



RePAH:

Research Portals in the
Arts and Humanities

A user analysis project

Appendix A8: Work-Package 5: Managed Research Environment Demonstrator

WP3 Report prepared by David Gerrard and Stephen Brown

<http://repah.dmu.ac.uk/report>



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The RePAH Project

In July 2005, the RePAH Project was commissioned to carry out a survey of user-needs for information portals in the Arts and Humanities by the AHRC ICT in Arts and Humanities Programme. It sought to understand how the arts and humanities research community finds and exploits the internet resources it needs.

In order to do this the RePAH project:

- Examined the existing literature on user needs with regard to web gateways and portals,
- Analysed the web-logs from the Arts and Humanities Data Service (AHDS) subject centres and the Resource Discovery Network's (RDN) humanities and arts web hubs (prior to July 2006 these were known as Humbul and Artifact, but now have been harmonised into Intute-Arts and Humanities)
- Conducted focus groups, interviews and a Delphi exercise with members of the arts and humanities community
- Developed and tested a paper-based demonstrator for a managed research environment to explore possible ways forward with regard to web-based research resources.

The project was carried out in 7 work packages:

- WP1 RePAH Online Questionnaire--this report examines an online survey of the Arts and Humanities Community's use of web resources.
- WP2 Web-Log Analysis--this report analyses web-logs from several of the Arts and Humanities Data Service subject centres as well as Humbul and Artifact of the Resource Discovery Network (now Intute).
- WP3 First Focus Group--this report studies the responses from a series of five focus groups conducted at the University of Sheffield and three interviews from DeMontfort University. Respondents discussed their use of web resources in general and portals in particular.
- WP4 Delphi Exercise--this report considers the results of a Delphi exercise conducted around the feasibility of various web-based tools.
- WP5 Demonstrator of a Managed Research Environment--this report is an exploration of a paper-based demonstrator of a variety of features that might be applied as portlets and used by the Arts and Humanities research community.
- WP6 Phase II User Trials of Portal Demonstrator--this report brought the paper-based demonstrator to scholars in eight subjects within the Arts and Humanities community and asked them to evaluate the features and functionality of possible portlet tools.
- WP7 Intute in Light of this Report--this report explores Intute-Arts and Humanities with reference to the features and functionality explored in the paper-based managed research environment demonstrator.

Additional appendices within the RePAH Project report include an overview of the Arts and Humanities research community [Appendix A2], and a review of the literature relevant to user requirements for digital resources and web-based research facilities [Appendix A3].

This appendix reports on Work Package 7 which examines Intute-Arts and Humanities with reference to the features and functionality explored in the paper-based managed research environment demonstrator, as well as some the data harvesting of the AHDS by Intute.

To see the full report and the other appendices see <http://repah.dmu.ac.uk/report>.

A8.1 Introduction

This is the report on work package 5 of the RePAH project. For the full report see <http://repah.dmu.ac.uk/report>. The main thrust of the RePAH investigation has been evaluative, that is to say it aimed to “discern patterns of use and to collect qualitative statements regarding the use and improvement of the various [...] components.”¹ In broad terms this approach can be situated within the design-based research paradigm (Barab and Krishna 2001; Brown 1992; Collins 1992; Sandoval and Bell 2004; Shavelson et al. 2003). Design-based research is carried out in a continuing cycle of design, enactment, analysis and redesign (Design-Based Research Collective 2003). Within this study we have picked up the cycle at the enactment stage, conducted an analysis of the current picture and used the redesign stage to explore user reactions to possible future functionality through prototype demonstrators.

The purpose of the demonstrators is to obtain formative evaluation feedback that can guide further development. User feedback can also help developers to improve their understanding of the problem being tackled and help potential users to refine their own understanding of their preferences and needs.² This is a vital step in the design and development of all products because even if the resulting product is not perfect, it will be better than if no user testing were carried out at all. It is never too early to test and involve future users in the design process. Ross et al.³ recommend using methods such as focus group discussions and interviews for this kind of evaluation. The RePAH project therefore used a second round of focus groups and interviews to present a series of examples to researchers to gauge their responses to the functionality offered. The examples were based on the lists of features generated by the questionnaire (Appendix 4), combined with the outcomes of the interviews and focus groups (Appendix A6) and subsequently refined by a Delphi exercise (Appendix A7).

From this list, a series of wireframe graphical mock-ups was created to be evaluated in the final set of focus groups, in order to judge the reaction of researchers and to elicit further requirements for research portals.

The shortlist of requirements was:

1. Ability to conduct simple searches across disparate data collections.
2. Ability to share ongoing research work, notes and ideas with research collaborators.
3. Ability to publicise and disseminate completed work, and comment upon other such work completed by peers.
4. Ability for comments / reviews / peer moderation to influence searches by flagging up content that has been deemed legitimate.
5. Ability to browse through disparate resources as well as search.

¹ Peterson, E., York, V. 2003 User-Evaluation of the Montana Natural Resource Information System (NRIS). D-Lib Magazine July/August 2003 9 (7/8) <http://www.dlib.org/dlib/july03/peterson/07peterson.html>

² Ross, S., Anderson, I., Green, D., Albrecht, K. DATE The NINCH Guide to Good Practice in the Digital Representation and Management of Cultural Heritage Materials. Humanities Advanced Technology and Information Institute, University of Glasgow. <http://www.nyu.edu/its/humanities/ninchguide/XII/> Consulted 06/02/02

³ Ibid.

