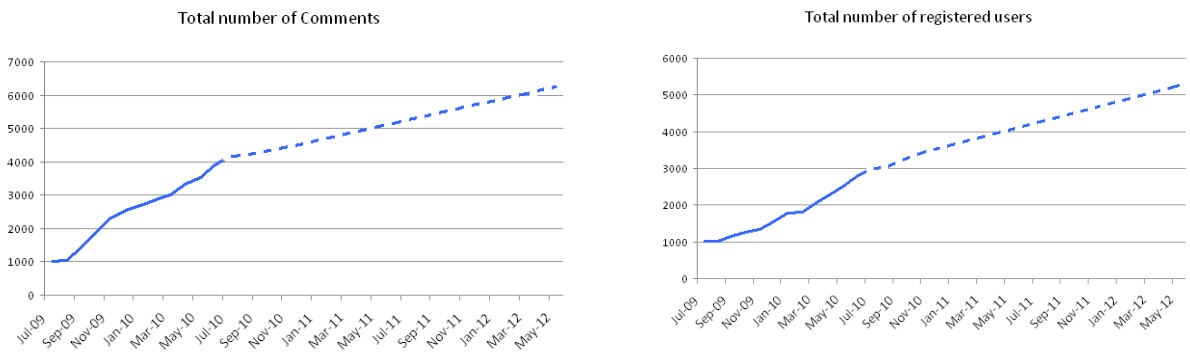


Figure 9 Cumulative activity across development phase-two, and predicted cumulative activity to the end of the OULDI-JISC project in May 2012 based on current performance.

During phase-two of development the site was visited just over 90,000 times from 167 different countries with just over half of all visitors (54.26%) coming from the UK

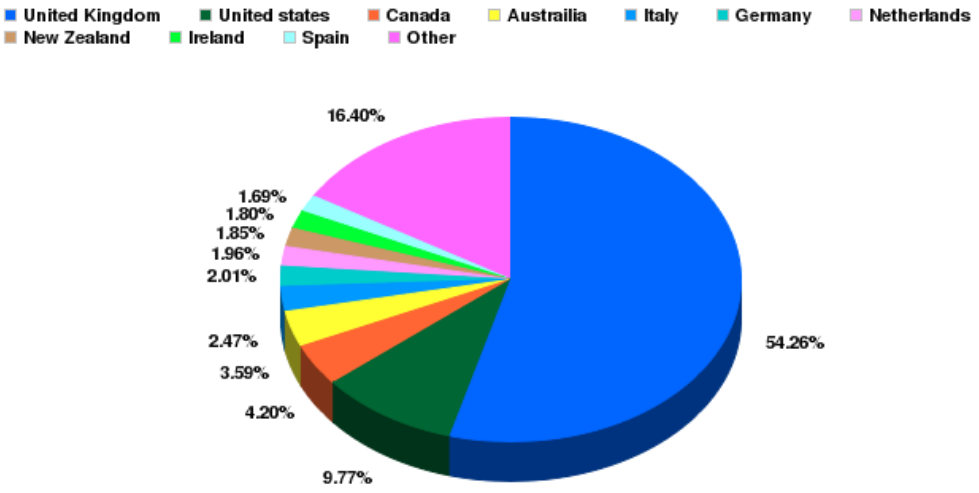


Figure 10 Pie chart showing the countries visitors to the site have come from in phase-two of development

Of those visitors coming from the UK, 28.42% came from London and 23.94% came from the Milton Keynes area where the main Open University campus is located.

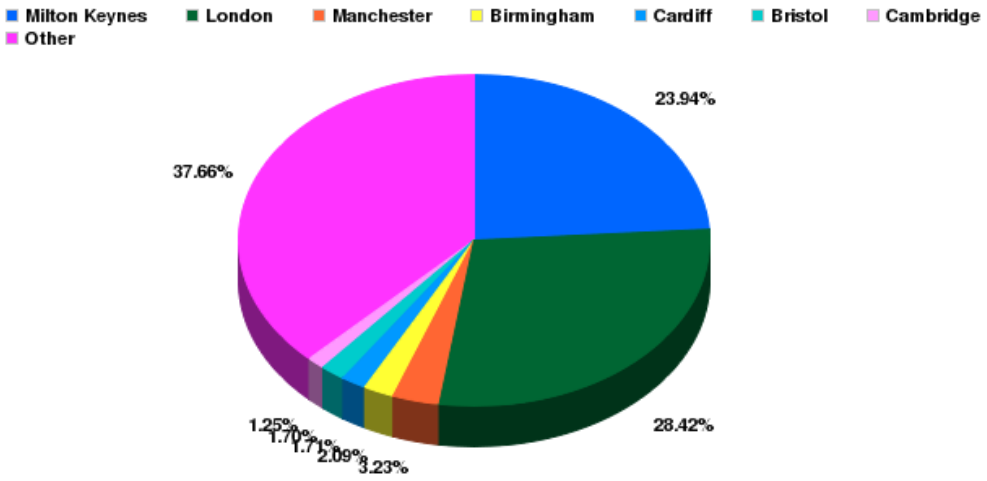


Figure 11 Pie chart showing the areas in the UK that UK visitors have come from in phase-two of development

Take-up in the Open University itself has been slow to be established but can be seen to be increasing as the site is used by more university groups, and for events such as the 'Learn About Fair' (http://cloudworks.ac.uk/cloudscape/view/1963) a university staff development event which received 3164 distinct guests (i.e. distinct IP addresses), 179 distinct people logged in and viewing Clouds, and 22 active participants, and the 'Open University annual Learning and Technology conference' (http://cloudworks.ac.uk/cloudscape/view/2012) which received 4417 unique guests, 474 distinct people logged in and viewing Clouds, and 54 active participants. During phase-two, the numbers of registered users who told us on registering that their institution was the Open University rose from 208 to 651 (up 213%).

