Splashes and Ripples

Synthesizing the Evidence on the Impacts of Digital Resources

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Acronyms and Abbreviations

AVoB: A Vision of Britain through Time

BHO: *British History Online*

BLN or BL News: *British Library 19th Century Newspapers Online*

BLS or BL Sounds: *British Library Archival Sound Recordings*

HumBox: The *HumBox* online humanities space

Histpop: *Online Historical Population Reports*

OBPO: *Old Bailey Proceedings Online*

PP: *18th Century Official Parliamentary Publications*

SDR: *Siobhan Davies RePlay*

SPH: *Stormont Parliamentary Hansards*

UOP: University of Oxford podcasts

Executive Summary

Overview

Digitised materials representing the world's cultural heritage are part of a growing trend towards a world in which knowledge is digitally stored, available on demand, and constantly growing. As the world becomes digital and the globally connected "digital brain" holds the shared knowledge of the world, the materials of the past need to be included in order to ensure that our collective memory online encompasses not just the present and the future, but also the past.

This report is an effort to begin to synthesize the evidence available under the JISC digitisation and eContent programmes to better understand the patterns of usage of digitised collections in research and teaching, in the UK and beyond. JISC has invested heavily in eContent and digitisation, funding dozens of projects of varying size since 2004. However, until recently, the value of these efforts has been mostly either taken as given, or asserted via anecdote. By drawing on evidence of the various impacts of twelve digitised resources, we can begin to build a base of evidence that moves beyond anecdotal evidence to a more empirically-based understanding on a variety of impacts that have been measured by qualitative and quantitative methods.

These impacts are both big and small – the splashes and ripples in the title of this report. Some collections have made big splashes, such as *The University of Oxford on iTunes U*, which sees 1-2 million accesses per day from people interested in hearing lectures delivered by world experts in their fields. Others have generated smaller ripples that are nevertheless important within specialty areas, such as the *Siobhan Davies RePlay* dance resource, which is one of the few digital collections in the world that allows students of dance to see the whole process of choreographing and creating innovative dance.

Method

The data was collected by eight teams, seven of which were funded in 2010 under JISC Grant Call 7/10: *Digitisation programmes: Impact & embedding of digitised resources.*[1] The eighth team was previously funded in 2009 as the *Usage and Impact Study of JISC-funded Phase 1 Digitisation Projects*,[2] and gathered data on five digitisation projects. In addition, the 2009 team created the *Toolkit for the Impact of Digitised Scholarly Resources (TIDSR)*[3] which documented a variety of methods for measuring impact. The TIDSR resource was used as a methodological reference by the 2010 projects, and the final reports have been included in TIDSR as case studies.

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[1] http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding.aspx
[2] http://www.jisc.ac.uk/whatwedo/programmes/digitisation/reports/usagestudy.aspx
[3] http://microsites.oii.ox.ac.uk/tidsr/

Key findings

Impacts on Research, Teaching, and Learning

Research excellence is a key measure in the Higher Education sector. Publications, patents, datasets, tools, and resources are all measured, compared, and examined for evidence of research excellence. The twelve resources examined in this report all strive for research excellence, but achieve it in different ways. For instance, *British History Online* and the *Old Bailey Proceedings Online* are among the resources mostly heavily cited in academic publications, while *Histpop* and the *Stormont Parliamentary Hansards* are allowing for broader use of publications that would otherwise only be available in a limited number of libraries and archives.

Teaching and learning excellence are also important cornerstones of effective digital resources. The University of Oxford's podcasting site which distributes lectures, interviews, discussions, and workshops is an excellent example of the way in which world-class institutions such as Oxford can extend their influence even further by sharing the knowledge and teaching skills of their scholars with the rest of the world. *Siobhan Davies RePlay* appeals to a smaller audience, but is designed to support the national UK Personal Development Planning (PDP) scheme for dance. The scheme allows students to develop portfolios of their dance training and development by using the digital resource to learn how professionals document their professional careers using the same methods asked of the students.

One measure of excellence is the enthusiasm with which users respond to a resource, as demonstrated by the following pair of quotes:

> *British History Online is my favourite and first source for primary sources in British history. As a student of history, librarian, and writer, I return again and again. Even when I'm not researching, I often visit BHO for the sheer fun of what I might learn and discover. The site is easy to navigate, convenient, and its offerings thorough and accessible. Where else online can I find such a bounty of Britain's heritage? It is a generous endeavour and an absolute goldmine.* (Blaney & Webster, 2010, p. 7)

> *I'm not joking but [the University of Oxford podcast site] has become my favourite site in ten seconds flat - can't stop downloading! Where has this been all my life?????? This is ridiculous!* (Wilson, Marshall, & Geng, 2010, p. 7)

Many other examples of impacts on research, teaching, and learning are available in the full text of the report. The evidence ranges from broad-based quantitative measures (number of visitors, number of links to the resource, frequency of being mentioned in the mainstream and non-traditional media, etc.) to more richly-detailed qualitative measures (gathered via focus groups, interviews, user feedback, etc.). No single measure reflects "the impact" of a digital resource; instead the combination of empirical evidence can be used to provide a broader idea of the various types of impacts these resources are having as a collection of collections.

Improving Impact: Recommendations and Challenges

At the end of the report, 15 recommendations for digital resource providers are presented, which were drawn from the evidence presented in the report. In addition, 10 additional recommendations for improving measurement and sustainability are offered. These 25 recommendations suggest ways to potentially increase the size of the splashes emanating from a digital resource, and to turn some ripples into splashes.

For Digital Resource Providers

1. Plan ahead to measure impact.
2. Use the media to your advantage.
3. The media and the public are influenced by numbers and metrics.
4. Make your resource easy to find.
5. Give your resource an unambiguous name and acronym/initials.
6. Create quick wins.
7. Leverage your wins.
8. Make resources easy to navigate without sacrificing functionality.
9. Adopt Cool URIs (i.e., human-readable web addresses).
10. Provide automatic citations that are easy to copy or download.
11. Provide the ability to export citations.
12. Create training materials using examples from real research.
13. Make teaching materials available.
14. Consider allowing users to comment on or modify items (with care).
15. APIs are the future.

For Improved Measurement

16. Remember in advance that you will want to contact your users.
17. Develop webometric tools that scale for larger collections.
18. Develop analytic tools that scale for larger collections.
19. Develop methods to better accommodate collections that are distributed via multiple channels.
20. Develop strategies for archiving log file data and analytics.
21. Centralize hosting.
22. Develop standardized measures.

For Future Sustainability

23. Innovative revenue models should be explored.
24. Develop Cool URI standards.
25. Maintain active sites to attract users in the long term.