6. Moderation, submission and creation of content by community as opposed to central authority.
7. Inclusion of news feeds and current event information.
8. Ability to create new searches within the context of existing searches.
9. Inclusion of information background information about the creator of a piece of content, which would allow the user to assess their “point of view”.
10. Inclusion of IPR and copyright information about resources.
11. Tracking of the user’s use of resources discovered via the portal.

NB the requirement to access all journals was not explicitly included since journals are content, whereas the demonstrator was primarily concerned with functionality. Journal access is subsumed within requirements 5, 6 and 8 above.

A8.2 The Demonstrator

The demonstrators have been designed to be essentially modular in nature to allow extension and personalisation. As a result, they do not cover all the potential functionality of a system of this sort. Instead, the following are highlighted:

- **The system homepage:** what the researcher would see when they logged on using Shibboleth or similar authentication system.
- A typical **set of search results** that the user would see after conducting a Google Scholar search from within the system framework.
- An example of an **annotated web page** that a researcher has visited and provided comments about.
- An example of the **usage history** for a resource: in this case a paper in an online repository, though it could be a website, an online article, an entire journal, a dataset, a book from the library etc.
- The researcher’s **bookmark** management system. Again, all types of resources could be bookmarked, not just web pages.
- The researcher’s **online CV**. This would contain a short biography, their current job title and location and information about their projects (current and previous), their professional associations and a record of their publications.
- A **project management** page showing details of the project team and linking to all shared documents generated by the project, as well as email and shared bookmarks that team members had collected.
- A list of the researcher’s collaborators or **research partners**. This page would also provide access to all the documents shared by research partners, all the email sent by and to them, and all the bookmarks they have shared, as well as links to their online CVs.

The wireframes and more in-depth notes regarding them are contained on the pages that follow. The diagram below shows a high-level architectural diagram showing how the demonstrator system might work; involving collaboration between software on the user’s desktop, servers hosted by individual institutions and a centrally managed (presumably by the JISC) database.

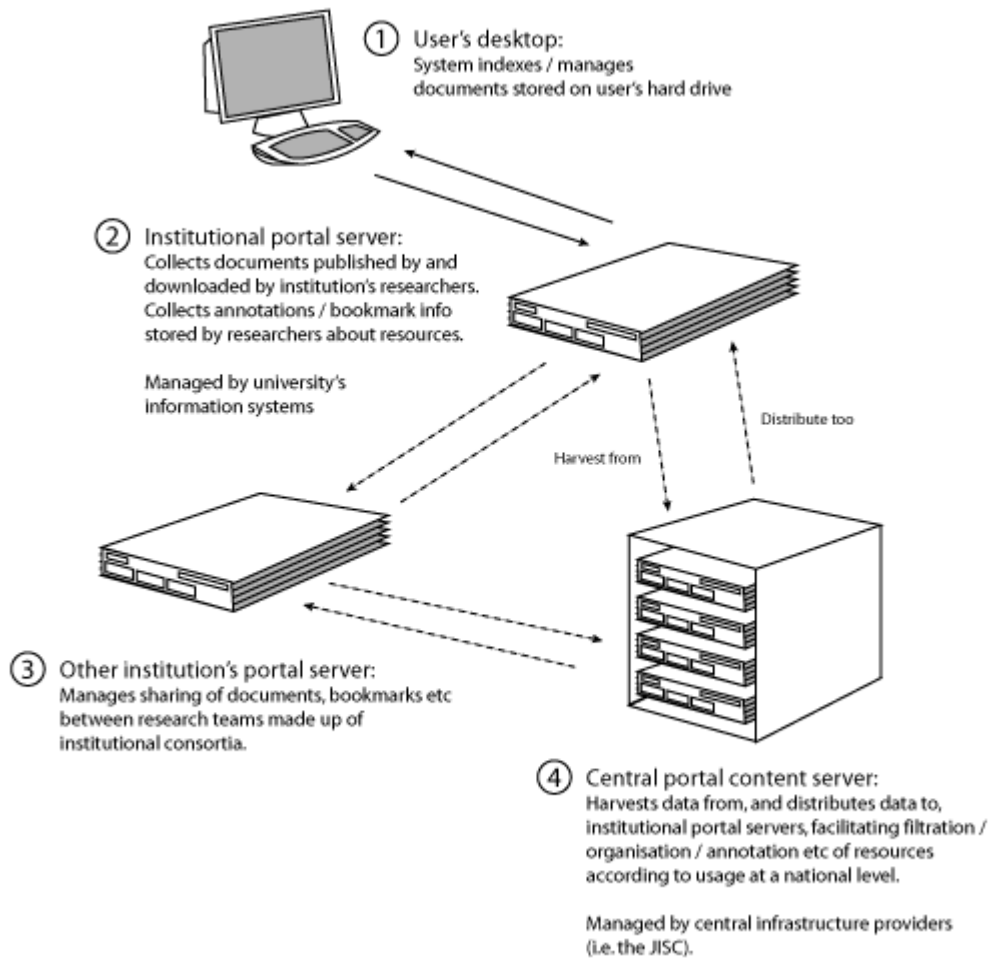


Figure 1

A8.2.1 The researcher's homepage

The screenshot shows the researcher's homepage for Prof. Mark Greengrass. It features several sections: a search bar at the top, a welcome message, 'Your documents' table, 'Your news feeds' section, 'Your projects' list, 'Your bookmarked resources' table, 'Your research partners' list, and 'Frequently used resources' table. Red arrows and numbers 1-6 point to specific elements: 1. Search bar, 2. Activity bar (search engine dropdown), 3. Your documents (table), 4. Chosen news feeds (news item), 5. Bookmarks, CV, projects and partners (project list), 6. Frequently used resources (usage table).