A number of Open University communities can be seen to be using the site. Some examples include:

- Mobile technologies special interest group http://cloudworks.ac.uk/cloudscape/view/1889 , 26 distinct people commenting, 1922 distinct IP addresses viewing
- Olnet http://cloudworks.ac.uk/cloudscape/view/562 , 60 distinct people commenting, 2489 distinct IP addresses viewing
- eLearning Community http://cloudworks.ac.uk/cloudscape/view/899, 3 distinct people commenting, 164 distinct IP addresses viewing
- Associate Lecturers http://cloudworks.ac.uk/cloudscape/view/1934, 6 distinct people commenting, 446 distinct IP addresses viewing
- Classical Reception Studies Network (CRSN) Learning & Teaching Group http://cloudworks.ac.uk/cloudscape/view/21678, 8 distinct people commenting, 183 distinct IP addresses viewing

- K802 Students and staff http://cloudworks.ac.uk/cloudscape/view/2171 8 distinct people commenting, 1009 distinct IP addresses viewing http://cloudworks.ac.uk/cloudscape/view/2161 7 distinct people commenting, 294 distinct IP addresses viewing
- Teaching and Learning Librarians http://cloudworks.ac.uk/cloudscape/view/2035 22 distinct people commenting, 2353 distinct IP addresses viewing

Alevizou et al., (2010a) looks in more detail at the use of the site by one Open University led group (OLnet) for sharing and the discussion of issues relating to the use and uptake of Open Educational Resources (OERs). We will continue to engage with these internal communities, and external communities such as Elesig, LAMS and Moodle, and encourage and support the use of Cloudworks for annual meetings and conferences as we move forward with the project over the next two years

6. Development of a support and guidance package

Over development phase-two we have been developing a set of resources to introduce groups to the site and support visitors. The development of these has been informed by user feedback and observations of use and we have sought to understand:

Resources to support users: *What resources would support users? What format should these resources be presented in? Who should they be aimed at? Where are the gaps in the current resource set?*

Cloudworks is a unique space, not least because of the open nature of the site. The initial guidance offered to those setting up Clouds and Cloudscapes has therefore been given on the basis of initial observations and theoretically based assumptions. We are only now beginning to be able to examine how accurate and effective this guidance has been. Feedback has been received from user surveys, semi-structured interviews and usability testing. In addition, we have set up a Cloudworks 'UserVoice' site (http://cloudworks.uservoice.com/forums/62879-general) with quick links from Cloudworks to make it easier for users to leave us feedback and comment on the site. By December 2009 we began to realise that we were increasingly engaging with people who would not generally use a social networking site, either because they had made a considered decision about not doing so, or because they have not encountered one before. This has been offering us challenges both in terms of the ways in which we begin to introduce concepts and benefits to these groups, and also in how we might develop the site to encourage uptake. We have begun to engage with these issues and continue to develop a series of support materials and activities:

- Introductory leaflet http://cloudworks.ac.uk/cloud/view/3143, ***183 views***

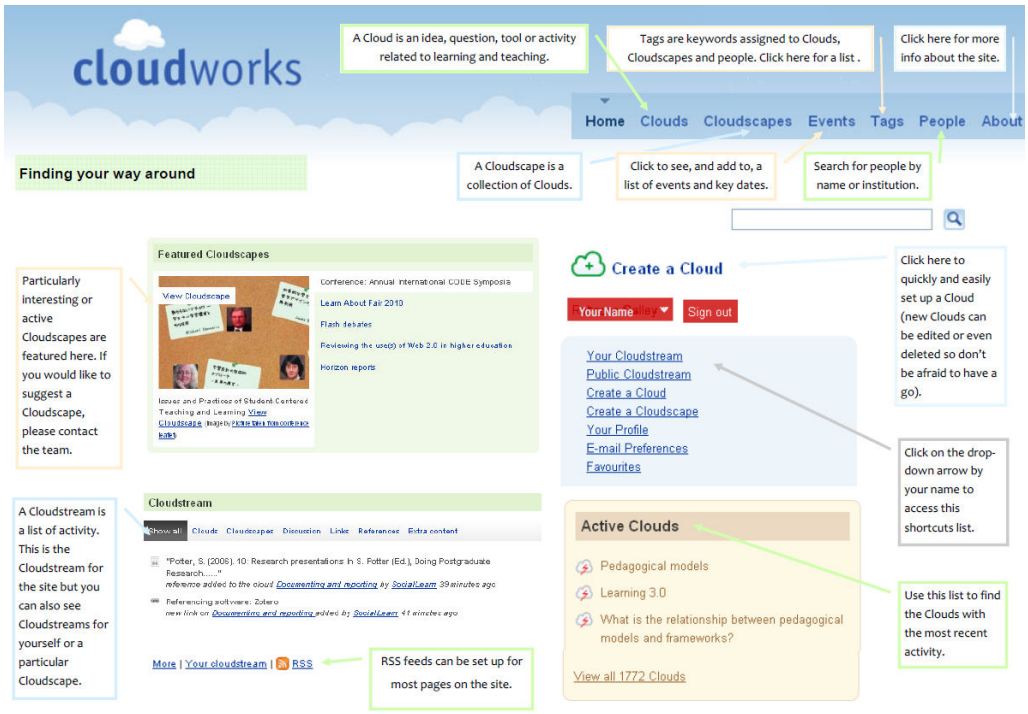


Figure 12 Cloudworks Leaflet

- Short introductory video http://cloudworks.ac.uk/cloud/view/2413, ***401 views***