These recommendations are just one step along the road toward increasing the impact of the digitised collections that are part of Britain's rich cultural heritage. As Tanner and Deegan (2011) argue in their recent evaluation of the broad social benefits of digitisation, the challenges for digital resources are even greater in the future. They describe a utopian view of the future world, in which connected citizens engage with digital content via ubiquitous

devices that allow them to learn about Britain's heritage as they move through the places where history occurred. These citizens of Digital Britain are engaged with educational, entertaining, and enlightening content, built on a rich and deep set of digitised content.

To achieve such an enlightened digital future will not be easy – it will take imagination, work, cooperation, funding, and dedication. Done correctly, however, the citizens of the future will thank us, as the splashes and ripples from today propagate into the future to shape and reshape the boundaries of knowledge. For, as Alan Kay once said, "The best way to predict the future is to invent it" (1995).

Introduction

The digitisation of materials representing the world's cultural heritage has been the focus of large numbers of projects in the UK and elsewhere. According to a recent JISC digitisation strategy paper:

> *The JISC e-content and Digitisation Programme has, since its inception in 2004, funded over 60 digitisation projects. Some of the most notable projects include The National Archives' Cabinet Papers 1915-78, Birmingham Museums and Art Gallery's Pre-Raphaelite Online Resource and the RLUK's (Research Libraries UK) Nineteenth-Century Pamphlets. This work is driven by the JISC Digitisation Strategy.*[4] (JISC, 2010, p. 2)

One of the central questions for the institutions building these digital assets and for the organizations funding these efforts, including JISC, is whether these digital resources are having sufficient impact in the world.

The title of this report, *Splashes and Ripples*, reflects the nature of impacts in the heritage sector. As we will see in this report, some digital resources have made a considerable splash, both in the UK and elsewhere, and their impacts are fairly easy to see. Other resources, however, have resulted in smaller ripples in the water, and uncovering the nature of their impacts can take a bit more digging. By and large, however, the water is anything but becalmed – the projects we will see here are succeeding in big and small ways to influence research, teaching, learning, and the wider public.

The bigger lake of digital humanities, if we stay with the metaphor a bit longer, is growing increasingly choppy, with splashes, ripples, and waves emanating from all quarters. In 2009, Pannapacker noted the vibrancy of the digital humanities sessions at the MLA convention: "*Amid all the doom and gloom of the 2009 MLA Convention, one field seems to be alive and well: the digital humanities*" (Pannapacker, 2009). Digitisation efforts represent one strand of many in the digital humanities, but in some ways it is the most accessible and understandable strand for humanities scholars. Unlike computational approaches to linguistics or grid-enabled video, understanding digitised content does not require a major cognitive shift: it mostly looks like the humanities materials we are familiar with, and the tools are generally easy-to-use. In a survey of humanities scholars, we found that 94% of respondents (n=550) felt that digitised collections were useful, 90% were enthusiastic about using digitised collections, and 94% felt that digitised materials would be important, very important or essential to their future work (Meyer, Eccles, Thelwall, & Madsen, 2009, pp. 151-152).

Reports such as the recent JISC report *Inspiring Research, Inspiring Scholarship: The value and benefits of digitised resources for learning, teaching, research and enjoyment* (Tanner & Deegan, 2011) clearly demonstrate the qualitative impacts that digitisation has had and is having on the UK, in terms of research, teaching, learning, and public engagement with resources that are an important part of Britain's cultural heritage. Tanner and Deegan argue that there are at least five "modes of value" that can be understood to accrue from digitised

[4] http://www.jisc.ac.uk/media/documents/programmes/digitisation/jisc_digitisation_strategy_2008.doc

resources: increasing options for users, the prestige of holding a cherished resource, the educational value of a resource, the existence value of knowing that something has been preserved, and the bequest value of passing along heritage to future generations (Tanner & Deegan, 2011, p. 34). These broad societal values are discussed in terms of the often difficult to measure values that heritage resources offer to the UK and to the world. This sentiment is echoed in a recent European Commission report which argued that "*there is probably no greater ambition than to perpetuate our rich cultural heritage*" and that "*digitisation breathes new life into material from the past, and turns it into a formidable asset for the individual user and an important building block of the digital economy*" (Comité des Sages, 2011, p. 1 & 4).

However, while the overall benefit of maintaining cultural heritage materials and making them accessible for research, teaching, and learning is clear, increasingly funders and institutions are interested in empirical measures, both quantitative and qualitative, to understand the specific impacts that different collections are creating. In terms of discovering appropriate empirical data, we need to go beyond the easiest crude measures of impact, such as number of accesses per month on the quantitative side, or rich anecdotal examples of new uses on the qualitative side. This is a considerable challenge, particularly since the diversity of resources in question means that not all resources can be measured in the same way. Unlike peer-reviewed journal articles, which all follow the same basic rules and, allowing for disciplinary differences in citation habits, can all be measured using similar bibliometric techniques, digital resources have a wider variety of audiences, uses, re-uses, and thus, potential ways in which impact can manifest itself.

JISC have issued guidance for measuring and reporting impact (Hutchings, 2011) which takes a practical approach to the question and which is supported by funding efforts such as the seven *Impact and Embedding* cases described in this report. Using a combination of statistics, metrics, case studies, illustrative examples, counter-factual arguments, and attributed testimonials, projects are encouraged by JISC to document the range of impacts that projects can demonstrate. One of the key recommendations, which is re-iterated in this report, is to think about impact from the beginning of a project so that it is possible to accumulate evidence throughout the process, rather than trying to collect evidence at the end of the project when some of it will have already been lost, and opportunities to enhance impact will have been missed.

In this report, we will synthesize the evidence for the impact these digitised collections are having on research, teaching and learning at multiple levels. Within the context of JISC and the United Kingdom, we will examine the impact evidence gathered by JISC-funded projects to better understand the impact these projects are having both inside their domains of expertise and on the broader research and learning communities, and on the public. At a broader level, we will consider evidence for the impact that digitisation efforts in general are having on the practice of scholarship both within the UK and world-wide: to what extent have research, teaching and learning practices seen a transformation? Because many of the materials that have been digitised have a humanities focus, we will primarily look at transformations within the humanities. However, the arts, the social sciences, medicine, and the sciences will also be considered in the context of digitisation projects that have either primary or secondary audiences in these areas.