1 Search bar

2 Activity bar

3 Your documents

4 Chosen news feeds

5 Bookmarks, CV, projects and partners

6 Frequently used resources

Figure 2

The first of the demonstrator layouts is the researcher's homepage, which (as all good homepages should) provides a general overview of the functionality of the entire system and a way into all the different areas (most of which are covered in detail in the remaining sections). The notes below refer to the key in the diagram above:

1. The **search bar** at the very top of the page would probably be a "tool bar" of some sort in the researcher's browser rather than part of a web page. It would work in

exactly the same fashion as the search bar in the Firefox browser (from which the idea originates), with a field for the search term and a dropdown that allows the user to choose which of a list of search engines the term should be searched for within. Please note that the local university's library OPAC might be one of the suggested search locations. Please also note that the institution might make new options available, and the researcher might also be able to customise this list with their favourite search engines (also as per Firefox).

2. The blank space below the tool bar is a kind of “**activity bar**” which changes to include functionality relevant to the different parts of the system when the researcher is within them (covered in the remainder of this Appendix).
3. **Your documents:** this is inspired heavily by the Google desktop application, which indexes and searches documents on your local hard drive. Please note: it would probably be more useful to restrict such an index and related search functionality to a dedicated “research area” of the local file structure, so that the system isn't clogged up with shopping lists etc. In fact, it is debateable whether or not such a “research area” would be best placed on the local hard drive: it would probably be better to store them on a local, always on document server to allow easier sharing of project documents
4. **News feeds:** both Google desktop and Firefox allow the inclusion of content from standard RSS news feeds, so this system shows the same type of function (in this case showing a potential “DRHA 2006” conference news feed). The researcher would merely need to know the address of the RSS feed to set this functionality up (it's not called “Really Simple Syndication” for nothing...) This functionality would obviously rely upon the increasing provision of RSS news feeds by people such as conference organisers, the JISC, the AHDS etc.
5. Links to **bookmarks**, the researcher's **CV**, **projects** and **research partners** will be covered in more detail in the section of this Appendix that follow.
6. **Frequently used resources:** would allow researchers to browse as well as search for resources, by making the resources that the rest of the research community have been accessing available. As mentioned in Section 2.1 above, if the local research portal server were in communication with a central JISC research server (that amalgamated research resource usage data from all HE Institutions), the researcher could widen the scope of this function to see what websites, papers, datasets, books and so on researchers from across the UK were accessing. They would also be able to narrow it down to see what resources their project partners had accessed recently. The inclusion of CV and HR information would also allow filtration by academic level (e.g. postdocs) and by subject area.

A8.2.2 Search results page

The screenshot shows a Google Scholar search results page. At the top, there is a search bar with the text 'religious pluralism' and a dropdown menu set to 'Google Scholar'. Below the search bar, there is an 'Order:' dropdown set to '100' and a 'results to show from:' dropdown set to 'Visited'. The search results are filtered by 'Postdoctoral researchers' and 'Researching History' at the University of Sheffield. The page is logged in as 'Prof. Mark Greengrass'. The search results are displayed in a table with 6 rows. Each row contains a result title, author, and a 'Resource usage history' section. The 'Resource usage history' section for each result shows the number of researchers who visited, referenced, and annotated the resource. Two red circles with numbers 1 and 2 are placed over the page. Circle 1 points to the activity bar at the top right, and circle 2 points to the 'Resource usage history' section of the first result.

1 Activity bar options allow filtered results to be returned

2 Resource usage history information

Result	Title	Author	Resource usage history
1:	Secularization Debate: Church, State, and Society in Late Medieval and Early Modern Europe, ca. 1300 ...	PS Gorski - American Sociological Review, 2000 - JSTOR	Visited by 86 researchers Referenced by 10 researchers Annotated by 6 researchers View full usage history >
2:	BOOK: persecutions in Bavaria: popular magic, religious zealotry and reason of state in early mode...	W Behringer - 1997 - books.google.com	Visited by 78 researchers Referenced by 14 researchers Annotated by 1 researchers View full usage history >
3:	Religion in Modern Britain: Changing Sociological Assumptions	G Davie - Sociology, 2000 - CambridgeUnivPress	Visited by 77 researchers Referenced by 8 researchers Annotated by 3 researchers View full usage history >
4:	The Economic Ascent of the Middle East's Religious Minorities: The Role of Islamic Legal Pluralism	T Kuran - JOURNAL OF LEGAL STUDIES-CHICAGO-, 2004	Visited by 74 researchers Referenced by 10 researchers Annotated by 0 researchers View full usage history >
5:	French Historians and Early Modern Popular Culture	S Clark - Past and Present, 1983 - JSTOR-urns.uchicago.edu	Visited by 77 researchers Referenced by 8 researchers Annotated by 3 researchers View full usage history >
6:	Modes of Religious Pluralism under Conditions of Globalisation	O Rüs - International Journal on Multicultural Societies (IJMS), 1999	Visited by 77 researchers Referenced by 8 researchers Annotated by 3 researchers View full usage history >

Figure 3

This page design shows the first few results of a search using Google Scholar, undertaken with the **search bar** described in the homepage section above.

1. Using the functionality that has become available in the **activity bar**, the researcher has chosen to increase the number of results from the Google default of ten to 100, and has returned this set to the local institutional portal server.
2. Once the result set is held locally, it can be cross-referenced **against resource usage data** indicating how it has been used by other researchers. In this example, the researcher has chosen to order the 100 results to show those resources most commonly visited by postdoctoral history researchers from the local institution, the University of Sheffield. Each result in the list is augmented by information about the number of researchers that have visited it, the number of references that exist to that

resource in other known resources, and the number of (publicly available) notes that have been left by researchers who have accessed the resource.