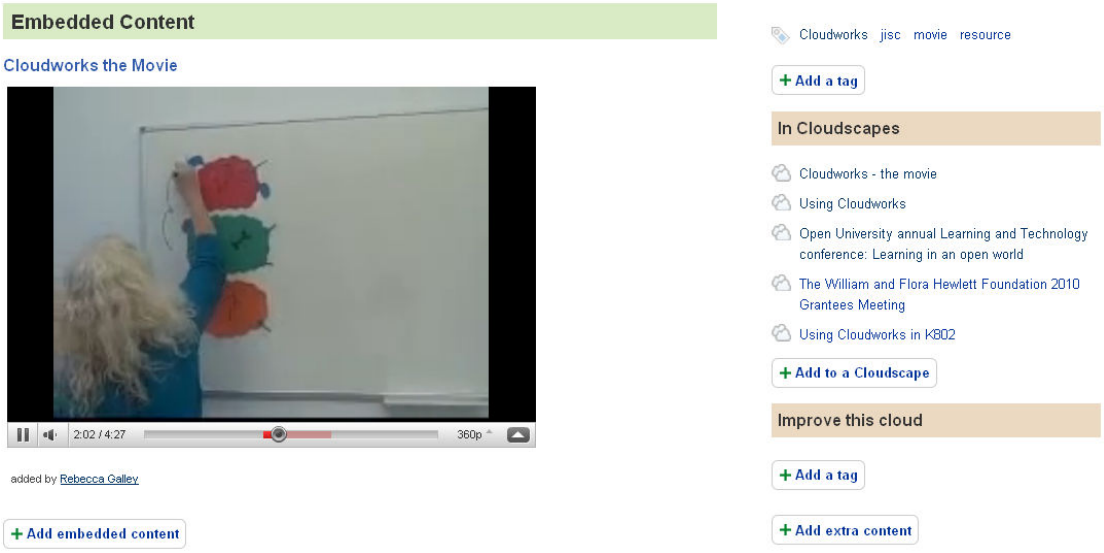


Figure 13 Screen shot from Cloudworks introductory video

- An introductory slideshow with audio http://cloudworks.ac.uk/cloud/view/2458, ***207 views***
- Cloudworks Virtual Fieldtrip video with audio and captions http://www.youtube.com/watch?v=N0HjlyU8OAU , ***51 views***

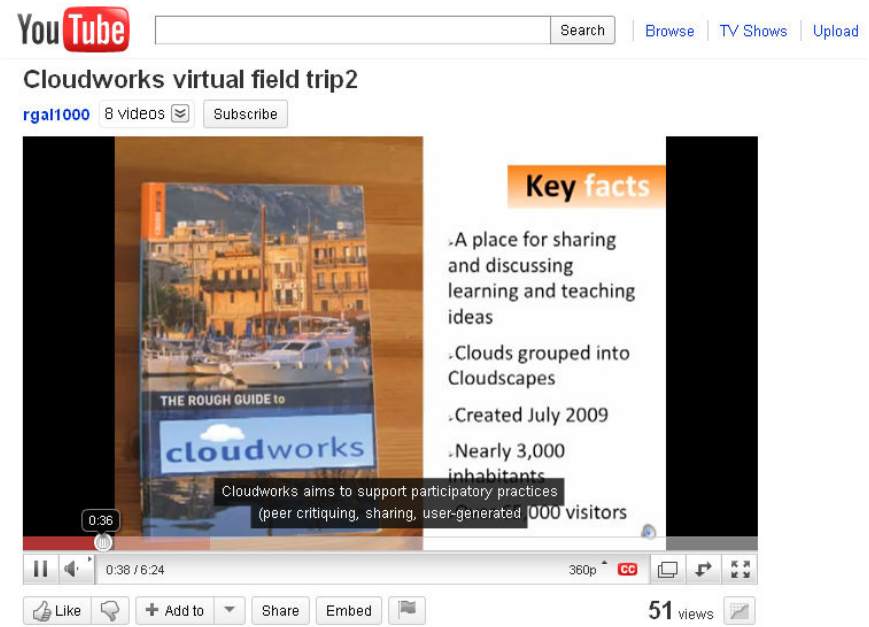


Figure 14 Screenshot from the Cloudworks Virtual fieldtrip

- '*Using Cloudworks'* Cloudscape which includes a number of 'support' Clouds written to support users at introductory, intermediate and advanced levels. http://cloudworks.ac.uk/index.php/cloudscape/view/1911

Figure 15 List of support Clouds in 'Using Cloudworks' Cloudscape

Views

Number of views of Cloudscape	**1072**
Number of distinct people logged in and viewing Cloudscape Clouds	**267**
Number of distinct guests (i.e. distinct IP addresses) viewing Cloudscape Clouds	**1498**

Content

Number of Clouds in Cloudscape	**17**
Number of comments	**12**
Number of embeds	**6**
Number of items of extra content	**5**
Number of links	**21**

- A series of video and audio interviews with active users of the site, sharing experiences of use http://cloudworks.ac.uk/cloudscape/view/1900

Content

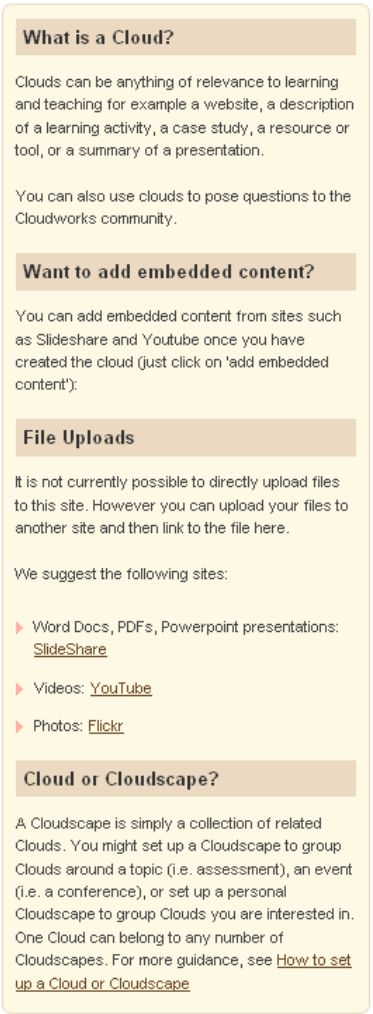
Number of clouds	**19**
Number of comments	**43**
Number of embeds	**14**
Number of items of extra content	**2**
Number of links	**9**

Views

Number of views of cloudscape	**400**
Number of distinct people logged in and viewing cloudscape clouds	**132**
Number of distinct guests (i.e. distinct IP addresses) viewing cloudscape clouds	**151**

- Cloudquest activity http://cloudworks.ac.uk/cloud/view/2699, ***418 views***

In addition, 'in-site' help has been added to a number of pages on the site where extra support might be needed, for example when setting up a Cloud or Cloudscape, or adding links and embeds. These appear to have significantly reduced confusion in regard to the concept of Clouds and Cloudscapes, and adding embedded material. In phase-three we will be adding to 'in-site' and documented help with a focus on promoting the accessibility of user-generated or user added content. For example we will be providing in-site links to auto-captioning software, guidance about text editing, and what sort of information to add in the 'accessible alternative' to embeds.



What is a Cloud?

Clouds can be anything of relevance to learning and teaching for example a website, a description of a learning activity, a case study, a resource or tool, or a summary of a presentation.

You can also use clouds to pose questions to the Cloudworks community.