The ability to document impact is becoming increasing important in the UK and elsewhere. The 2014 Research Excellence Framework (REF) exercise which rates the research outputs of UK university departments will include a measure of impact other than strictly academic impact (REF, 2011). All departments will be required to submit one case study, plus an additional case study per ten faculty members, demonstrating impact *beyond academia*. The National Science Foundation in the United States 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). The Economic and Social Research Council (ESRC) in the United Kingdom requires applications to include "pathways to impact,"[5] as does the Arts and Humanities Research Council (AHRC).[6]

Previous efforts to measure impact include the University of Oxford's TIDSR[7] project (Meyer, et al., 2009), discussed in more detail throughout this report, as well as a number of others: the LAIRAH project at University College London (UCL) (Warwick, Terras, Huntington, & Pappa, 2008), MIT's OpenCourseWare evaluation (Carson, 2005), the Open Educational Resources Report (Atkins, Brown, & Hammond, 2007), the Berkeley Digital Resource study (Harley, 2007), the Rice University Fondren Library Impact of Digital Resources on the Humanities study (Spiro & Segal, 2007), and a Wolverhampton-Loughborough digital repository analysis project for JISC (Zuccala, Thelwall, Oppenheim, & Dhiensa, 2007). JISC is also currently funding efforts to measure impact, including the *Open Educational Resources Impact* project,[8] and the seven projects funded to measure and enhance the *Impact and Embedding* of their resources which collected the core data for this report.[9] All of these efforts contribute to a broader understanding of the multiple types of impacts digital resources can have, and ways to measure those impacts.

At the larger scale, it has been suggested that *Europeana*,[10] the European digital library with about 15 million digitised objects as of 2011, become a central repository for national and regional digitisation efforts (Comité des Sages, 2011, p. 5). At the same time, large commercial efforts such as the Google Books[11] project continue to attract considerable use and public attention worldwide. In the United States, the *Save America's Treasures* programme[12] includes efforts to digitize rare and endangered heritage materials. These and many others signal a broad consensus about the value of preserving cultural heritage, but more importantly, enabling *access* to these materials via digital collections.

One of the central questions that remains to be answered is to what extent the impacts of digitisation are first-order (direct) effects such as improving access to research materials and decreasing the time and distance required to access materials, and how many impacts are in the realm of second-order (derivative, or indirect) effects, such as enabling unanticipated re-

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[5] http://www.esrc.ac.uk/funding-and-guidance/tools-and-resources/impact-toolkit/what-how-and-why/pathways/index.aspx
[6] http://www.ahrc.ac.uk/FundedResearch/impact/Pages/default.aspx
[7] http://microsites.oii.ox.ac.uk/tidsr/
[8] http://www.jisc.ac.uk/whatwedo/programmes/elearning/oer2/oerimpact.aspx
[9] http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding.aspx
[10] http://www.europeana.eu
[11] http://books.google.com/
[12] http://www.imls.gov/about/treasures.shtm

use of data, or creating synergy with contemporary online data, or generating completely new audiences for previously inaccessible material. In this report, there is evidence that these second-order effects are among the most interesting impacts.

Finally, we need to consider the impacts that digital resources are having on the institutions, and how they compare with the other digital outputs of universities, libraries, and other institutions engaged in digital heritage. These impacts are not directly measured in most of the data presented here, but in the conclusions to the report, we will start to assemble a sketch of the role that digital heritage resources have in the life of institutions.

The Collections

Over the last several years, JISC has funded research into the usage and impact of twelve digital projects. Most recently, seven projects were funded in 2010 to "undertake rapid analysis of a digitised resource/collection, and implement solutions to embed the resource within teaching, learning and research" (JISC, 2010, p. 1). In the original call, it was anticipated that 4-6 projects would be funded, but after the review of proposals, all seven projects that were recommended as fundable by the review committee were supported. One of the goals of this funding was to address the problem discussed above: the lack of systematic data on the impact of digital resources in the UK.

A central requirement of the funding call was that projects use the methods in the *Toolkit for the Impact of Digital Scholarly Resources (TIDSR)*[13] as the starting point in the rapid analysis phase of each project, although projects were welcome to use additional measures as well. The TIDSR resource was developed by the Oxford Internet Institute, University of Oxford, in 2008-2009 as part of a previous JISC invitation to tender awarded for a "Usage and Impact Study of Digitised Resources Funded Under the JISC Phase One Digitisation Programme" (JISC, 2008). In that project, five digitised collections were studied using a broad range of quantitative and qualitative measures to better understand their impacts on research, teaching, and the broader public (Meyer, et al., 2009).

This report will draw on the evidence from the seven projects funded in 2010, with additional evidence from the five collections studied in the 2008 TIDSR project, to better understand the range of impacts seen in UK digitisation projects. These are not exhaustive: there are hundreds and thousands of digital resources in the UK and elsewhere. However, it is hoped that other resources will be able to learn from this exercise, in terms of seeing ways to measure and enhance their collections.

This section has brief descriptions of and links to each of the 12 projects included in this report.

A Vision of Britain through Time

URL:	http://www.visionofbritain.org.uk/
Project:	Embedding A Vision of Britain through Time as a resource for academic research and learning
Reports:	http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/vobimpact.aspx
TIDSR:	http://microsites.oii.ox.ac.uk/tidsr/case-study/349/vision-britain-through-time

The website *A Vision of Britain through Time* was originally launched in 2004 using National Lottery funding. The site includes geographical surveys of Britain, including every census from 1801 to 2001, and a library of historic maps. The site was designed mainly with local historians in mind as the key user base.

One innovative aspect of the AVoB site is that it uses an income generation model based on a combination of open access, free-to-the-user content combined with Google AdSense to generate revenue. This revenue covers the running costs of the site, and thus contributes to the site's sustainability, but also provides useful data about the impact of various parts of the site in terms of income generation.

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[13] http://microsites.oii.ox.ac.uk/tidsr/

The site is of particular widespread interest because some of the material it houses – in particular the scanned and geo-referenced historical maps – is not available elsewhere.

British History Online

URL: http://www.british-history.ac.uk/
Project: The Impact and Embedding of An Established Resource: British History Online as a Case Study
Reports: http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/bho.aspx
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/348/british-history-online

British History Online (BHO) was created in 2002 by Institute of Historical Research and the History of Parliament Trust. It contains core resources focused on the medieval and modern history of Great Britain.

One quote from the BHO impact analysis is telling, in terms of how the resource is seen by its more enthusiastic users:

> *British History Online is my favourite and first source for primary sources in British history. As a student of history, librarian, and writer, I return again and again. Even when I'm not researching, I often visit BHO for the sheer fun of what I might learn and discover. The site is easy to navigate, convenient, and its offerings thorough and accessible. Where else online can I find such a bounty of Britain's heritage? It is a generous endeavour and an absolute goldmine.* (Blaney & Webster, 2010, p. 7)

While the BHO has done work previously assessing research uses (such as interview-based studies in 2002, 2005, and 2009-2010), this funding enabled the resource personnel to take a step back and look at their impacts beyond research into teaching and learning. They also used this exercise as an opportunity to enhance the collection based on the data they collected for this study and previously. In particular, the team implemented four new features: screencasts as a training tool, Cool URIs to enhance citation of the resource, suggested citation formats to aid in citing the material in the collection, and shared tagging of content.