This idea is an attempt to fulfil the user requirement for “quality control” of Internet resources, though it does fall some way short of the original requirement of: “... a list of sites deemed worthy of consideration after the application of a standardised set of criteria, which could be cross-referenced with the list of sites that were not deemed worthy of consideration, with the reasons why they were not included in the original list.”

Given that Google searches quite regularly return result sets in the tens of millions, this request was deemed somewhat impractical! Also, there is a distinct possibility (highlighted by usability research conducted during the Aria project) that a lot of researchers might not agree with the criteria used to select “worthy” resources and would thus not trust a system of that sort, even if it were possible to set one up.

While on the subject of the large result sets that Google returns: it must be noted that this system would only allow filtration and ordering of result sets divided into blocks of 100 – 200 maximum. A system that allowed functionality such as the ability to “Search Google to show *all* results ordered by those most visited by post-doctoral history researchers at DMU” would require the retrieval and cross referencing of entire Google result sets: often in excess of 25 million results. This might be achievable, but probably only if the JISC set up this type of system *with* Google Inc. itself and licensed its entire index. To do so would most likely preclude the use of any other search engine in the system.

A8.2.3 Web page annotation

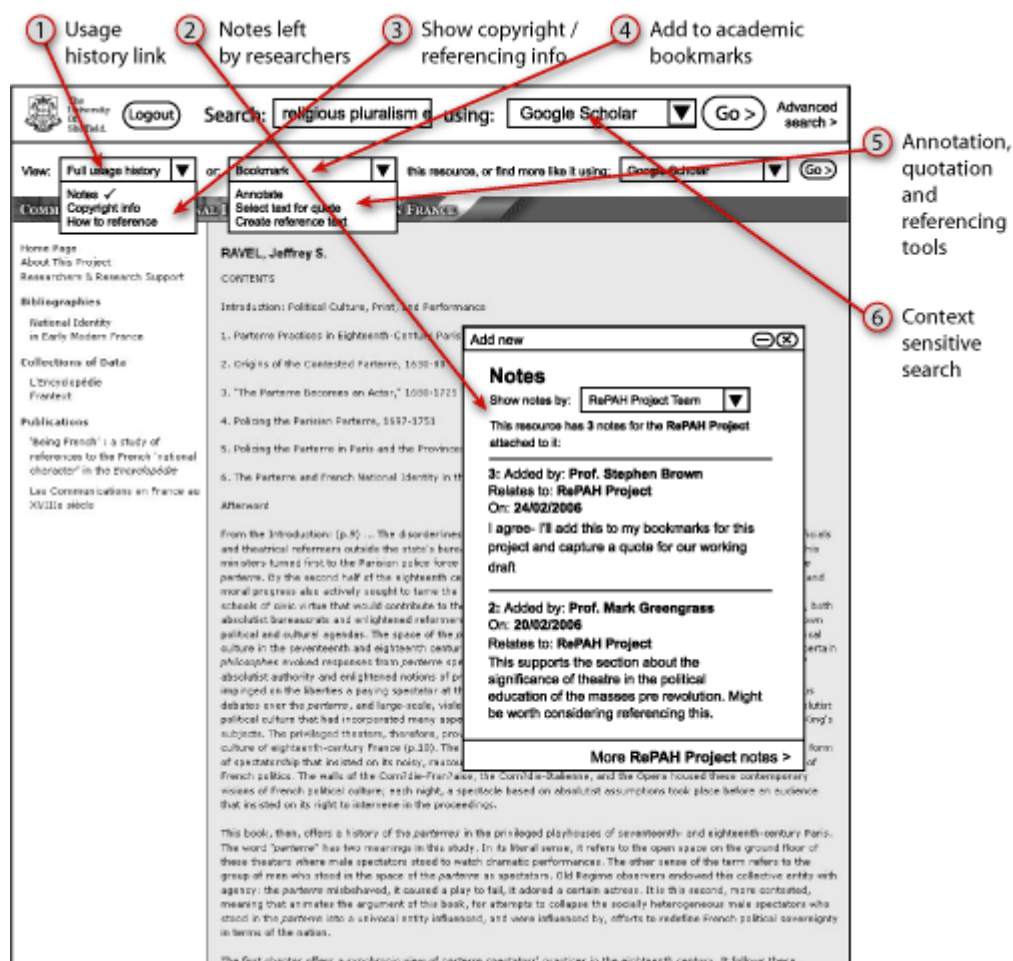


Figure 4

This design shows a web page visited by a researcher who is logged into the system. It is heavily inspired by the Diigo social bookmarking and website annotation system, for which animated demonstrators are available (as Flash movies) at:

http://www.diigo.com/help/flash_tutorial

This functionality would work by intercepting the HTML from this page at the local institution’s portal server, searching for any metadata related to the URL of this page, then adding it to the original resource’s HTML. This would allow for the “notes stuck to the front of the page” effect shown in the design. The demonstrator indicates the following functionality.

1. A link to the full **usage history** for this web page (see A8.2.4).
2. Any **notes** attached to this page (shown “switched on” in the design). As with other types of information, the researcher would be able to change the “scope” of the notes to show ones kept completely private, ones shared between project partners (shown in the design), ones to be kept within the local institution (which might perhaps be the

best default setting when new notes are added) and ones that are “public” to research within UKHE.

