

VREs IN THE ARTS AND HUMANITIES

Sheila Anderson
Arts and Humanities Data Service

Stuart Dunn
AHRC ICT in Arts and Humanities Research Programme

Lorna M. Hughes
AHRC ICT Methods Network

Abstract

This paper examines common issues thrown up by the four successful responses to the JISC VRE development programme made by academics working within the Arts and Humanities. It focuses on the general strategic benefits to, and user needs in, these communities that VREs bring, VREs as agents of resource discovery and enhancement, integration with existing infrastructure, and the development of new tools and methods. From each angle it will consider what new things VREs make possible and how such innovation can be pursued.

1. Introduction

A significant proportion of scientific research has traditionally been highly collaborative and distributed and the advent of grid-enabled Virtual Research Environments therefore provided obvious benefits. Historically, in the arts and humanities disciplines collaboration has tended to be informal and based around smaller networks of scholars with shared interests and problems, and there has been little imperative for the development and deployment of such systems. However, over recent years there has been a marked shift towards greater and more formal collaboration, and this together with the a significant rise in the volume of digital data, the increasing use of ICT-based methods, and the rapid advance of technology, has created a fertile environment for such development and deployment.

In September 2004, the JISC recognised this by funding four demonstrator projects within the arts and humanities under its Virtual Research Environments programme. They are: Collaborative Stereoscopic Access Grid (CSAGE), (Manchester); Silchester Roman Town: A Virtual Research Environment for Archaeology (Reading); Building a VRE for the Humanities (Oxford); and the VRE in History of Political Discourse 1500-1800 project (East Anglia). This paper summarises the scope of the projects, their value for the research

community, and the potential for integrating humanities VREs in existing research infrastructures. It also provides an overview of the current strategic context within which they are operating, and highlights future opportunities for the arts and humanities to engage with and develop its own 'e-science' agenda.

In terms of disciplinary scope, the VRE projects listed above cover a significant area of the arts and humanities subject domain. The qualitative scope that is dealt with – archaeology, history, musical performance, and involvement across Oxford University's humanities division – together with the fact that each project has extensibility built explicitly into its plans, amply demonstrates that the principal of enabling seamless movement from distributed resource to distributed resource, and the building of an infrastructure to support that, has been recognised across an intellectually diverse cross-section of the community. Furthermore, in all four cases there is a strong emphasis on interdisciplinarity, and it is clear that the outcomes will be of relevance to many sorts of data. Given that all the arts and humanities subject communities now have available to them increasing quantities of data, the collective outcomes of the projects will therefore be of potential value across the arts and humanities community.

2. Strategic benefits and user needs

Any development and deployment of the grid, grid technologies and tools, and collaborative working through VREs and the access grid must arise from research needs, and be embedded in the research process. The arts and humanities are no different in this respect. Therefore, establishing current and future user requirements for VRE development is critical. These requirements include, but are not limited to, two key strands: linking digital resources produced by arts and humanities research, and linking agents both with those resources and each other. In the physical science communities, the definition of 'agent' is likely to include computers contributing processing power as well as human beings contributing knowledge. At this stage in the arts and humanities the latter is far more applicable, although in time there may be use of the former, particularly if dealing with large amounts of digital video, very high resolution images, or complex virtual reality modelling. Although requirements across both strands are likely to prove nuanced from subject to subject in terms of the type of middleware (and hardware) needed, the technical issues of application, and the data classes and formats involved, there is likely to be much that is applicable across subjects, and much to learn from the process of using these types of technology.

There are, however, far more fundamental user needs which are clearly community-wide and of critical importance which the projects will be instrumental in addressing. Arts and humanities researchers are confronted by a proliferation of digital material arising from easier digitisation methods, wider availability of relatively cheap hardware, greater (and more advanced) data curation capacity, and an increasing awareness of all three. One measure of this is provided by the allocation of research funding. Since 1998, of over £100m spent by the Arts and Humanities Research Council (AHRC), around half has gone to projects producing some form of digital output, and the establishment of the AHRC's Resource Enhancement scheme has continued this trend. Furthermore, much of the evidence and raw materials on which arts and humanities scholarship is based is provided by archives, libraries, galleries, cultural heritage organisations and museums that sit outside the higher education domain. Increasingly these organisations are digitising their collections and making them available, adding both to the increasing volume of data, and to the

complexity with which arts and humanities scholars must engage. However, they will all be doing so to different standards, both technical and metadata, and will organise and present their data in a huge variety of ways. Thus, locating resources, creating interoperability and from there integration, is extremely complex and difficult.