HumBox

URL: http://www.humbox.ac.uk
Project: HumBox Impact
Reports: http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/humbox.aspx
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/350/humbox

HumBox is an online repository designed to support a community of humanities professionals to publish, share, and manage digital humanities resources. The system is based on the ePrints repository software with custom-designed improvements.

While still relatively small in terms of registered users (approximately 450) and content (approximately 1350 resources), *HumBox* has seen uptake for the storage and presentation of teaching materials and materials for dissemination.

Old Bailey Proceedings Online

URL: http://www.oldbaileyonline.org
Project: Crime in the Community: Enhancing User Engagement for Teaching and Research with the Old Bailey Online
Reports: http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/oldbayley.aspx
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/351/old-bailey-online

The *Crime in the Community* (CiC) project examined the impact and embedding of the *Old Bailey Proceedings Online* (OBPO). The OBPO contains all published accounts of trials held at the Old Bailey court from 1674-1913 (n= 197,745). The content includes 127 million words of tagged and accurately transcribed historical text which comprises the largest "fully searchable edition...detailing the lives of non-elite people" [14] ever published.

The resource has benefited from concerted efforts to publicize the site, and in a 2008 comparative survey 62% of a sample of humanities scholars in the UK reported having seen or used the site, placing it fourth highest among the 15 sites in the sample (Meyer, et al., 2009). More recently, it has benefitted from the publicity of being featured in a popular BBC television programme, *Garrow's Law*, and a BBC Radio 4 series *Voices from the Old Bailey*, which was the fourth most listened programme on BBC radio in 2010.

The *Old Bailey Proceedings Online* has also been the subject of a recently published set of case studies of user information practices (Bulger, et al., 2011).

Oxford University Podcasts

URL: http://podcasts.ox.ac.uk/ and http://itunes.ox.ac.uk
Project: Listening for Impact
Reports: http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/lfi.aspx
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/354/oxford-university-podcasts

The Listening for Impact Project was an effort to measure the audio and video podcasting efforts at the University of Oxford. Podcasts at Oxford are distributed through multiple outlets (reflecting the decentralized nature of the university), but in 2008, spurred by a partnership with Apple's iTunes U podcasting platform, the computing service of the university began to more systematically provide support for distribution of podcasts via iTunes U, as well as via http://podcasts.ox.ac.uk, http://itunes.ox.ac.uk/, and the Mobile Oxford portal (http://m.ox.ac.uk/).

The complete collection at the time of this project consists of approximately 2650 podcasts, including lectures, interviews, discussions, and workshops. Two-thirds of the files are audio, and the remaining are primarily video plus a few electronic books and PDFs.

[14] Retrieved 28 October, 2010 from http://www.oldbaileyonline.org/

Siobhan Davies RePlay

URL: www.siobhandaviesreplay.com
Project: D-TRACES: Dance teaching resource and collaborative engagement spaces
Reports: http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/dtraces.aspx
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/352/siobhan-davies-replay

The D-TRACES (Dance Teaching Resource and Collaborative Engagement Spaces) project sought to understand and enhance the impact of the *Siobhan Davies RePlay* digital archive of dance resources. Siobhan Davies is a leading UK choreographer, and the *RePlay* archive contains more than 5,000 items relating to her choreography, dancing, and dance training. The collection includes film, photographs, marketing materials, scholarly writings, personal recollections, sketches, and drafts of both public performances and materials related to the process of developing dance and training dancers, such as rehearsal 'scratch tapes', draft designs, and artist notes.

One of the unique aspects of this collection, beyond its status as one of very few digital dance archives worldwide, is the role the collection plays in education. The national UK Personal Development Planning (PDP) scheme, which allows students to build and reflect on their portfolios, was targeted as a way to embed the RePlay archive into the dance students' PDP plans.

Stormont Parliamentary Hansards

URL: http://stormontpapers.ahds.ac.uk/
Project: SPHERE: Stormont Parliamentary Hansards: Embedded in Research and Education
Reports: http://www.jisc.ac.uk/whatwedo/programmes/digitisation/impactembedding/sphere.aspx
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/353/stormont-parliamentary-hansards

The *Stormont Parliamentary Hansards* website offers access to the Parliamentary Debates of the devolved government of Northern Ireland from June 7, 1921 to the dissolution of Parliament in March 28, 1972.[15] The resource, online since 2006, gives access to approximately 92,000 pages of materials which are held by few institutions, and would otherwise be relatively inaccessible to interested researchers, teachers, and learners.

The content of the *Stormont Papers* reflects the debates about social and economic policy in Northern Ireland, and relations with both the British and Irish governments. One of the main interests in the collection is from historians interested in issues related to Home Rule and the Northern Ireland troubles from the perspective of the day-to-day governing of a state. The documents in the collection are available both as scanned page images and as downloadable transcribed text.

[15] http://stormontpapers.ahds.ac.uk/stormontpapers/index.html

Previously analysed resources

In the 2008-2009 TIDSR project, the following five collections were studied to examined their usage and impact (Meyer, et al., 2009). These projects are included in this report for comparison, although the data have not been updated except where noted.

18th Century Official Parliamentary Publications Portal

URL: http://parlipapers.chadwyck.co.uk[16]
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/345/impact-jisc-phase-i-digitisation

The *18th Century Parliamentary Publications* digitised material is drawn from the University libraries at Southampton and Cambridge Universities and the British Library. Digitised material includes Journals of the House of Commons and Lords, Parliamentary Registers, Sessional Papers of the House of Commons, Acts, Bills and other related materials. The original publications were often poorly indexed, and the complex inter-relationships between the documents difficult to understand.

After the end of the TIDSR study, BOPCRIS announced that all access would be through the ProQuest commercial site and that direct access would be discontinued, although access to UK HE users would still be free under an agreement with JISC.

19th Century British Library Newspapers

URL: http://newspapers.bl.uk/blcs/[17]
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/345/impact-jisc-phase-i-digitisation

The first phase of the *19th Century British Library Newspapers* project digitised over 2,000,000 pages of content, providing free access to a virtual library of nationally, regionally and locally important digitised British newspapers from 1800 to 1900. The digital material is free to users in UK Higher Education (HE) and Further Education (FE) institutions, and is also available free of charge in British Library reading rooms.

The collection benefits from strong awareness: in the TIDSR survey of users of digital humanities resources, 77% of the UK portion of the sample and 61% of the overall sample (n=550) were aware of this collection. In qualitative interviews, the *19th Century British Library Newspapers* collection was well-known and highly regarded. As a collection, the newspapers hold appeal both to scholars and to lay historians.