3. Access to information regarding **copyright / ownership** of the information within the page (where provided by the page’s creator / publisher), alongside information about **how to reference** the page.
4. A **bookmark** function, which would add the page to their research bookmarks (see A8.3.5), rather than their standard browser bookmarks.
5. A means of **annotating** the page themselves, selecting a block of HTML text from the page to use as a **potential quote**, or generating the text necessary to **reference** the page.
6. The researcher would be able to leverage key words stored about the page (either from the page itself, or perhaps from Google etc) to perform a **context sensitive search** for more pages / resources like this one using one of their chosen search engines.

A8.2.4 Resource usage information

The screenshot displays the 'Resource Usage Information' page for a document. The page is divided into several sections:

- About the resource:** Contains metadata such as Title, Author, Abstract, URI, and Source. It also includes buttons for 'Open' and 'Synchronise desktop, local and online versions'.
- Local usage history:** Shows 'Personal use' with dates for 'First downloaded' and 'Last accessed', and 'Institutional use' with 'First downloaded to local document store' and 'Downloaded by'.
- Related to documents:** Lists documents that reference the resource and publications that reference it.
- Copyright information:** States 'Copyright © Blackwell Publishing Ltd 2000 All Rights Reserved'.
- Referenced in:** Lists other papers published in the same area, with a 'MORE >' link.
- Reference using:** Lists researchers who have used the resource, with a 'MORE >' link.

Annotations on the right side of the page, indicated by red circles and arrows, identify key features:

- 1 Basic info.
- 2 Researcher's personal usage history
- 3 Resources that reference this resource
- 4 Rights and referencing info.
- 5 Institutional usage info.
- 6 Synchronise desktop version with institutional and online versions

Figure 5

This page shows more in-depth information about a resource. It could be accessed by selecting “view full usage history” from the activity bar when viewing the resource after searching for it online (see A8.2.3), or by looking at a bookmark (see A8.2.5), or by browsing through the “frequently used resources” selected by other researchers from the local institution or UK HE as a whole (see A8.2.1). It would also be possible for the researcher to view the usage histories of their own publications via their CV page (see A8.2.6).

Resources could be papers / articles, web pages, news stories, library books (with data held on the local OPAC), datasets etc. The page contains:

1. **Basic information about the resource** (e.g.: author, brief abstract, publication dates etc).
2. **Personal usage information** that would track when the user had first found the resource, which documents the researcher had created that referred to the resource, and which of the researcher's publications contained an official reference to it.
3. Links to **other resources that refer to this one**.
4. **Ownership and referencing** information.
5. **Institutional or wider UKHE usage**, indicating of how many / which other researchers had accessed the resource. The researcher would be able to change the scope of this survey (and potentially filter by subject, academic level etc) as before.
6. Functionality to compare the user's desktop version with a copy held in an institutional (e.g. University-wide) **document store**, and the "original" online version.

Notes related to a resource that previous researchers may have left could also be included in this page (but are not shown in the demonstrator).

A8.2.5 Bookmark management system

The screenshot shows a web interface for managing bookmarks. At the top, there is a search bar with the text 'religious pluralism' and a dropdown menu set to 'Google Scholar'. Below the search bar, there are options to show 20 bookmarks, ordered by 'Most recently added', and filtered by type 'All'. The user is logged in as 'Prof. Mark Greengrass'. The main heading is 'Your bookmarked resources'. The first bookmark is expanded, showing details for 'Johann Heinrich Alsted 1588-1638: Between Re...'. This expanded view includes a title, URI, a table of related documents, a table of publications that referenced the resource, a 'Latest' note, and a 'View full resource usage history' link. To the right of the expanded view, there are four numbered annotations: 1. 'Expanded bookmark' pointing to the expanded view; 2. 'Latest note regarding bookmarked resource' pointing to the 'Notes about this resource' section; 3. 'Links to documents that refer to bookmarked resource' pointing to the 'Referenced in your publications' table; 4. 'Bookmarks can be filtered by type' pointing to the 'and filtered by type' dropdown menu.

1 Expanded bookmark

2 Latest note regarding bookmarked resource

3 Links to documents that refer to bookmarked resource

4 Bookmarks can be filtered by type

Figure 6

This demonstrator page shows:

1. A set of the researcher's bookmarks, with the first in the list "expanded" to show a fuller set of information. Clicking on the button to the right of each bookmark (viewable without expansion) would take the user to the resource itself (see A8.2.3 above), while clicking the "View full resource usage history" link at the bottom right of an expanded bookmark would take the researcher to the resource's usage history page (see A8.2.4).
2. Expanded bookmarks also show the latest note added about a resource.
3. Expanded bookmarks also link to documents and publications in which the researcher had referenced the resource.
4. Bookmarks are filterable by type of resource.

Bookmarks would not necessarily be added to this list by the researcher alone: they could also be added by research partners in reference to projects etc (not shown).

A8.2.6 Researcher's online CV

The screenshot shows a web interface for a researcher's online CV. At the top, there is a search bar with the text "enter keywords" and a dropdown menu set to "Google Scholar". Below this, a "View" dropdown is set to "the version saved on: 18/12/2005", with a "Roll back to" button and a "Publish changes >" button. The user is logged in as "Prof. Mark Greengrass".

The main content area is titled "Your CV" and includes a "Biography" section with a text area and an "Update >" button. To the right of the biography is a "Current position held:" section with fields for Title, Institution, Faculty, and Department, and an "Edit >" button. Below this is an "Associations:" section with a list of four associations and an "Add >" button. At the bottom right is a "Career history:" section with fields for Job title, Add from, and Add to, and an "Add >" button. A "Publish all changes >" button is located at the bottom right of the main content area.

