

Digitisation as e-Research infrastructure: Access to materials and research capabilities in the Humanities

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Abstract. Although considerable effort and expense has gone into digitising content in the humanities, there is a lack of data about the actual uses and impacts these digitised resources are having on scholarship and on the public. In this paper, we report on a study completed in 2009 that examined five digitisation projects using a variety of measures to ascertain a nuanced picture of the usage and impact not only of those five projects, but also of digitised material in general. The paper focuses on the qualitative results obtained through interviews and focus groups to draw a picture of the ways in which digitised scholarly resources are having an impact. The paper concludes with the recommendations that the project made to JISC based on the research.

Introduction

From the mid-1990s, there has been considerable investment in the creation of digital content; in the U.K., for instance, by 2005 at least £130 million of public money had been spent on digitization programmes (JISC, 2005). Funding councils continue to invest heavily in creating digital content, and are increasingly also creating infrastructures to support existing initiatives. Critics have suggested that this programme of digitisation has ‘sprung up in piecemeal fashion’ and has largely been led by ‘supply rather than demand, spurred by opportunity instead of actual need’ (JISC, 2005). Such criticism has played a part in the growing desire to understand the impact and uptake of digital resources (Atkins, Brown, & Hammond, 2007b; Steven Carson, 2005; Harley, 2007b; Warwick, Terras, Huntington, & Pappa, 2008; A. Zuccala, Mike Thelwall, C. Oppenheim, & R. Dhiensa, 2007) and the behaviours and needs of users (Nicholas, Huntington, Jamali, & Watkinson, 2006; Rowlands, et al., 2008). Nevertheless, there remains an absence of guidance and knowledge-sharing among projects on how best to measure the usage and impact of their resources, and how to use this information both at the project and at the programme level.

In this paper, we report on Joint Information Systems Committee (JISC) funded research that addressed some of these concerns by analyzing five case studies of digitisation projects in the Humanities (see below), probing their usage and impact using a combination of quantitative and qualitative methods, and using this knowledge to develop a Toolkit of best practice to be freely available to the research communities.

There has been an increasing interest recently among funding bodies to find ways to measure the impact that the projects they fund have on a broader audience. This JISC project reflects that concern, but other agencies are also engaging in similar efforts. In the U.S., for instance,

the National Science Foundation (NSF) has required submissions to address the broader impact of their proposals since the mid-1990s, but has recently re-iterated the importance of describing in detail the broader impacts of proposed activities as an integral part of all proposals (Echogoyen, 2008) and has showcased the broader impacts of selected NSF projects (National Science Foundation, 2005). Finding useful and meaningful ways to assess impact, however, is difficult for many scholarly endeavours.

This project does not exist in a vacuum: there have been other notable attempts to measure the impact and reach of online scholarly resources. Examples of previous efforts include the LAIRAH project at UCL (Warwick, Terras, Galina, Huntington, & Pappa, 2008; Warwick, Terras, Huntington, Pappa, & Galina, 2006), MIT's OpenCourseWare evaluation (Stephen Carson, 2006), the Open Educational Resources Report (Atkins, Brown, & Hammond, 2007a), the Berkeley Digital Resource study (Harley, 2007a, 2007c; Harley, et al., 2006), the Rice University Fondren Library Impact of Digital Resources on the Humanities study (Spiró & Segal, 2007), and a Wolverhampton-Loughborough digital repository analysis project for JISC (A. Zuccala, Michael Thelwall, C. Oppenheim, & R. Dhiensa, 2007). This project has drawn upon these previous efforts to inform the methods that will be used to measure the impact of the five digitisation projects specified in this tender, but goes further in producing a toolkit that others can draw on and add to when trying to assess the impact of similar projects. The *Toolkit for the Impact of Digitised Scholarly Resources* (TIDSR) includes tools, recommendations for best practices, and guidelines regarding the strengths and weaknesses of various items in the toolkit for dealing with different types of projects (<http://microsites.oii.ox.ac.uk/tidsr/>).

The studies discussed here are all important additions to our understanding of the types of impacts digital resources are having and can potentially have on the humanities. From the points of view of a single project (OCW), teaching (Berkeley), libraries (Fondren), uses (LAIRAH), and link analysis (Wolverhampton-Loughborough), these studies all have informed the work reported here.