Want to add embedded content?

You can add embedded content from sites such as Slideshare and Youtube once you have created the cloud (just click on 'add embedded content'):

File Uploads

It is not currently possible to directly upload files to this site. However you can upload your files to another site and then link to the file here.

We suggest the following sites:

- Word Docs, PDFs, Powerpoint presentations: SlideShare
- Videos: YouTube
- Photos: Flickr

Cloud or Cloudscape?

A Cloudscape is simply a collection of related Clouds. You might set up a Cloudscape to group Clouds around a topic (i.e. assessment), an event (i.e. a conference), or set up a personal Cloudscape to group Clouds you are interested in. One Cloud can belong to any number of Cloudscapes. For more guidance, see How to set up a Cloud or Cloudscape

Figure 16 Example of 'In-site' support table added in phase-two

A series of surveys and interviews have asked users about their experience of using the site and how useful they find these support resources. As part of the April 2010 End of Phase User Survey, participants were asked: "To what extent do you agree, or disagree with the statement 'Cloudworks is easy to use'?" and "What do you think of the guidance and support on Cloudworks". Response to the survey was low, and further surveys will be carried out across phase-three to enhance this data, but these findings are of interest in that can be judged indicative of perceptions at this time.

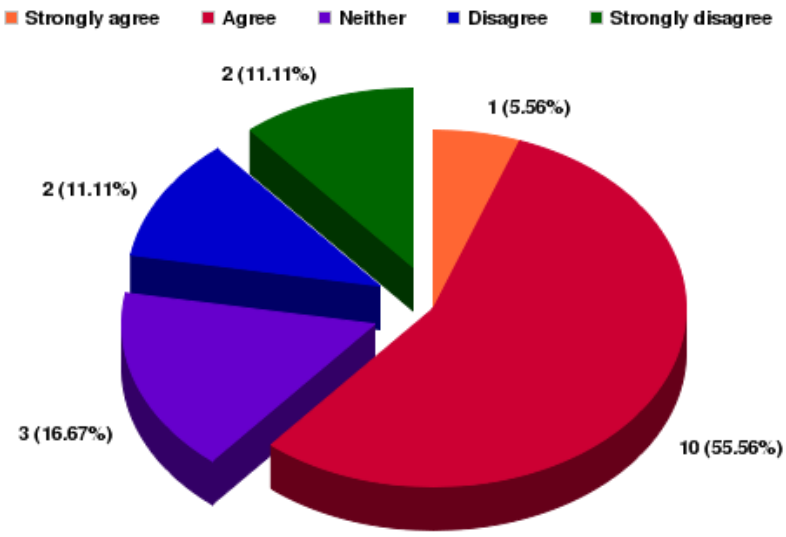


Fig 17 Pie chart showing responses to the statements 'Cloudworks is easy to use'

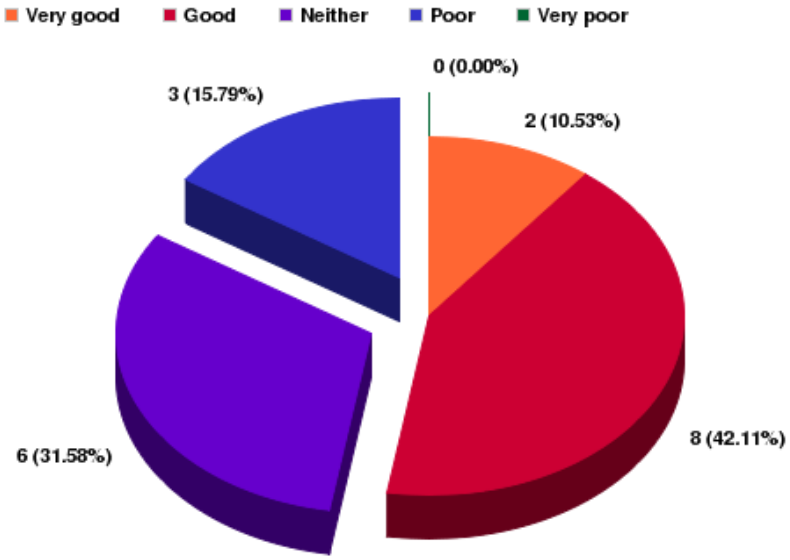


Figure 18 Pie chart showing responses to the question 'What do you think of the guidance and support on Cloudworks?'

Interestingly, in our end of phase survey, Cloudworks users who used more social networking tools in the last month (and who therefore perhaps may be considered more experienced in using social networks) were more likely to disagree with the statement

'Cloudworks is easy to use'. More work needs to be done to discover whether this finding is reliable, and if so, why this might be the case:

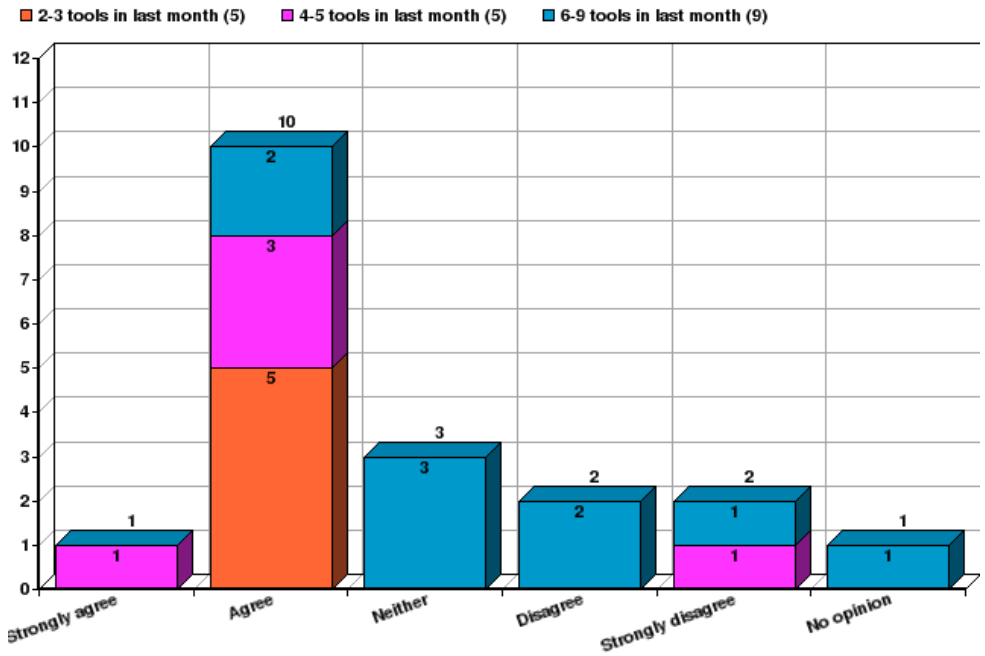


Figure 19 Responses to the statement 'Cloudworks is easy to use' filtered against the number of other social networking tools respondents used in the previous month