On the left side, there are sections for "Research Projects" and "Publications", both containing tables with columns for #, Title, Started, Ended, and Published, and "More >" buttons. At the bottom left, there are links for "Terms and conditions of use", "Help", and "Send feedback".

Five numbered callouts point to specific elements:

- 1: Points to the "Current position held:" section.
- 2: Points to the "Associations:" section.
- 3: Points to the "Publications" table.
- 4: Points to the "Add >" buttons in the "Associations:" and "Career history:" sections.
- 5: Points to the "Roll back to" button.

Figure 7

The idea of an online CV is inspired both by existing online academic CVs (the head of De Montfort's Centre for Computational Intelligence has a comprehensive one at: <http://www.cci.dmu.ac.uk/index.php?i=5&id=1> for example) and by professional social networking sites such as LinkedIn (<http://www.linkedin.com>) and Ecademy (<http://www.ecademy.com>).

It is anticipated that this information would need some kind of input from an institution's HR Department to at least confirm details of the researcher's job title, qualifications, career history etc (shown a 1 above). It would also be necessary to link this page to an institutional "publication repository" of the type being considered to aid the computerisation of the RAE, in order to confirm details of a researcher's publication history. Clicking on one of the

publications (shown at 2) above would show the full usage history as described in A8.2.4. The page design also contains links to professional / academic associations and societies of which the researcher is a member (shown at 3 above).

This page design shows the state of the screen as the researcher administers their own CV, which means that:

4. Buttons to edit or upload new information are present, and the button to contact the researcher is greyed out. (Please also note that the researcher's contact details would not be shown on this page to prevent spamming).
5. The activity bar allows the researcher to view and roll back to previously saved versions of their CV.

As mentioned previously: it is vital to the proper running of this system that the information within a researcher's CV is made available, as reviewing a CV is an important method for fellow researchers to attach provenance to notes left by the researcher (aside from the fact this is very useful information to have available when preparing bids, attending conferences etc).

This method of providing provenance is perhaps the strongest aspect of the arts and humanities that exists within the demonstrator: other subject areas usually have other ways of attaching provenance to research (e.g. empirical testing), but in the arts and humanities the research history, reputation and track record of the researchers themselves (i.e.: how informed their point of view is) becomes much more of an issue.

A8.2.7 Project information page

The screenshot shows the 'RePAH Project Information' page. At the top, there is a navigation bar with a search box, a 'Logout' button, and a 'Go >' button. Below this, a dropdown menu for 'Send email to:' is open, showing names like 'Jared Bryson', 'Stephen Brown', 'Robert Ross', and 'David Gerrard'. The main heading is 'RePAH Project Information'. The page is divided into several sections:

- Project documents:** A table with columns for '#', 'Title', 'Creator', 'Modified', and 'Expand'. It lists documents like 'repahReportHeadings.doc', 'draftHeadings.doc', 'posterCopy.doc', 'managementMinutes20_0...', and 'bibStudFocusGroup.doc'.
- Project team:** A section with a 'Name:' field and a list of team members: Stephen Brown (Inst. DMU), Jared Bryson (UofShef), David Gerrard (DMU), and Robert Ross (DMU).
- Project news feeds:** A section with 'Latest:' news items, including one received on 01/03/2006 from 'AHDS ICT Guides'.
- Project email:** A table with columns for '#', 'From', 'Subject', 'To', 'Received', and 'Expand'. It lists email messages from Stephen Brown, Mark Greengrass, and Jared Bryson.
- Resources bookmarked for project:** A table with columns for '#', 'Title', 'Added by', 'Type', 'Added', and 'Expand'. It lists bookmarks like 'AHRC ICT Strategy Home', 'Grid computing: making the globa...', 'British Academy Portal', 'Making the LEAP', and 'Use of VREs in Collaborative Res...'.
- Funding news feeds:** A section with 'Latest:' news items, including one received on 18/02/2006 from 'The JISC'.

Annotations 1-6 are placed on the right side of the page, with red arrows pointing to specific elements:

- 1 Project team members
- 2 Project documents
- 3 Project email archive
- 4 Project bookmarks
- 5 Project links in activity bar
- 6 RSS feeds relevant to project and funding issues

Figure 8

This demonstrator page shows all the information about a particular project (in this case the RePAH project itself). Note that this page is actually a “stage down” from the “index of projects” (not included in the demonstrator layouts), which would probably look something like the bookmarks and partnership management pages.

The project information page shows:

1. The members of the **project team**: clicking their names would display their CV (as per A8.2.6).
2. Project **documents** created by all the team members and uploaded to the RePAH project folder on the local institutional portal server to allow sharing between team members. Following links to documents would display their usage history page (see A8.2.4).
3. **Email** sent between team members regarding the project. Note that the researcher can see messages they have sent, they have received and those sent to the whole team group.
4. Project **bookmarks** collected by the whole team (see A8.2.5).
5. The **activity bar** for this page, which contains a short cut to creating email, a link to the official “public” project website and a button that archives completed projects (probably only available to the project director, who would probably also be able to re-activate projects too).
6. Also shown are two **news feeds**. The first is related specifically to the project itself, and new RSS feeds could be added by all members of the project team. The second is a “general project funding” news feed, which would probably also be included in the “index of projects” page (mentioned above but not provided within these layouts), and visible on every other project page too.