British Library Archival Sound Recordings

URL: http://sounds.bl.uk
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/345/impact-jisc-phase-i-digitisation

The *British Library Archival Sound Recordings* (Phase 1) project digitised more than 12,000 items totalling 3,900 hours of segmented recordings, and follow on funding has increased the size of the collection to over 46,000 items. The content includes a wide variety of sounds, including oral history recordings, field recordings of traditional music, rare classical and popular music recordings, soundscapes, wildlife sounds, public debates, and other sound materials. The digital material is free to users in UK Higher Education (HE) and Further Education (FE) colleges, and is

[16] Originally http://www.bopcris.org and http://www.parl18c.soton.ac.uk/parl18c/digbib/home
[17] Originally http://www.bl.uk/reshelp/findhelprestype/news/newspdigproj/paperdigit.html

also available free of charge in British Library reading rooms. Like the *19th Century British Library Newspapers*, the *British Library Archival Sound Recordings* benefit from their association with the other high quality collections at the British Library, and from the British Library's strong efforts to publicise their collections.

In qualitative interviews and focus groups, there was evidence that one barrier to greater usage and impact is that many researchers are not really sure how to use audio materials effectively in their research. This points to an opportunity for creators of multimedia collections to enhance the resource's impact by better demonstrating the kinds of uses to which researchers can put collections such as these.

Histpop

URL: http://www.histpop.org
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/345/impact-jisc-phase-i-digitisation

The Online Historical Population Reports project, which goes by the short name *Histpop*, was publicly launched in 2007, containing some 200,000 pages of census and registration material for the British Isles, and provides free online access to the complete British population reports for Britain and Ireland from 1801 to 1937. While overall awareness of the *Histpop* resource in a general survey of users of digital humanities resources was low (16% awareness in the UK and 12% awareness overall, n=550), among those who use the resource, we found strong indications both in the survey data and in qualitative interviews that it is an important resource for the niche audience it serves.

Histpop benefits from a clear, memorable name and website URL, which is relatively well linked to by other domains (n=214, increasing to 565 currently). The project has benefitted from some courses beginning to use it as a teaching tool, which increases the likelihood that students will be aware of the resource as they develop higher level projects later in their academic careers. Because of the specialised nature of the resource, *Histpop* is unlikely to generate traffic and usage comparable to collections with a more general audience.

Wellcome Medical Journals Backfiles

URL: http://library.wellcome.ac.uk/doc_WTD037630.html[18]
TIDSR: http://microsites.oii.ox.ac.uk/tidsr/case-study/345/impact-jisc-phase-i-digitisation

The *Wellcome Medical Journals Backfiles* project has digitised the complete backfiles of a number of important and historically significant medical journals. The digitised content, an estimated 3 million pages, is freely available on the internet via PubMed Central[19] and is mixed in among the other medical content in that resource. Because the Wellcome Backfiles collection is housed within this much larger collection of contemporary medical literature, the *Wellcome Medical Journals Backfiles* collection is particularly difficult to trace using some of the techniques used in this study, such as webometrics. With other measures, however, such as bibliometrics, we see evidence that the project has been comparatively well discussed in the academic literature for such a new resource, with 18 unique citations to the collection in the citation analysis, mainly in articles discussing the trend toward digitising collections in the biomedical domain rather than to specific materials within the collection. Finding evidence of citations to the digitised journal materials is a challenge, since many researchers using all the collections discussed here often cite the material in

[18] Originally http://library.wellcome.ac.uk/backfiles/
[19] http://www.pubmedcentral.gov/

such a way that appears as if they have consulted the original physical materials, with the effect that any use of the digital resource is not obvious. In the general survey of users of digital humanities resources, there was relatively low awareness of the collection (34% among UK respondents, n=75), and low usage (9% of respondents overall reported using the resource regularly or on occasion). Among actual users (n=38), however, 61% felt that the collection was important to their research, a proportion second only to *Histpop* users among the five projects studied. This suggests that this, like *Histpop*, may be a niche resource in terms of overall awareness but is nevertheless very important to the smaller number of users for whom it is relevant; alternatively, it may just be difficult to measure users for this resource, and there are actually many more users which these methods were unable to discover.

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Evidence of Impact

The digital resources described above were all analysed to better understand (and enhance) their impacts on research, teaching, and learning using a variety of methods. One of the lessons of the original TIDSR study is that no single measure can give a very useful understanding of a collection's impacts. Unlike resources aimed at the wider public, which can sometimes be measured by their overall popularity and traffic, for most digitised scholarly materials, the audiences will always be smaller and more specialized. Thus, using a range of methods builds a fuller picture of their multiple types of impacts.

Table 1. Methods Employed to Measure Impact

Methods	AVoB	BHO	Hum Box	OBPO	SDR	SPH	UOP	PP	BL News	BL Sound	Hist-pop	Med
Quantitative												
Analytics	●	●	●	●	●	●						
Income	●	●										
Log Files		●	●	●		●	●				●	
Scientometrics	●	●			●			●	●	●	●	●
Surveys	●	●	●	●	●	●	●	●	●	●	●	●
Webometrics	●	●			●	●		●	●	●	●	●
Qualitative												
Content Analysis	●	●				●	●	●	●	●	●	●
Feedback	●	●					●				●	
Focus Groups	●	●	●	●		●	●	●	●	●	●	●
Interviews	●	●		●	●	●		●	●	●	●	●
Referrer		●			●	●	●	●	●	●	●	●

In Table 1, we see a summary of the methods used by each project to measure impact. As shown, projects used either a few or many methods, depending partly on their goals and partly on the sorts of data available to them. For instance, the five TIDSR projects were not using analytics software, so their data was not possible to analyze using that technique, but analytics were used for most of the current *Impact and Embedding* projects to better understand their impact.

The tools are divided into those with a more quantitative emphasis, which generate numerical data which can be compared across studies, and those with a more qualitative emphasis, which add richness to the case studies and help to explain some of the patterns in the numerical data.

This report draws on all twelve cases to synthesize the large amount of empirical quantitative and qualitative evidence collected. In the subsections that follow, evidence from the projects will be summarized, compared, and analyzed for trends, patterns, and unexpected outliers. Not all cases are discussed in each section; instead, those cases with the clearest evidence to understand the topic are drawn upon to contribute to what we hope will be a growing evidence base for understanding the impact that digital resources are having in the UK and beyond.

Analytics

Analytics, often in the form of the widely popular, easy-to-implement and easy-to-understand Google Analytics service, help provide the most broad-brush measure of the impact of a website. While analytics numbers can be used to compare sites in terms of popularity and amount of traffic,

by themselves they do not show the entire picture. However, they can give us a good idea of the scale of use, and if resources use them consistently over time, they can help understand the changing patterns of, and hopefully growth in, use.

Six of the projects have installed Google Analytics on their resources, and reported this data. The seventh project, the University of Oxford podcasts, was not able to use Google Analytics because the method of access for the majority of the traffic to the site would not trigger the javascript required to make the analytics work. The Oxford team instead built a bespoke solution, discussed elsewhere in this report. However, because of the nature of the way people access their resource, they do not have a way to accurately gauge some data, such as unique visitors per month.