Only one of the respondents who thought the guidance was poor explained their reason for saying so. That person wrote that they would find simple tutorials for how to get started useful, "as well as tutorials for how to consider using it for other purposes". They stated that they were not clear how to use the site to access content that was not immediately available, and their answers to previous questions strongly suggested that navigation issues were the primary reason for this. This individual said that they had used 7 different social networking tools in the last month so was in no way new to the concept of navigating through such spaces. Three other respondents also added an open comment to their answers:

Response to Q.9	Open comment
Very good	*"Make new users aware that they can search for a cloud re. whatever issue (obvious when you find out but less so when you don't know)."*
Good	*"Guidance for setting up clouds, linking clouds, linking cloudscapes and set up project cloudscapes."*
Neither good nor poor	*"Not really used it"*

7. Summary of achievements

Critical success factors	Key questions	Achieved	Not yet achieved
Critical success factor 1: *A body of evidence sufficient to demonstrate that the Cloudworks website has created real enhancement in the professional knowledge and understanding of participants and increased their sense of belonging to a professional community.*	○ Enhancement of professional knowledge and understanding: do participants believe there been a gain in their professional knowledge and understanding of participants as a consequence of using Cloudworks? ○ Positive shift in culture towards sharing: is the level of self-reported activity of posting and viewing increasing? Are people more engaged in posting and viewing/? Is it seen as more central to how they get ideas and report practice? ○ Community identity increased: have participants experienced an increase in their sense of belonging to a community? ○ Positive shift in attitudes towards sharing: are people more willing to share to larger networks? Has the value attached to online sharing of user-generated content increased? ○ Positive impact on practice: have discussions and content on Cloudworks supported users in improving efficiency, flexibility and innovation in their designing?	We now have a methodological framework to enable us to determine how far activity in the site can be judged productive, and whether it can be said that users are experiencing a sense of belonging to a professional community. Some established users of the site are reporting that the site is having a positive impact on their professional development and teaching practice and there is emerging observable evidence that this is the case. Good use of the site for crowdsourcing and collating and sharing resources, ideas, articles and tools relating to learning and teaching, especially those relating to the use of technologies in learning.	The methodological framework developed has not yet been validated and will be over the next year. Collecting robust empirical evidence against Critical success factor 1 has been challenging. And it is only in phase-three that this will be more properly achieved. Uptake of the Cloudworks tool in the university, and at our partner universities has been slow, and although there is increasing evidence that more university groups are using the space we can not yet see evidence of a change in culture, or embedded use of Cloudworks in the Course design process. Promoting, sustaining and embedding the use of Cloudworks internally, and in external communities, will be a focus in phase-three development. The site is not yet being used to share and discuss worked learning designs of any format. This is a key aspect of the Cloudworks mission statement referred to at the start of this report and as such the sharing of learning designs will become a key are of focus in phase-three development.
Critical success factor 2: *A community of sufficient size and/ or a sufficient annual*	○ Increase in usage statistics: has there been a quantifiable increase in the amount of activity, numbers of users and frequency of use?	User, visitor and activity statistics are sustained and the site has exceeded targets set in the project plan of 500 Clouds in the first year (896 actual), 1500 Clouds	'Critical mass' can not yet be said to be achieved as activity does not yet appear to be entirely self-sustaining, although facilitation and moderation of

[3] For the purposes of this project 'critical mass' is defined as being the minimum amount of user activity required to maintain a chain reaction which ensures that the site becomes self-sustaining in terms of both registrations and content.

programme of community engagements that ensure the site will continue to be used frequently without intervention from the project team.	○ High enough level of engagement to support sustainability: are communities likely to continue after project involvement, especially in respect to the pilots? What is the rate of retention and activity over time of Cloudscapes? What is the rate of retention of users? What are the projections for use in Year 4? Who will continue to use Cloudworks after the project ends? ○ The 'critical mass' [3] threshold has been surpassed: what are the indications that a critical size or mass has or has not been reached?	by the end of year two (2930 actual) and the end of project target of 4000 Clouds is expected to be achieved by Spring 2011, a year ahead of schedule.. Increasing numbers of established users can be seen to be taking on a 'champion' role in supporting and promoting use of the site by a variety of educational and research communities. Strong registration figures with an increase in registrations of 198% in phase-two. Approximately 8-10% of registered users go on to participate in discussions and other activity on the site for more than 28 days (Cross 2010a). This is in line with other social networking sites. Strong use of the site for supporting and archiving annual educational conferences and events. More than 60 events are listed in the events stream.	the site is currently at very low levels. Key project related communities have not yet demonstrated full 'buy-in' for the site, including the Open University, JISC, Partner Universities and Cluster projects however there is evidence that after a slow start, this is gradually starting to happen. Again, promoting, sustaining and embedding the use of Cloudworks internally, and in external communities, will be a focus in phase-three development. Although well used before and after conferences, the site is not yet used well during the events themselves. User feedback suggests this is for a number of reasons including some continuing issues with navigation, particularly where the Cloudscape has been created by organisers, because they prefer to interact face to face with colleagues where possible and because the site does not yet support purely social, networking type discussions.
Critical success factor 4: *Resources and guidance that are regarded by users as clearly and effectively supporting them in the intended task/ skills/ knowledge acquisition and guidance that are regarded by users as clearly and effectively supporting them in the intended task/ skills/ knowledge acquisition.*	○ Have the resources and guidance produced been useful to users? ○ Have they clearly and effectively supported users in completing the intended task/skills/knowledge acquisition? ○ What other resources are demanded?	The majority of users find the site easy to use and the support and guidance materials either good or very good. early finding suggest that less experienced social networkers are more likely to find the site easy to use than more experienced users but more work would need to be done to validate this finding and the reasons for it. A wide range of support and guidance documents have been created and these have been well visited. We have established a number of systems of gathering feedback and requests from users and have been quick to respond to requirements.	Despite significant development work having been done on the site's search engine, and voting, favouriting and tagging systems, there still appear to be issues with regards to navigation of the site for some users. Although these users are in the minority, it is possible that this issue may become more significant as the site continues to grow over phase-three. Lab testing with a variety of users has still not yet been done. This will be essential moving forward to inform development and check progress.
Critical success factor 5: *A software product that is*	○ Are the software products fit-for-purpose? ○ Can and have they be installed and used in other institutional settings?	Formal and informal feedback from users indicates that the majority of users find the software useful and	A number of further technical and soft – developments have been identified through our