One major missing part, however, is any concrete way for collection managers, developers, and funding bodies to attempt to understand and collect data for measuring impact from the onset of a project and throughout the life-cycle of a digitisation effort. The toolkit is an attempt to fill this gap. This study thus serves multiple purposes: using as wide a variety of methods as possible to assess the impacts of five specific projects funded as part of the JISC phase I digitisation programme, using that exercise to develop a toolkit of suggestions, best practices, software recommendations, and related information that is accessible on the web, and to use the development of the toolkit as a springboard to further work in this area that will re-iteratively strengthen the toolkit and make it more useable as it is updated and expanded.

The comparative approach that used five disparate projects made this exercise more difficult than the analysis of a single resource would have been, but also more valuable in terms of assessing the strengths and weaknesses of different approaches to measuring impact.

Digitisation case studies

In 2004, the JISC funded the first round of the JISC Digitisation Programme through a £10 million investment by the Higher Education Funding Council for England (HEFCE) to create new e-resources for learning, teaching and research. In 2008, the JISC commissioned the study reported here, which looked at five of the six projects funded in that first phase to better

understand the impact the projects are having on the communities they serve. Those projects are:

- Histpop: Online Historical Population Reports¹: Histpop provides free online access to the complete British population reports for Britain and Ireland from 1801 to 1937, having digitised 200,000 pages of census and registration material for the British Isles, supported by numerous ancillary documents from The National Archives, critical essays and transcriptions of important legislation.
- 19th-Century British Newspapers at the British Library²: This project provides access (to Higher and Further Education communities in the UK) to a virtual library of nationally, regionally and locally important digitised British newspapers from 1800 to 1900, having digitised over 1,000,000 pages of content. Materials available through commercial partner Gale Cengage.
- Archival Sound Recordings at the British Library³: The Archival Sound Recordings project digitised 12,000 items totalling 3,900 hours, freely available to play and download.
- 18th-Century Parliamentary Papers from the British Official Publications Collaborative Reader Information Service (BOPCRIS)⁴: The project digitised over one million pages of British Official Parliamentary Publications from the eighteenth century, drawn from the University libraries at Southampton and Cambridge and the British Library. Freely accessible to HE and FE audiences through BOPCRIS, subscription access via ProQuest.
- Medical Journals Backfiles (jointly funded by the Wellcome Trust)⁵: Digitisation of up to 1.7 million pages of complete backfiles from important and historically significant British and American medical journals through PubMed Central⁶.

While these projects were selected for study non-randomly to meet the JISC's requirements, they have proven to be a very good set of cases to illustrate a number of tendencies and tensions underlying the provision of digital content, as discussed in more detail below.

Methods

Impact measurement is a difficult multi-dimensional challenge: while quantitative measures are generally relatively easy to obtain and easy to use for producing compelling numbers and eye-catching charts and graphs, by themselves they are insufficient measures of overall impact because they miss much of the non-quantifiable and non-hyperlinked uses of scholarly resources. As a result, our research has combined a range of quantitative methods, including webometrics, bibliometrics, log file analysis and content analysis, with qualitative methods, ranging from interviews with key stakeholders and users, to focus groups and online surveys. These methods were also under evaluation in the project, as each approach was considered for inclusion in the Toolkit which was an output of the project, in the form of an updateable Drupal-based website (<http://microsites.oii.ox.ac.uk/tidsr/>).

¹ <http://www.histpop.org>

² <http://www.bl.uk/reshelp/findhelprestype/news/newspdigproj/database/paperdigit.html>

³ <http://sounds.bl.uk/>

⁴ <http://www.parl18c.soton.ac.uk/parl18c/digbib/home>

⁵ <http://library.wellcome.ac.uk/backfiles>

⁶ <http://www.pubmedcentral.nih.gov/>

Results

Only a small portion of the results can be discussed here. The full results are available in a 164-page final report to the JISC, available at the toolkit website (<http://microsites.oii.ox.ac.uk/tidsr/>). In particular, the report includes detailed webometrics, log file analysis, scientometrics, news content analysis, and the results of a web-based survey. Given the space limitations of this paper, we have chosen to focus on the qualitative findings based on interview and focus group data collected during the study.

While the interviews mainly allowed the researchers on this project to build a more comprehensive understanding of the context within which the overall impact of the projects can be understood, there are a number of specific quotes from the interviews which are instructive by themselves. As mentioned, project personnel were asked about planned uses and impacts, and their perception of the success of the project. The following quotes illustrate these issues.