The five projects studied previously did not report analytic data, because at the time none of those projects were able or willing to install Google Analytics (Meyer, et al., 2009, p. 18). We are heartened to see that our recommendation in that earlier study to use Google (or other) analytics tools was taken up by some of the projects here, and that others were already using analytics before doing the current round of impact and embedding studies.

Table 2. Summary Statistics

	AVoB	BHO	HumBox	OBPO	SDR	SPH	UOP
Visitors per month	96,759	330,000	1,692	83,201	816	636	
Page views per month	366,730	1,430,000		628,032	10,148	2,570	30M+
% UK traffic	78%	71%		62%	95%	29%	18%

These broad-brush numbers show the huge variation in the amount of visitors and traffic coming to the collections. From the *Stormont Papers* and *Siobhan Davies RePlay* sites with fewer than 1,000 unique visitors per month each, to the *British History Online* collection with 330,000 unique visitors a month, to the University of Oxford podcasts with 1-2 million accesses *per day*, these numbers give some idea of the scale of use for these resources.[20]

We have said elsewhere that a smaller resource can, nevertheless, have considerable impact if the users are the *right* users – the researchers, teachers, learners, or members of the public, for instance, who are part of the target audience of stakeholders. The incompleteness of simple analytics was one of the motivations behind building the TIDSR resource in the first instance: by combining broad brush measures with additional quantitative and qualitative evidence, it is possible to create a much better understanding of what *types of impacts* a resource is having.

One of the questions for UK-based resources is what proportion of the use is also from the UK, indicating impacts on the local research, teaching and learning community, and how much is from elsewhere, suggesting impacts on an international scale. For the resources examined here, the UK traffic ranges from a high of 95% for the SDR dance resource to a low of 18% for the podcasts which have been promoted world-wide by Apple through its advertising for iTunes U. The *Stormont Papers*, like the Oxford podcasts, have a minority of traffic originating in the UK, with more traffic originating in the United States (39%). Whether these three resources are comfortable with the extent of their global reach (or lack thereof) is not something for this report to decide, but it is something these resources should be aware of, and consider whether their marketing approach needs to be adjusted.

[20] Note that these are different counting methods: it is not possible to directly compare unique users versus accesses, which in the case of UOP is somewhat inflated due to the nature of "accesses" in the log files, where multiple lines contribute to a single media download due to the way that clients request large files in manageable pieces. However, these numbers do give a sense of the different scales at which various resources operate.

A Vision of Britain through Time, *British History Online*, and the *Old Bailey Proceedings Online* all receive a majority of their traffic from the UK, which is about what one might expect for resources of interest to British historians and history enthusiasts.

Webometrics

Webometrics is another quantitative measure that relies on counting how many pages and domains link to a particular website. As with all the measures highlighted in this report, webometrics provide only one view on the impact of a digital resource. Only by looking at multiple measures in context can we start to assemble a view of the types of impacts digital resources are having, and the scale of those impacts.

Webometrics do, however, give a snapshot of the visibility of a collection online. Even though considerable traffic arriving at many of the sites originates from search engines, links still continue to help users find sites of interest. Also, linking between pages is part of the page rank algorithm that Google uses to rank pages in search results, so doing well in webometric results can also influence a web site's performance with regard to appearing at the top of search results.

In Table 3, the specific numbers don't tell the entire story, but taken as a group we can see some overall patterns. The most striking of these is the reasonably obvious grouping into three levels of web visibility, as measured by links: sites with links in the tens, in the hundreds, and in the thousands. To put these numbers into context, the National Trust[21] in the UK is an order of magnitude higher than any of these, with about 70,000 inlinks, and the UK National Archives website[22] is another order of magnitude higher still, with about 380,000 inlinks.

Table 3. Webometrics results for selected digital resources

	Resource	Inlinks[23]	Current Hits[24]	Original Hits[25]
3	Old Bailey	6,680	1,740	
	British History Online	5,265	141,000	
	British Library Sounds[26]	3,021	21,700	542
2	BL 19th C Newspapers	950	232	187
	A Vision of Britain	644	1,510	
	Oxford Podcasts[27]	531	161	
	18th C Parliamentary Papers	291	280	72
	Histpop	225	565	256
1	Stormont Hansards	98	38	
	HumBox	72	5	
	Siobhan Davies RePlay	35	10	
	Wellcome Medical Backfiles	16	1	63

In the first, lowest order of magnitude (10-100 inlinks) are the collections with the lowest number of visitors per month (see Table 2), which tends to confirm that these resources are, at the moment,

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[21] http://www.nationaltrust.org.uk
[22] www.nationalarchives.gov.uk
[23] Inlinks excluding those from the domain being tested, as reported by Yahoo Site Explorer (http://siteexplorer.search.yahoo.com).
[24] Estimated current hits in Bing, as reported by Webometric Analyst (http://lexiurl.wlv.ac.uk/).
[25] As reported in Meyer, et al. (2009), based on data gathered in 2008-2009.
[26] The apparent large growth in numbers of hits for the British Library Archival Sound Recordings should not be taken too literally, as the original project and collection pages no longer exist, so could not be used for these metrics. Instead, the overall collection (http://sounds.bl.uk) was used, which includes a larger collection that was being examined in the first study.
[27] Combined numbers for http://podcasts.ox.ac.uk/ and http://itunes.ox.ac.uk/. This does not take into account the links originating within the iTunes application.

appealing to a fairly limited audience. As we will see later in this report, however, they have demonstrated other types of impact on those smaller audiences.

In the highest group (magnitude 3, with between 1,000 and 10,000 sites), we see some of the sites with the highest number of visitors per month, including OBPO and BHO, plus the BL Sounds collection from the original study. Again, this tends to confirm that these are among the most well-known resources, as measured by links and demonstrated by high traffic figures.

In the second group of sites, we see inlinks an order of magnitude higher (100-1000) than in the first group, but lower than group 3. These are a bit trickier to interpret, since some, such as the University of Oxford podcasts, are performing relatively poorly at least partly because the nature of the resource makes it difficult to measure using this technique. Much of the traffic for the Oxford podcasts comes via iTunes rather than via links, and thus doesn't lend itself to this metric very well. Overall, however, the resources in group 2 appear to be reasonably well-linked.

In four cases from the original five-resource study, the numbers of links are growing over the past 2-3 years. This is encouraging in terms of impact, which should ideally grow over time. The only site that has performed less well is the *Wellcome Medical Journals Backfiles* collection, which moved its web page. This resource also has the problem of being very difficult to measure as a collection, since the actual documents are contained with the much larger PubMed collection[28] of general medical journal publications. Whether this increases or decreases the impact of the digitised historical journals is unclear. On the one hand, including them with similar contemporary content seems likely to make them easier to find, but on the other hand, historians who would be a potential audience for these older journals do not tend to use PubMed as a key resource unless they are specifically interested in the history of medicine. Tanner, however, reports that the Wellcome collection has significant impact, arguing that "one title, *Biochemical Journal*, attracts 300,000+ uses per month" (Tanner, 2010, p. 6). Whether this use is dominated by reference to the more recent portions of the collection or to the oldest parts of the collection (which dates back to 1906) is unclear.