The project management section of the demonstrator is very similar to document sharing and collaboration tools such as Microsoft Sharepoint:

<http://www.microsoft.com/uk/office/sharepoint/prodinfo/default.aspx>

A8.2.8 Research partner page

The screenshot shows a web interface for a researcher's research partners. At the top, there is a search bar with 'religious pluralism' and 'Google Scholar' selected. Below the search bar, there are filters for 'Show: 10 research partners, ordered by: Alphabetically' and 'and filtered by project: All'. The user is logged in as 'Prof. Mark Greengrass'. The main heading is 'Your research partners'. The first partner is 'Professor Stephen Brown' from 'De Montfort University'. The interface includes sections for 'Latest document', 'Latest email', and 'Latest bookmark' for each partner. There are also 'Contact' buttons for each partner. Red arrows point from numbered callouts (1-4) to specific features: 1. 'View shared documents' points to the 'Latest document' table. 2. 'View projects involving collaboration with this partner' points to the 'Collaborating on:' section. 3. 'Read email from partner' points to the 'Latest email' table. 4. 'View your partner's public bookmarks' points to the 'Latest bookmark' table.

1 View shared documents

2 View projects involving collaboration with this partner

2 Read email from partner

3 Visit partner CV page

4 View your partner's public bookmarks

Figure 9

The final layout shows the researcher's project partners, which they would use in a similar fashion to their bookmarks (see A8.2.5). This page would:

1. View all the documents shared with their partners (see A8.2.4).
2. Link to the projects they were working with their partners upon (see A8.2.7).
3. Read email sent to and received from partners.
4. Allow the researcher to contact and view the CV (see A8.2.6) of all the partners they were currently working with.
5. View all bookmarked resources recommended by partners.

A8.3 The technologies

As noted in the above descriptions, several of the proposed demonstrator features were inspired by tools and services already available on the web. Whatever forms of ICT support structures are developed in future to facilitate arts and humanities research they will necessarily both reflect and be constrained by what is happening elsewhere on the web.

Four major developments are currently discernible:

- Internet 2
- Grid computing
- Semantic web
- Web 2.0

Internet2

Internet 2 is a US initiative to develop and deploy advanced network applications and technologies for research and higher education. Internet2 efforts are focused on:

Advanced network applications are enabling collaboration among people and provide interactive access to information and resources in ways not possible on today's commercial Internet. Interactive distance learning, remote access to unique scientific instruments, real-time access to large databases, and streaming high-definition video are all possible with high-performance networks.

New network capabilities such as Quality of Service, multicasting, and IPv6 are being aggressively tested and deployed in the networks used by Internet2 members. These capabilities support advanced network applications today, and will enable tomorrow's commercial Internet to provide the reliable performance advanced applications require.

Middleware, the behind-the-scenes software, is providing security, directories and other services required by advanced network applications. In today's Internet, applications usually have to provide these services themselves, which leads to competing and incompatible standards. By promoting standardization and interoperability, middleware will make advanced network applications much easier to use.

High-performance networks are linking the campuses and laboratories of over 200 Internet member institutions. The high-performance networks participating in the Internet2 project provide the environment in which new network applications and capabilities can be deployed and tested. For further information see www.internet2.org

Grid computing

The Grid is an architecture proposed to provide an infrastructure that enables flexible, secure, coordinated resource sharing among dynamic collections of individuals, institutions and resources.' In this context the term "resource" includes computational systems and data storage and specialised experimental facilities as well as the kinds of data and objects more commonly recognised as resources by arts and humanities researchers. The purpose of the Grid is to support collaborative research enterprises that require access to very large data collections, very large scale computing resources and high performance visualisation back to

the individual user scientists. Grid developments thus underpin the future of the UK eScience programme which, since 2006, includes the Arts and H. The UK e-Science Programme is fostering the development of IT and grid technologies to enable new ways of doing faster, better or different research, with the aim of establishing a sustainable, national e-infrastructure for research and innovation. The UK e-Science Programme is a coordinated initiative involving all the Research Councils and the Department of Trade and Industry with funding of £230 million from 2001-06. It has also leveraged industrial investment of £30 million. The Engineering and Physical Sciences Research Council manages the e-Science Core Programme, which is developing generic technologies, on behalf of all the Research Councils. For further details see <http://www.rcuk.ac.uk/escience/>.

The Semantic Web

The idea of the Semantic Web was developed by Tim Berners-Lee, web visionary and Head of the World Wide Web Consortium (W3C).

“The Semantic Web is not a separate Web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation.”

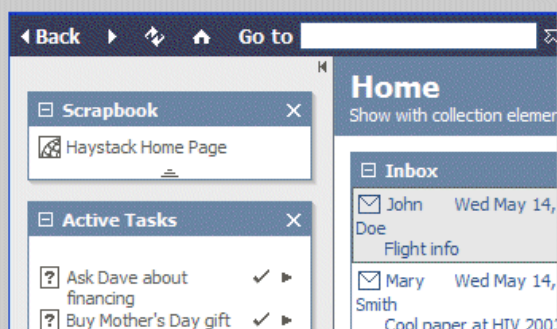
Tim Berners-Lee, inventor of the World Wide Web (Berners-Lee et al 2001).

Put simply: where the "old" Internet of simple HTML could only provide links with the simplicity of "A links to B", semantic web technologies allow the crucial extra step of "A links to B *because...*They allow resources to be linked together *meaningfully* (hence "semantic web").