Importance of close contact with users when developing a project

Matthew Woollard, the project director of Histpop stressed the importance of close contact with users when developing a project:

‘At the time [of the bid], I was working in the History department... I wrote a paragraph [supporting the bid]... then applied for the job [of leading the digitisation project]... My interest in this came from a historian’s point of view, who had been using this material for some time in my own academic work, and so the vision... was to produce something that would be usable by me... The whole of the original project, I was the user, and obviously it was designed for many others but my first critical feeling was, why don’t you design a site that would do everything that I want it to do... It [then] went through a number of refinements during the design process... The whole of this is designed so that it does the things that I want it to do... and things that I think it should do, and when we had users come in to look at the various demonstrators that we had produced, in most cases I was right... I wanted good quality images, I wanted easy navigation, I wanted things that had been designed in a scholarly fashion.’

A steering committee member of the 19th Century British Library Newspapers project had this to say:

‘The British Library... made an arbitrary decision just to confine themselves to digitising the holdings that happened to be in Colindale, and those themselves are some arbitrary selection of all the serial titles that the British Library holds and there’s a very odd line that was drawn between what counts as a newspaper historically, 100 years ago, so there were lots of specialist titles included in the Colindale collection because they were more like magazines, not newspapers at all... so there was this long list of very variegated titles and we had to make some executive decisions and a certain amount of consultation.’

Digitised projects and lack of contact with custodians of original collections

A group of sound archive curators with the British Library Archival Sounds expressed some dissatisfaction with their frustrations at not being as integrated in the evaluation of the digital resources they helped to build:

‘We don’t have, or at least I don’t have, any user evaluation data about who’s using the ASR site, my colleagues might, but I don’t think we’ve been given yet any figures even, let alone any more targeted information about who’s actually going onto the site to use the collections that have been digitised... I could give you some impressionistic feedback, but we don’t know, and that ‘s been one of my main criticisms of the project is that despite the fact that we’re now in Phase 2, there’s still insufficient user information as far as I can tell.’

When asked what kind of information would be useful: ‘Numbers, purposes of use, how long people are on the site for, what they’re going into, how much stuff is being downloaded, what are they doing with it afterwards... Some of it is just stats, which I cannot understand... why we can’t be supplied with that information.’

Discrepancy between intended usage and perceived success

Some Wellcome Medical Backfiles project staff mentioned how their intended uses were not necessarily the uses to which the finished collection was being put:

‘We did have a selection criteria [for the journals], a key one being are they of interest to the research community, predominantly the medical historian research community... although we had to demonstrate that it wouldn’t just be of interest to some academics, it would also be of interest to practicing researchers, you know, biomedical researchers... So we found some examples which demonstrate how sometimes medical practice hadn’t changed that much, but it was published in the 1940s perhaps but it wasn’t available online.

‘They were the obvious goals, which were to provide access to what we deemed historically significant biomedical journals... and to ensure they could be readily found.

‘Statistics are available at the individual journal level... I think realistically, on the whole, it does seem to be the more recent stuff which experiences the heavier downloads. If you just... took a snapshot... I suspect most of those would be relatively recent articles rather than old ones.’

Project impacts revealed through interviews with users

Quality of undergraduate dissertation work seems to be improved by early contact with digitised primary sources. A lecturer in Historical Geography at King’s College London, reported that he had used Histpop in both second and third year undergraduate courses in Urban Historical Geography, allowing students access and freedom to explore primary sources at this stage of their undergraduate careers. This, he said, led to several Final Year dissertations of high quality, which he said were enhanced by early access to primary sources. ‘I think [the students scored so well]... Because they had already been used to dealing with historical documents...using Histpop as a teaching tool fed into those particular dissertations.’

‘Histpop made it possible to do a completely different project [at undergraduate level]... It allows them to start using primary sources and do some basic research, which otherwise they wouldn’t be able to do.’

‘You tend to get a very big spread of marks in this kind of coursework... It sorts out the really good students from the weaker ones.’

He also stated that setting up undergraduate courses that make use of (easily accessible) digitised primary resources counters the plagiarism issue. ‘There’s a plagiarism problem with coursework, and getting them to use primary documents [means] there’s no chance that they can plagiarise. That was a consideration.’