As mentioned in our previous reports, one aspect of impact that webometrics highlights is the effect that changing web addresses has on traffic to a site via links (Meyer, et al., 2009). Four of the five sites in the original study have moved their web pages in the last two years for a variety of reasons, and in doing so have left dead URLs in their wake and heightened the difficulty of measuring the impact of their resources. The 18th Century Parliamentary Papers, for instance, was originally hosted at www.bopcris.org; that URL no longer exists, and now is redirected to http://www.southampton.ac.uk/library/bopcris/projects.html which lists a number of projects on a more generic University of Southampton Library web page. The actual resource is now made available via the commercial *House of Commons Parliamentary Papers*[29] collection sold by ProQuest/Chadwyck-Healey (although the collection is still free to the UK HE community). It is very difficult to do webometrics over time on resources such as this, which change URLs, move into larger collections, and re-organize the websites. A common technical solution by web developers is to redirect requests for the old URLs to a new location. While re-directs help to minimize the problem of dead URLs, they do not address the problem of an apparent lack of impact for the new URL, since there may be few links to the new URL if it moves after the initial efforts to promote and advertise the site.

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[28] http://www.ncbi.nlm.nih.gov/pmc/
[29] http://parlipapers.chadwyck.co.uk

Changing URLs are clearly an ongoing problem. During the 2009 study, the *19th Century British Library Newspapers* project changed project and collection URLs in a site redesign, and have done so again between then and now. As mentioned above, the 18th Century Parliamentary Papers have moved into a new site, and the *Wellcome Medical Journals Backfiles* pages have also moved to a new location. Of the five projects in the original study, only *Histpop* and the *British Library Archival Sound Recordings* have stayed stable in terms of web addresses.

One of the limitations of webometrics is that many of the tools don't work well with sites that have over 1,000 incoming links. In both the BHO study (Blaney & Webster, 2010) and the AVoB study (Aucott, Southall, & Healey, 2010), for instance, the project teams ran up against this limit. For these broad overview numbers reported here, this isn't a problem, but in the more detailed webometrics reports which can help to understand things like the proportion of links from individual top-level domains (e.g., .uk or .com) and second-level domains (e.g., .ac.uk or .org.uk), the reporting tools[30] are limited to 1,000 links due to the way the results from search engines are obtained. Since search engines detect the location of the user and attempt to return geographically-aware results, this can result in what appears to be a bias in linking from within the country (in this case the UK) when in fact, the site may be well-linked from elsewhere also, but these links are outside the top 1000. Since the studies, by and large, did not report comparable information, we won't compare these more detailed results here. Some of the individual reports, however, have these data for specific projects.

Scholarly impact

Scientometrics or bibliometrics refers to, at its simplest, the process of counting the number of citations in the academic literature to a prior work. This is a standard technique, dating back at least five decades, for understanding the scholarly impact of individual researchers, research departments, and academic journal articles. For our purposes, we are using the technique slightly differently, which is to try to understand the scholarly impact of digital resources based on citations to the resource in the published literature. Like webometrics this involves finding links to the resource, but is limited to the scholarly portions of the online world, in this case represented by the collections at Scopus and Google Scholar.[31]

Table 4. Scholarly Citations to each web collection

Resource	Scopus	Google Scholar	Original GScholar
British History Online	61	401	
Old Bailey	47	355	
A Vision of Britain	22	97	
British Library Sounds	1	36	12
Histpop	6	44	11
18th C Parliamentary Papers	3	20	8
HumBox	0	13	
BL 19th C Newspapers	2	12	4
Stormont Hansards	1	12	
Oxford Podcasts	12	4	
Siobhan Davies RePlay	0	2	

[30] Such as *Webometric Analyst*, http://lexiurl.wlv.ac.uk/, which is also described in the TIDSR pages.

[31] Scopus will generally report lower numbers than Google Scholar, since it searches primarily traditional publication sources. Google Scholar, on the other hand, includes gray literature, such as unpublished conference proceedings, PowerPoint slides, and reports, and thus finds more non-traditional outputs.

In Table 4, we see the results of searching[32] for the collection URLs in the scholarly literature. There are problems with this technique, which we will return to below when we discuss citation habits. In short, however, many of the materials *within* these collections may have been cited directly without any reference to the digital source of the materials. As a result, these numbers are in most cases under counting the number of times material within a digital resource has been cited.

So, again using these figures in a broad-brush fashion, we can see that they largely reinforce the data in Table 2 and Table 3. Again, BHO, Old Bailey, and AVoB are near the top of the list, suggesting that these resources are being used for academic research. BLS, *Histpop*, and PP are all less well-cited, but the numbers in all three cases have increased by 3-4 times since the last measurement in 2009. The bottom two examples, UOP and SDR, are somewhat unsurprisingly not well represented in the academic literature, as they contain materials more geared toward education and learning rather than research.

Media impact

What can the content analysis of news, blogs, and other traditional and non-traditional media outlets tell us about how the impacts of digital resources travel?

Understanding how a resource is discussed in the media can tell us several things about resources. First, the frequency with which the resource is mentioned in the media gives us a rough idea of how successful the project has been at advertising itself to the general public. Second, seeing what aspects of a resource attract media attention can provide a better understanding of what a general audience might find attractive or useful about a resource. Third, understanding how a collection is framed[33] in the media can help understand which aspects can be further developed or highlighted to attract additional media attention in the future.

For the Oxford U. podcasts, one aspect of the podcasting that attracted particular attention was that the materials were being provided for free, which was mentioned by nearly all of the 70 web, newspaper, radio, and television outlets that provided coverage.

Interestingly in the context of this report, being able to demonstrate scale and impact in terms of large (or at least large sounding) numbers can help attract attention. For UOP, a common theme in their analysis of the media mentions of their resource including examples such as:

> *In the first week their [Oxford's] 200 items were visited by 168,000 visitors and 60,000 downloads occurred...Information about the Oxford admissions process has proved very popular, attracting more than 30,000 downloads to date...Apple's iTunes U sees more than 300M downloads, offers 350,000 educational files.* (Wilson, et al., 2010, p. 5)

[32] For the searches, the collection URL was used. So, for instance, the BHO numbers derive from the search terms ALL("british-history.ac.uk") in Scopus, and "british-history.ac.uk" in Google Scholar.