regarded fit-for-purpose, for install and use in diverse university settings and that have either been used by, or inspired use in, several of these settings		usable. An increasing number of educational communities are using the site alongside their other communication and networking tools. Release of the Cloudworks code on an open source licence is imminent and a number of communities and institutions have indicated an interest in having their own version of the site. In addition, there has been interested voiced within the university for a closed student-facing version, and a closed-staff version of Cloudworks. The accessibility audit conducted in phase-two demonstrated good levels of accessibility on the site and most actions have been completed.	evaluation and monitoring which we believe will further enhance usability and usefulness in a variety of settings. These include: multi-party direct messaging, better integration with other communication and networking tools, enhanced personalisation features, support for a wider range of embeds and support and guidance for better accessibility of user generated content. Some outstanding actions remain from the accessibility audit, not least the issue of the inaccessibility of much of the user generated content, including comments, videos, slides, and images. The team believe that the project has a responsibility from promoting accessible professional social networking practices and this will become a key focus for phase-three development.

8. Phase-three development

Phase-three development will take place during the last 18 months of the OULDI-JISC project between August 2010 and May 2012. Staff time allocated for technical development in this phase is reduced as it has been anticipated that most development will have been done by this stage and that increasingly the site should be self-sustaining. The phase-three development roadmap can be found in Appendix 2 and as can be seen, the priorities as we move into phase-three of development are:

- Promoting the sharing of Learning Designs
- Improving Accessibility
- Sustaining and embedding an online community

7.1 Promoting the sharing of learning designs

Although the site is continuing to develop at a steady pace and we are pleased with progress, we are not yet seeing the sharing of worked learning designs between educators which is a key aim for the site. As discussed above, we believe that the reason for this is that educators are using the affordances of the site for sharing new ideas, crowd sourcing and finding out about innovation and best practice in their field, but are then taking that information and developing it into worked designs in other virtual or physical spaces, which better support that activity. We have always recognised that there will never be a definitive site for learning and teaching (Conole and Culver, 2009a); rather we aim for Cloudworks to be part of a network of related sites focused on different communities connected via Application Profile Interfaces (APIs).

What is important to us is that designers are persuaded to come back to Cloudworks to share their finished designs with the people who helped them, and others designing similar learning activities. In order to achieve this, we plan to add to the functionality of Cloudworks to better support the movement between physical and virtual design spaces (this is likely to be through increasing the range of embeds supported, and through the use of side-panel gadgets etc) and in addition, create a private discussion function for short multi-party or community 'closed' discussions.

7.2 Improving Accessibility

> *"Even in today's Web 2.0 of 'user-generated content', the challenge remains of how best to address the accessibility of large quantities of content created by people without the knowledge or tools to ensure this content is created with accessibility in mind. What must be emphasised is that…holistic accessibility does not mean forgetting*

> *about those excluded because of the inherent accessibility barriers present, but that information with accessibility problems can be published so long as these barriers be identified, and appropriate steps taken to support people who may be affected."*
>
> **Sloan and Kelly (2008) cited in the Cloudworks Accessibility Audit, (2010)**

The project team believe that they have a role to play in promoting accessible and open professional networking practices in the university, and in the educational community more widely. Phase-three development will include the writing of a clearly phrased accessibility statement which will be used both on Cloudworks and CloudEngine, and provide an overview of the work done on accessibility on the site, and details of any known and outstanding issues. In addition, support and guidance materials relating to making user generated content as accessible as possible will be developed. This will include for example, information on how to add captioning to embedded videos, the purpose and importance of alternative text for embeds, how to use textual headings to structure content so it can be better understood by someone using a screen reader, and how to quickly check material for good colour contrast for users with visual impairments and dyslexia.

7.3 Sustaining and embedding an online community

The sustained use of the site by a number of groups remains a priority as we move into phase-three. This need will be partly met by use of the site for a series of annual conferences, ongoing and developing use of the site by Elesig, OLnet, SocialLearn, JISC, Moodle, LAMS and the smaller Open University special interest groups such as the eLearning Community, Mobile Technologies Special Interest Group and Library Services, but we will need to continue to promote use by existing communities and develop use of the site by new communities.

There are a number of issues or risks relating to the long term sustainability of the site, not least the challenges of sustaining the use and focus of the site by a wide range of people over time, and the issue of how the site and associated code might be supported once JISC funding finishes in May 2012. We are seeking to maximise the chances of sustainability of Cloudworks in four key ways:

- Promoting sustained use by a variety of core communities
- Releasing the API and Cloudworks code on an open source licence
- Post project support and development
- Sharing developing knowledge and understanding

7.3.1 Promoting sustained use by core communities

During the phase-three development we aim to apply for and secure additional funding in order to develop and add functionality to meet the needs of other groups outside of the scope of the OULDI project, specifically academic researchers. These groups are likely to come from inside and outside of the university. We believed that key to embedding academics use of the site in the university will be greater use of the site for a variety of open professional activities.

7.3.2 Releasing the API and Cloudworks code on an open source licence

The Cloudworks Application Programming Interface (API) was designed towards the end of phase-two, enabling external programmers to develop apps, gadgets, network visualisations for and of the site. The Cloudworks API has already attracted some interest and positive feedback:

> *"The Cloudworks team have been developing an API for Cloudworks to allow developers to create their own visualizations, programs and mash ups. The API currently supports calls to get data and I found this is a great opportunity to test different ways of visualizing and organising the resources within cloudworks for the* [conference]. *XX has created a cloud to store and discuss Cloudworks API tests, my test demos can be found there and the cloud works team are encouraging developers to get stuck in and have a go...There is some excellent documentation on using the API already made available by the Cloudworks team and* [Cloudworks developer] *was happy to provide example code, his PHP example can be seen here... I hope to turn my demos into something more useful and post some specific examples of things that can be achieved using the Cloudworks API".*
>
> **Blog post about using the Cloudworks API**

The API currently only supports calls to get data however it will be expanded in phase-three to provide more response formats.