Type of research being presented at conferences

Conference paper submissions in some of the fields served by these digital humanities resources are reportedly becoming increasingly quantitative. An organiser of a large annual conference said, ‘I had 500 paper proposals and you did feel just from those paper proposals that a lot more people than had previously been doing so were working on sources that came straight out of these databases and were doing searches and making generalisations... I’m not entirely happy about this... You do feel the ground shifting... I think the place where you see it is that people make generalisations based on global searches and therefore they’re citing quantitative measures.’

Types of research being attempted

Quantitative research projects are being piloted with digital data with mixed results:

‘With digital resources it should be much easier to do this; because of keyword searching, you don’t have to browse through every issue. But what I’m finding now is that keyword searching is... unreliable.’

We spoke to a researcher at the University of Oxford, who has recently embarked upon a project looking at popular protest in a major city over two centuries, using the C19th British Library Newspapers as a key resource. The researcher explained that such studies have been common before digitised newspapers were available, and have generally covered a 50 year period, say 1945-95. The researcher’s new project took a more ambitious scope, using the British Library Newspapers to open up the entire C19th for similar research. (S)he said ‘With digital resources it should be much easier to do this; because of keyword searching, you don’t have to browse through every issue. But what I’m finding now is that keyword searching is... unreliable. For example, if you search for ‘riot’, you get a lot of ‘nots’. It may not be possible to use keyword searching... There are too many false positives, and false negatives. Digital will still be better than using microfilm... but it still won’t be as powerful as I’d hoped. I’ll have to truncate the time period – I really had been ambitious going for two centuries, but now I think it’ll be about 50 years.’

Archival Sounds: New possibilities for serendipitous research

A musicologist stated that ‘what I’ve found most enjoyable... is the serendipity, the serendipitous nature of [the resource]. I didn’t have a clue about some of these African music recordings and I found some wonderful stuff, I found a whole series of radio programmes I didn’t know existed, and a genre of music - Jazz from Soweto - that I didn’t know existed. That was a great moment... Dipping in and out of things... That’s impossible [with the Sound Archive]... You have to know exactly what you want because somebody has got to go and get it for you.’

Impact of Digital Resources on Ease and Patterns of Research

An important aspect of the impact of digitised scholarly resources in History is the ease with which digital resources can be accessed. I think this should not be underestimated. Many of the academics we spoke to cited this as the biggest impact on their research. One parliamentary historian reported, 'There are days when I spend most of the day looking at digitised resources... I can probably work through most of the material for this project in this [one] year of leave that I have, there is no way I could have done that before... it would have taken me years'.

Focus groups

In addition to the individual interviews, two focus groups of students that participated in this study were enthusiastic about digital resources, and were using digital collections on a regular basis. The undergraduate students were responding to requests from tutors that they use certain collections, but were also independently seeking out such resources. The postgraduate and postdoctoral researchers were also using recommended resources, but were less sure about where the best recommendations would come from, and were more sceptical about the content and quality of resources they had discovered outside the library catalogues. Both groups were aware of the advantages of seeking and discovering digital resources through their library catalogues. Both groups were unlikely to cite the digital material if there was a paper or analogue citation available, although for different reasons. The undergraduates were concerned that they would be perceived as having not completed 'proper' research unless they cited the analogue resources, whereas the postgraduates and postdoctoral researchers were more concerned about giving stable citations that future researchers would be able to trace. Both groups were concerned about the trustworthiness of digital resources. The undergraduates were more likely to trust a digital resource on the basis of its look and feel, but were also convinced by branding such as 'British Library'. The postgraduates and postdoctoral researchers were more likely to encounter digital resources through trusted sources such as library catalogues and gatekeepers such as Intute, and therefore established trust through these gateways. There was some concern among this group as to the availability of these resources in other universities, as most are likely to seek jobs elsewhere and were concerned that access would present challenges to their research agenda.