The challenge facing the arts and humanities is not therefore a data deluge in the sense used within the sciences, but rather it is the existence of a multitude of data, widely distributed, created and made available using different technical and metadata standards. The Arts and Humanities Research Council has shown great foresight in funding the Arts and Humanities Data Service (AHDS) to provide advice and guidance on standards for the creation, curation and presentation of all AHRC funded resources, and to collect, curate, provide access to, and preserve these collections. Many organisations outside of HE also use the advisory and guidance services provided by the AHDS. In addition, the Resource Discovery Network provides an on-line catalogue describing and linking to a vast array of digital resources suitable for research and teaching. Nevertheless, capacity to enable these resources to interoperate at a deep level of granularity has barely begun to develop. The requirement for deeper integration, for bringing together seemingly disparate resources without a great deal of manual effort remains to be addressed.

The issue then, is not how the arts and humanities deals with a data deluge in terms of petabytes of data, but rather it is for the bringing together and integration of a huge range of distributed datasets and cultural artifacts, and the development of tools and middleware that enable their use, interpretation and analysis. In some ways this can be compared to the requirements for science. For example, a giant telescope collects and transmits data from observations that is subsequently made available through the grid, alongside tools to use the data, and computational power to run experiments and undertake analyses. However, within the arts and humanities the need is not for a giant telescope and the related infrastructure, but is instead for an infrastructure that can locate and bring together data from a huge range of distributed and disparate places, provide common metadata, standardisation, and enable integration, annotation, visualisation, presentation, interpretation and analysis, all via the Grid.

As the JISC projects demonstrate, VRE tools form part of the solution to these challenges. The VRE in Political Discourse project is considering digital content in the context of the development of political discourse as a sub-discipline. This specifically recognises the need to integrate digital outputs within a diverse and evolving intellectual research framework. The Silchester Roman Town project is concerned with a variation of the same problem. Data from the massive Silchester excavation in Hampshire is stored in various elements of the same 'Integrated Archaeological Database', but on a number of different servers in several physically dispersed locations in the UK and abroad. The problem is compounded by the fact that the database contains complex specialised data including stratigraphic tree structures and site matrices. The Silchester VRE project aims to resolve this by making these different elements of the same database cross-searchable and interoperable in the same interface, or to put it another way, to coalesce them into a single 'virtual' database consolidating all digitised information from the site.

The issue of linking existing data collections is itself inextricably linked to the broader issue of research structures within the HE community. Working from an institutional perspective, the Oxford project 'Building a VRE for the Humanities' is focusing on this aspect, with the objective of identifying areas where VRE tools will be of maximum benefit for the arts and humanities. Based on an initial survey of Oxford's Humanities Division, it has identified communication, project management and design, efficiency, and access to resources as such areas. The identification of these issues clearly adds research structures to linking distributed content, and bringing together scholars from across the globe, as a major area where VREs can bolster the research process. This is particularly noteworthy as these issues stray into project management and interoperability, which are as relevant to large and / or complex arts and humanities projects as they are to their scientific counterparts. As noted above, scientific projects have access to a far more established culture of VRE embedding in their research communities, and at this stage there is every reason to suppose that parallel value-added benefits are available to humanities scholars - indeed the VRE in Political Discourse project explicitly commits itself to providing 'an opportunity to bring into being an exemplar for the humanities approximating to the more

advanced collaboration models available in the sciences'. It also suggests a clear potential for VREs as agents for pooling cross-disciplinary expertise.

3. Resource discovery and enhancement

The phrase 'pooling cross-disciplinary expertise' in fact risks oversimplifying the second strand of the arts and humanities VRE strategic context. The term 'Environment' implies more than simply linking resources: it also involves linking, and perhaps more importantly, enabling deep engagement, by researchers with those resources. This is the primary thinking behind the Silchester VRE: the establishment of an online conferencing facility which geographically dispersed experts can use to mine the integrated database, and have real-time 'meetings' in the 'presence' of the data. In this case, the experts in question are based in Cardiff, Oxford, Reading and York, as well as those on the site itself during the excavation season. Eliminating the need for them to travel to meetings to discuss problems arising from data held in the database, or indeed as it is uncovered in the field, is expected to transform the iterative research process, and may well provide other unexpected benefits.