Phase-three of development will begin with the launch of CloudEngine, the software that powers Cloudworks, on an Open Source licence. The process will be documented in a blog (http://cloudengineblog.wordpress.com/) and the code, support documentation, developers' wiki and issue tracker will be hosted on Bitbucket.org (http://bitbucket.org/cloudengine/cloudengine/wiki/Home).

Figure 20 Graphics designed for CloudEngine, the Open Source version of Cloudworks

In addition, two Google Groups have been set up to support technical discussion and the sharing of resources around the Open Source version:

CloudEngine News https://groups.google.com/group/cloudengine-news

CloudEngine Developers https://groups.google.com/group/cloudengine-developers

It is hoped that developers and institutions that download the code, and use the API, will participate in the process of ongoing development, maintenance and support of the code and associated gadgets.

7.3.3 Post project support and development

The architecture for Cloudworks is hosted on a virtualised system run by the Open University's Institute of Educational Technology (IET) and can continue to run on that for as long as IET hosts systems. Cloudworks is currently supported weekdays only, as are other IET services, and will continue to be so after the funded period. If there is a service failure the site will be restored through the virtualised service backup and restore process which might mean some loss of data but unlikely to be more than 24-hours worth. CloudEngine, the Open Source version, will be externally hosted by http://bitbucket.org and will remain there for as long as that service lasts. Over time, the code may become prone to vulnerabilities and this risk will be monitored. If it became a security risk after the funded period, then a decision would be made on the viability of the service and the remedial effort required. This is true for all of the 'more mature' OU research services - the Knowledge Network for

example is ten years old, seven years of these without funding.

7.3.4 Sharing developing knowledge and understanding

The Cloudworks team have taken care to reflectively blog and report on findings throughout phases-one and two. We have made these documents openly available and have actively promoted discussion and critique of our theories (see for example http://cloudworks.ac.uk/blog/archive, http://e4innovation.com/?cat=18 and http://www.open.ac.uk/blogs/OULDI/?page_id=113). It is hoped that by doing this we enhance our own opportunities for building on our findings, now and in the future, and provide opportunities for others to do so too. Reflection and report documents have been created in many different spaces and for different purposes (Cloudworks, personal blogs, reflective logs, papers and reports to the Open University and JISC) however, most have been collated on the Open University hosted project blog http://www.open.ac.uk/blogs/OULDI/.

8. Final comments

In this report we have provided an interim summary of the development of the Cloudworks site across development phases-one (February 2008 to June 2009) and two (July 2009 to August 2010), including an overview of the theoretical frameworks considered and the decisions made. We have included in this report references and links to findings from our initial evaluations and investigations and have pointed to the future development of the site in phase-three of development (August 2010 to May 2012).

Early evidence suggests, that Cloudworks is one of the sites blurring formal and informal *cultural* and networked learning about being an educationalist, scholar, practitioner or indeed a student (in limited examples) with online interactions and experiences allowing roles to be learned, experiences to be shared, values to be exchanged and – to an extent – identities to be performed and (re)shaped, and communities to gather (Alevizou et al., forthcoming). It is too early in our research to demonstrate empirically more than glimpses of emerging patterns but we have now developed clear ideas about research questions that will inform Cloudworks position within this landscape of practice, as well as guide implications for further systematic research.

We continue to recognise the complexity and challenges inherent in supporting and promoting a collaborative and open learning design process. However, we argue that Cloudworks is a platform where we are starting to see evidence of expressive interactions, crowd sourcing and archiving of issues relating to learning designs and the process of design. We are also staring to see new connections and interactions emerging within Cloudworks (on a given time, for a given purpose, or randomly and serendipitously) which we believe are key in supporting the dialogic and creative process of design. The idea of Cloudworks functioning as a hub between several virtual and physical learning design spaces is both

powerful and visible: we have pointed to evidence whereby designs can be seen to be both negotiated and improved. We do however recognise that we have significant work to do in encouraging and supporting designers in sharing, discussing and archiving worked designs, and promoting the shifts in culture and practice necessary for many educational practitioners in order to achieve this, and benefit from it.

Appendix 1

Cloudworks evaluation reports written during phase-one and two of development:

- *'Cloudworks: a place to share find and discuss learning and teaching ideas and experiences'* in Institutional strategic report The Learning Design Initiative Institutional Projects Phase Two Report: 'Embedding learning design and establishing a reversioning culture'
- Usability Testing Report phase-1 http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Cloudworks-Usability-Testing-evaluation_AnneJelfs.pdf
- Expert Usability Testing Report phase-2 http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Usability-testing-Sep-09.pdf
- Accessibility Audit Report phase-2 http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Cloudworks-accessibility-June-2010.pdf
- User Survey Report phase-2 http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/End-of-phase-2-Cloudworks-user-survey-May-to-June-2010.pdf
- Case study: Using Cloudworks for an Open Review http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Open-Review-Case-Study-FINALv2.pdf
- Case study: Using Cloudworks at Conferences http://www.open.ac.uk/blogs/OULDI/wp-content/uploads/2010/11/Case_study_Using-Cloudworks-at-Conferences.pdf

Appendix 2

CloudEngine/Cloudworks Phase-3 Roadmap Aug 2010- July 2011

Ongoing

Development

NF will be the Acting Lead Developer of CloudEngine/Cloudworks during this period as JC (Lead Developer) will be on maternity leave. He will be supported by RL (Cloudworks Developer).