Both groups were enthusiastic about the JISC-funded resources. Both groups were more familiar with the 19th Century British Library Newspaper project than any other, but found the other sites to which they were exposed for the purposes of the focus groups both high quality and trustworthy. Both groups found Histpop easy to find, easy to use and could quickly see how this resource could be of use to them. Our postgraduates and postdoctoral researchers were particularly excited about the British Library Archival Sounds project, but were largely unfamiliar with using sound resources for research, and might perhaps need further encouragement or training to engage confidently with this resource. An unexpected finding was that one of our postdoctoral researchers had been using the commercial version of the House of Commons Parliamentary Papers at ProQuest, and found the BOPCRIS 18th Century Parliamentary Publications easier to search and extract information from. This was in contrast to the results of some of our other qualitative measures. Our postgraduates and postdoctoral researchers were very open to using the PubMed Central database to look for historical material, but did not find the search and browse terminology translated easily, suggesting that a help page for historians may be necessary to maximise the potential of this resource for Humanities researchers.

While both groups were enthusiastic about the resources, some resources presented more challenges than others. As historians, official publications such as the Histpop material and the British Library Newspapers presented few difficulties, as these are commonly used in historical research. The parliamentary papers were difficult to navigate for those unfamiliar with the complicated cataloguing and classification of these parliamentary documents. The journal material at PubMed Central was also familiar to these researchers, even though the scientific terminology slowed their progress through the resource. The most difficult resource for our historians was the British Library Archival Sounds material, which was significantly less familiar to our researchers as a resource, and therefore required more of an investment of their time and energy in seeking out relevant material.

Discussion

These case studies proved to be something of a natural laboratory experiment, as their organizational and distribution systems presented a number of opportunities for comparison and contrast with regard to conditions affecting usage and impact. Overall, this project has confirmed that multiple methods are necessary to begin to draw conclusions about impact. None of the methods were novel, but their combination is, and we hope that this will allow us to continue to have an impact ourselves on the community of scholars interested in understanding aspects of web presence.

As a result of this project, we made several key recommendations for those interested in understanding the impact of digitised scholarly resources.

- Plan on measuring impact from the beginning of any new project, before the website is even designed. The more that initial designs accommodate the types of measures you will later need, the less you will have to try to reconstruct impacts after the fact.
- Monitor impact regularly, but don't become bogged down by it. Monthly reports of any of the measures included here are probably excessive and risk losing sight of overall trends while getting stuck in the details. During the initial phases of a project's rollout, monitoring key metrics at 3 or 6 month intervals should be sufficient. When the collection is mature, bi-annual or annual monitor should suffice.
- Build in sustainability strategies. This is difficult given funding models that favour projects, but it crucial if a collection is to have a long term impact.
- Follow on funding should be sought/provided that is specifically for the analysis of impact data, particularly since many impacts have a lag time and won't happen immediately at the end of the project.
- Use the measures for impact to try to enhance impact. Actively promoting the resource through blogs, web links, conference talks, publications, and other avenues will in turn increase the impact later on.
- It is essential to view multiple sources of evidence when evaluating impact, and to examine these sources from different directions or points of view. For instance, use a focus on the project at one level, but also focus on users, focus on communities, and focus on disciplines that are served by the resource.
- Inclusion within trusted gateways are important to long-term impact. Being linked from major gateways (such as a university library portals) increase use and awareness, but also increase trust in the resource.
- There are important generational shifts taking place: younger researchers are developing research habits that will become mainstream as they replace their elders. These so-called digital natives are a natural constituency for digital collections, so

ensure that your resources are available to them, usable by them, and promoted to them.

- Some of the impacts included are measures often associated with e-Research and information science, but some of these measures may conflict with the habits and behaviours of humanities scholars (such as counting citations or webometrics). We nevertheless suggest that these measures, which are major techniques within the community of scholars who research the Internet, are relevant since digital collections may arise from the humanities, but live in the digital world of the Internet.
- Be wary of changing URLs. Impact is enhanced by having unchanging URLs, permanent project pages, and association of project pages with content so people don't get frustrated with project pages that go nowhere. Projects far too often move pages and URLs because of a decision made at the technical level without considering what the effect of that decision is on overall impact. In general, projects should seek to reduce confusion about where resources actually reside, but this is still too often not the case.
- Custodians of original resources need to be linked up with digital content, in terms of making sure that resources are usable to traditional users, but also to help with reaching audiences they know about and have involvement with understanding new audiences. In general, development of collections should have feedback occurring in multiple directions among librarians, archivists, technical staff and programmers, user communities, and domain experts.

While digitization projects and programmes are somewhat simpler than many advanced Grid infrastructure projects, taken together they are arguably contributing to a growing research infrastructure that supports e-Research in the humanities, whether or not it is formally called e-Research or e-Infrastructure.

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