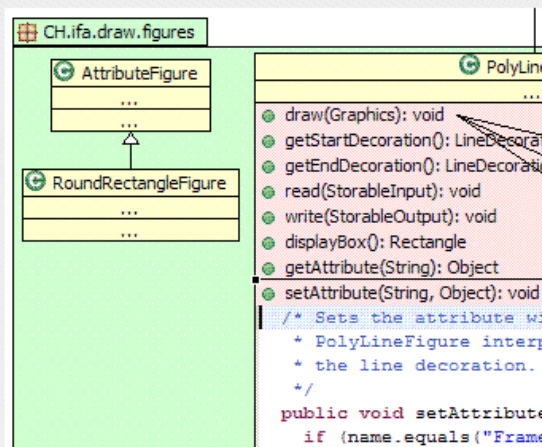
This really does make a lot of difference if your application relies upon amalgamating a variety of disparate online resources (or in other words: if you're making a portal). You can be a lot more intelligent in how you organise them, you can give the user more filtration and re-ordering options, for example, or you can easily flag up who put the resources there, and why. Figure 10 below is an example of a Semantic Web based Personal Information Manager, developed by MIT, that shows how this kind of data integration and filtering could work.

The Semantic Web relies on users being able to agree quite precise definitions of the meanings of terms or concepts and also the relationships of different terms with each other. These formal concept/relationship definitions or schema are known as ontologies and these ontologies are used to “mark up” objects or resources with metadata that web agents can then find and correlate with other resources and users’ needs and profiles. Semantic Web technologies are likely to underpin the future of the next generation Web and any portal services in the foreseeable future are likely to employ Semantic Web Technologies. However, a lot of knowledge, even scientific knowledge, cannot be described in a logical way and in the Arts and Humanities, where a lot of “knowledge” is the result of heuristics and associative thinking the semantic web poses substantial problems for use as a refined research tool. For a relatively jargon-free introduction to the Semantic Web see <http://www.archimuse.com/mw2006/papers/lowndes/lowndes.html>

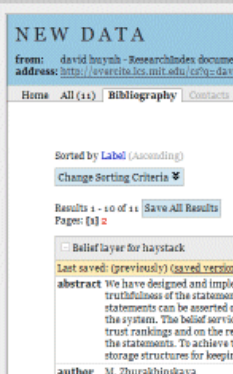
the universal information client - The **Haystack client** provides everyday information management capabilities such as scheduling appointments, reading and creating email, and organizing photo albums. It explores the bringing of information to a single location in order to let users' focus on information instead of programs.



relationship based exploration - The **Relo** plugin for Eclipse is designed to help users explore and understand portions of large information spaces. We are currently focusing on the software domain.



bookmarks on steroids - The **Piggy-Bank** extension is designed to let users of the Firefox browser collect and browse "semantic data" linked from ordinary web pages (in the form of RDF).



re-finding previously seen information - The **Re:Search** browser extension is designed to let users of the Firefox browser have their past search results seamlessly integrated into the current results.



Figure 10. MIT Haystack Semantic Personal Information Manager Source: <http://haystack.lcs.mit.edu/> [Accessed 28 August 2006]

Web 2.0

Web 2.0 is a new phenomenon identified by Tim O'Reilly in the wake of the dotcom bust. He defines Web 2.0 as

- Services, not packaged software, with cost-effective scalability
- Control over unique, hard-to-recreate data sources that get richer as more people use them
- Trusting users as co-developers
- Harnessing collective intelligence
- Leveraging the long tail through customer self-service
- Software above the level of a single device
- Lightweight user interfaces, development models, AND business models

Some researchers are already familiar with popular Web 2.0 services such as Flickr (<http://www.flickr.com/>), Delicious (<http://del.icio.us/>) and MySpace (<http://www.myspace.com/>). Flickr allows users to upload images with descriptions, annotations and associated metadata

("tags") via an easy to use web interface. Image collections can be kept private or shared with a specific group only, but Flickr is largely a social space where people share images and comments and the more users, images, comments and tags there are, the richer the resource becomes. The idea of "social tagging" aka "folksonomies" is currently being explored by the steve.museum project. "Steve" is a collaborative research project exploring the potential for user-generated descriptions of the subjects of works of art to improve access to museum collections and encourage engagement with cultural content. (<http://www.steve.museum/>)

Delicious is a forum for storing and sharing web bookmarks. Again users may keep their bookmarks private or share them with selected individuals only but the main reason for the popularity of Delicious is the ability to share, link to and browse other people's bookmarks to create vibrant overlapping communities to shared interests.

MySpace is unashamedly a social phenomenon in which individuals create home pages with personal profiles, interests, diaries, comments from visitors, links to their MySpace friends, to other websites, to music, etc. It acts as a virtual space within which to meet people based on published personal information e.g. ("I like eating hot chillies"), tracked behavioural patterns (e.g. number of times different discussion for a were accessed or music files were downloaded), and emergent characteristics (e.g. number and type of other people who create a link to your page from theirs).

A brief explanatory note is in order here to dispel any potential confusion between the terms "Web 2.0" and Web services" Web 2.0 is a conceptual model of how the Web can be, while Web services are a set of technical standards for creating/combining services delivered by the web. A simple example of a Web service would be an online travel agent that combines individual applications such as a calendar, a shopping trolley, an image bank, a currency converter, etc. into a single, coherent service that serves a particular purpose. The confusion arises because sites such as Flickr are providing services and they are on the Web. Even Tim O'Reilly, who coined the term Web 2.0, explicitly links it to Web services: "People don't often think of it [Web 2.0] as "web services", but in fact, ad serving was the first widely deployed web service, and the first widely deployed "mashup" ." Source: "what is Web 2.0?" (<http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html?page=1>) . The point to remember here is that a Web 2.0 service may not necessarily have been built using Web services technology (although it probably was) and a Web service (e.g. the online travel agent) is not necessarily an example of Web 2.0.

None of the above developments are happening in isolation from each other. We shall need the increased bandwidth of Internet2 and the shared processing and communication tools of the Grid to fully exploit some of the potential of future Semantic Web and Web 2.0 services.