Time scheduled:

- Acting Lead Developer has one day per week scheduled during this period.
- Cloudworks Developer has six months scheduled over the twelve month period

The role of Acting Lead Developer will include:

- Producing a monthly report for the Cloudworks team and IET on development progress
- Liaising as necessary with OULDI Project Lead and OULDI Project Officer
- Providing technical direction for CloudEngine/Cloudworks
- Ensuring that development work retains strategic focus, including reviewing this roadmap if necessary
- Providing technical support for CloudEngine/Cloudworks and acting as a backup for OULDI Project Officer for first line support.
- Contributing minor enhancements to the site
- Ensuring all contributions to CloudEngine are code reviewed and meet the CloudEngine coding guidelines.
- Managing the release strategies for CloudEngine and Cloudworks
- Developing and facilitating the CloudEngine open-source community
- Contributing to any bids for future development work on CloudEngine

The goal is to allow the Cloudworks Developer to focus on major items of development work and only covering support as an emergency backup (2-3 days per month maximum).

Non-development

OULDI Project Officer:

- Produce regular (e.g. fortnightly) Cloudworks blogs post and newsletter
- Continue to work on encouraging and supporting specific communities with their use of Cloudworks e.g. by running workshops
- Provide first line and non-technical support for Cloudworks
- Continue to study user behaviour patterns

OULDI Project Lead :

- Work on embedding buy-in for Cloudworks
- Bid development

August 2010

Development

- Open Sourcing Cloudworks
  - finish upgrade work
  - Make open-source release candidate available
  - Code reviews changes for release candidate
  - Continue with install script testing and maltwiki change
  - Fix any issues with release candidate and tests on live site
  - Decide on hosting provider and release code

Non-development

- End of phase 1&2 reporting

September 2010

Development

- Open Sourcing Cloudworks
  - Write coding guidelines and migrate relevant bugs to issue tracker

Non-development

- Completion of end of phase-2 reports
- Cloudworks team away-day

October 2010

Development

- Private messaging
  - Review user interfaces for private messaging systems on other social networking sites (e.g. Facebook, Flickr, Twitter)
  - Develop a means for CloudEngine users to send private messages to each other
  - E-mail notifications of private messages
  - Interface for viewing all private messages received and sent
  - Notification on login box of new messages (similar to notification of items under moderation for admins)
  - Consider issues with spam and possible need to block users
  - If time, consider development of non-private direct messaging similar to the wall on Facebook.

Non-development

- Ongoing work only

November 2010

Development

- Create a CloudEngine website
- Plan CloudEngine developer event

Non-development

- Ongoing work only

December 2010

Development

- Improve installation script
    - Review installation process for other open-source PHP-based web software such as Wordpress, Drupal, Moodle
    - Gather feedback on the install process (and if time, do limited usability testing)
    - Alter installation script to automatically create and the data directories required
    - Alter installation script so that manual editing of config files is not required
    - Make install script check SMTP host
    - Make any other changes to the install script and instructions based on review of other software and feedback.
- Improve admin interface
    - Allow admins to make other users administrators
    - Allow admins to block/delete users
    - Allow admins to see a list of all users and also all non-activated users
    - Allow admins to manually activate users and to see activation/forgotten password links for users and to send password resets for a user
    - Allow admins to see a user's username and e-mail address
    - Improve the admin cloudstream (fix broken tabs, and also consider if there is more information that would be useful e.g. showing addition of tags, people following items etc.)
    - When an item needs moderating, send out an e-mail to admins
    - Consider whether it would be useful to have different level of admin roles e.g. may want a role that allows only access to statistics interface. It would be useful to review who is currently an admin for the site and what functionality they need access to, especially if admins are now allowed to e.g. delete users.
    - Admin interface for scheduled tasks (to be used in conjunction with cron).
    - Gather feedback, especially from any users of CloudEngine and from OULDI Project Officer managing support requests, as to useful admin functionality and implement
    - If time, allow users to change their e-mail address (not strictly part of the admin interface, but similar type of change)
    - If time, look at admin interface for reindexing search and how it can be made to not be timed out by a proxy server.
    - If time, consider an interface to allow admins to delete cloudstream events
    - If time, review and improve statistics interface
    - If time, allow admin to see popular search terms on the site

Non-development

- Research and scoping on using Cloudworks for learning design / creating a template for learning design
- Write CloudEngine accessibility statement and 'in-site' accessibility support.
- Update community development roadmap

January 2011

Development

- Host CloudEngine Developer Event

Non-development

- Ongoing work only

February 2011

Development

- Learning design technical development
  - Work to be scoped by OULDI Project Officer in December
  - Focus will probably be on embed support on the site

Non-development

- Review Cloudworks strapline, vision statement etc.
- Focus specifically on teacher training, subject-specific and Further Education communities
- Templates for different types of cloudscape
- Usability testing

March 2011

Development

- ongoing work only

Non-development

- How we will work with Moodle
- Look at Cloudworks user group

April 2011

Development

- Accessibility:
  - Review Accessibility Report from Summer 2010 and make appropriate adjustments
- Ajax
  - Review the site for opportunities to use Ajax to improve the user interface and implement, ensuring Javascript degrades gracefully.
- Improve the user profile
  - Liaise with OULDI Project Lead and OULDI Project Officer over possible improvements to the content of the user profile page and implement

Non-development

- JISC six-monthly report
- Accessibility work e.g. accessibility statement, support for making accessible user-generated content

May 2011

Development

- Improve event support
    - Support for series of events (e.g. the Technology Coffee Mornings or seminar series)
    - Gather feedback on how the site could support conferences better and implement and e.g. compare with other sites such as lanyard, crowdvine, Eventstreams and joined.in as to how event support could be support and in particular how virtual conferences might be supported better
    - Liaise with OULDI Project Lead and OULDI Project Officer over possible improvements to the cloudscape page with the focus on events
    - If time, consider how conference schedules could be represented/implemented

Non-development

- Ongoing work only

June 2011

Development

- Improve activity streams
    - Perform a general review of activity streams on the site
    - Provide activity stream of activity on a user's own content
    - Include additional events such as marking as favourites and attending events in activity streams
    - If time, consider whether similar items can be grouped together e.g. 'X has added 3 links to the cloud…' rather than the display of three separate events
    - Refactor the activity stream code as necessary
    - Review whether activity streams would be useful on the site elsewhere
    - Review RSS feeds and iCal support on the site generally to see whether there are RSS feeds not currently provided that might be useful (e.g. for events/deadlines) and whether the content of the current RSS feeds is useful.

Non-development

- Ongoing work only

July 2011

Development

- Cloudworks Developer working on other projects

Non-development

- Ongoing work only

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