The issue of linking researchers with each other, is taken up in earnest by the CSAGE project. This is a response to the practice-based methods employed by the performing arts. The notion is to build user (i.e. audience) 'presence' into an extension of existing Access Grid infrastructure by establishing stereoscopic extensions to an existing Access Grid node. This will deliver new and far more sophisticated means of one-to-one, or one-to-many communication. Orchestral performances, for example, can be delivered to the 'audience' with the familiar speed, cost-efficiency and flexibility of the Access Grid, but stereophonically. The project will achieve this by digitising objects in 3D and infiltrating them into virtual environments as believable, life-sized entities. In other words, this extends the existing capabilities of Access Grid tools both technologically and artistically. From a strategic point of view, this illustrates the key point made earlier that the research agenda and intellectual and / or performance-driven questions produced by arts and humanities research can, and should, drive VRE innovation. Furthermore, in a climate where arts and humanities researchers are increasingly

waking up to the potential of Access Grid as a collaborative tool, this kind of development of the Grid seems not only desirable, but also essential and inevitable.

4. Integration with existing infrastructure

The CSAGE instance involves a direct approach to physically integrating a VRE into existing technical infrastructure, and thus extending the infrastructure (in this case the Access Grid). But other cases involve other foci, where the challenges are not just technological but also intellectual. The VRE in Political Discourse is backed technologically by existing frameworks – the Sakai Project¹ and, again, by the Access Grid - but its intellectual drive (at least initially) is an historical MA course. This bipolar model represents a fusion of technical and academic considerations, where one drives the other. It is certain from the four JISC projects that they, and indeed every VRE established in the arts and humanities, will be confronted with the need to make such a fusion, and careful attention will need to be paid to the impact of the technologies on the research process and the formulation of research questions. The challenge is to ensure the development of research/user-led and data driven grid technologies and VREs.

The Silchester VRE is physically integrated into the site at Silchester via a wireless network facility, and provides the means to capture archaeological data onsite using digitisation hardware adapted for outdoor use. There is thus a seamless join between the field data capture process and the VRE itself which consists of middleware-enabled databases across a number of servers, linked to an interactive common conferencing area. To an extent, this reverses the pattern identified above, whereby arts and humanities VREs are conceived in response to overabundance of digital media. In this case, the VRE is meeting user needs by itself creating more digital data. Such incorporation of a VRE into existing research conditions underscores the place of the academic research imperative setting the parameters for technological adaptation.

5. The Future

The Arts and Humanities have come late to an engagement with e-science tools and technologies. However, whilst the four JISC VRE projects are still at a developmental stage, the possibilities they highlight are tremendously exciting. The new modes of connectivity and collaboration which they are developing and broadcasting represent the first systematic attempt to engage in this area and to use VRE-type tools. This attempt will act as a pathfinder for an ambitious, far-reaching and forward looking programme, with the full backing of the AHRC and its major partner organisations like the AHDS and JISC, to support research in the arts and humanities through the use of these kinds of technology.

A second major pathfinder in the immediate term is a grant under the AHRC's ICT Strategy Projects Scheme² of £68,005 to the Director of the AHDS for a scoping survey of e-Science and e-Social Science developments and their value to the arts and humanities. The study commenced in September 2005 and will report by end May 2006, and will help ensure that e-science is at the heart of the AHRC's 2006 Fundamental Strategic Review of ICT.

The next steps are the development of a joint £1.6m programme funded by the AHRC and JISC. This new initiative will provide:

- (a) E-Science demonstrator, proof-of-concept and resource projects
- (b) 6 4-year postgraduate studentships
- (c) An e-science support centre that will provide an integrated programme of activities to support the take-up, integration and evaluation of the programme

The Programme will build upon the existing infrastructure to support ICT use in the arts and humanities. The AHDS, The Methods Network, the Training and Awareness Programme (ARIA), and the AHRC ICT Programme staff, will all make a significant commitment to the development and integration of these technologies, and will work with colleagues across the sciences and the social sciences to achieve its wider aims.

¹ <http://www.sakaiproject.org/index.php>