[33] Framing refers to a concept from media studies: frames are built in the media and influence the view the public has of an event, topic, or resource, for instance. These frames are inherently limited views that include certain aspects and exclude others, and how they are constructed influences the public's view and the public discourse. For instance, a frame focusing on the fact that "Apple's iTunes U sees more than 300M downloads" is a much different frame than one suggested that public resources have been spent on a frivolous resource. Obviously, the latter is to be avoided when possible, but if such frames begin to be associated with a resource in the media, it would suggest a need for efforts to re-frame the understanding of what the goals of the project are.

For better or worse,[34] people are influenced by numbers, particularly ones that appear large. Conversely, appearing to be small raises the risk that a resource will be seen as insignificant. As we have discussed above, the size of a collection or the number of accesses or downloads is not necessarily a very good measure, particularly when examining a niche resource that is nevertheless, an important part of that niche. However, knowing that numbers can influence a resource's ability to be discussed by the media is worth keeping in mind as a resource is advertised and disseminated.

UOP also noted that much of the initial media coverage was based on press releases issued by the university's press office. Many of the articles on the resource at the time of the launch were verbatim or nearly verbatim reprints of the press release materials. This was also common among the five cases studied in the original TIDSR project: 17 of 58 Nexis articles in the news media were press releases, the highest single type of article. The two British Library resources (BL Newspapers and BL Sounds) benefitted particularly from the press office of the British Library, which promotes the activities of the BL via a strong network of traditional and non-traditional media outlets.

Some of the media coverage is outside the control of the resource. For Oxford University podcasts, the promotional activities of Apple to promote iTunes U has an impact on the sources of traffic, even if the promotion didn't specifically mention Oxford's materials on iTunes. For instance, when Apple launched iTunes U in China in September 2010, the traffic to Oxford's podcasts increased dramatically. The resource had experienced a similar spike two years earlier when the service was launched in Europe, but the Chinese spike was six times higher. Apple's promotional efforts continue to drive new audiences to the Oxford iTunes U content, and the appearance of a podcast in the iTunes U Top 100 chart can increase listenership.[35]

Table 5. Blog references, measured using Google Blog Search

Resource	URL	Search term
British History Online	731	
Old Bailey	265	
British Library Sounds	127	
BL 19th C Newspapers	75	
Oxford Podcasts	62	1230
A Vision of Britain	28	
Histpop	8	268
HumBox	3	
18th C Parliamentary Papers	2	
Stormont Hansards	2	265
Siobhan Davies RePlay	2	
Wellcome Medical Journals Backfiles	1	21

In Table 5, we see the number of blogs mentioning the resource. Blogs are a well-established source of traffic to a site, and being discussed in the blogosphere can be an important way to help new potential users discover the material in a collection. The numbers in the URL column show the number of blogs linking to the website of the resource. *British History Online* and *Old Bailey Proceedings Online* both do well, as do the British Library Resources.

[34] The most influential discussion of the dangers of an uncritical acceptance of numbers is Paulos (1988), who discusses how innumeracy can lead to undesired consequences based on poor decisions that have been inordinately influenced by a misunderstanding of numbers.

[35] This is an example of the Matthew Effect (Merton, 1968) which, essentially, refers to the process where things which get a lot of attention tend to, as a result of that attention, garner even more attention. This can result in a "winner takes all" scenario where initial prominence influences future prominence.

For several of the collections, a search term was used to find additional references to the collection, but which may not have included the full URL. The most obvious case that jumps out here is that of the Oxford University podcasts which were discussed extensively in blogs (as discovered using search for <iTunesU and Oxford>), but these discussions often linked to iTunes and Apple, rather than directly to the Oxford pages. *Histpop* and Stormont also have more hits using the names of their collections without the URL, suggesting that the resources are being discussed, but not necessarily linked.

One of the challenges for the projects in the bottom portion of this table are to think whether they can increase their visibility in the blogosphere by promoting particularly interesting and compelling portions of their resource in the mainstream and alternative media.

Understanding the media

As discussed elsewhere in this report, the *Old Bailey Proceedings Online* benefitted not just from news coverage, but also from attention in the media due to the resource featuring as a source for a popular radio programme and a television series. As the OBPO noted:

> *[There is a value in]...capturing media attention as a means of publicising the resource. While much of the academic use of the OBPO has been achieved through other routes (such as word of mouth and academic publications), the clear spikes in usage generated by media attention have not only served to increase levels of popular use, but they have also helped draw additional academic users to the site in the long term. This suggests that 'impact' activities oriented at the general public may actually generate benefits for academic users as well.* (Howard, Hitchcock, & Shoemaker, 2011, p. 9)

Siobhan Davies RePlay noted this effect on a smaller scale, with a small spike in visitors to the website (from ca. 200 visitors per day to 394 visitors on a single day) when *The Guardian* published a piece which linked indirectly to the archive.[36] Whether any of this traffic resulted in anything more than a short spike is unclear, but underscores the fact that traffic can come from unexpected sources.

The Oxford University podcasts also benefitted from media coverage of a different sort: Apple featured the service in an iPad advertisement broadcast during prime time on all the major United States television networks. This sort of happy circumstance that provides free advertising for a resource is obviously something fairly difficult to create, but being prepared to take advantage of such opportunities is clearly important. Whether a collection is able to capitalize on these moments of increased traffic from the public is partly a matter of design, partly a matter of content, and partly a matter of chance.

A good example of this in practice is the experience of the GalaxyZoo[37] project on launch: after a project launch appearance by the principal investigator on the BBC "Today" morning radio programme and subsequent press coverage around the world, the number of users jumped from essentially zero to over 35,000 in a single day, and these volunteers helped do 1.5 million classifications on that first day (Raddick, et al., 2010). Since then, the number of volunteers has continued to grow. The ability of the project to capitalize on this influx of attention involved both technical support (to keep the infrastructure from crashing under the load) and good planning by

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[36] The link was not directly to SDR, nor was the article primarily about Siobhan Davies, but contained a link to an earlier article about Davies. That earlier article, in turn, linked to the archive.

[37] http://www.galaxyzoo.org/

the project to ensure that interested new users could easily have quick successes – in this case, immediately contributing to the work of classifying galaxies.

An example to UOP from a student also demonstrates how easy wins can generate enthusiasm:

> *I'm not joking but this has become my favourite site in ten seconds flat - can't stop downloading! Where has this been all my life?????? This is ridiculous!* (Wilson, et al., 2010, p. 7)

These sorts of reactions should be a goal for all resources. Even if you think your resource may not generate such over-the-top responses, it is important to remember that there are people who are passionate about the subject or subjects about which you are providing materials. The question you need to ask then is not how you can make all visitors enthusiastic users of historical material, but how you can trigger enthusiastic reactions among people who already have a passion that you are helping to support.

The lesson of having ways for new users to experience quick successes once they arrive on site is invaluable. A number of projects see unacceptably high bounce rates – numbers of people who come to their site because of some interest, but only stay a short time before leaving the site. Some of these may have simply found their way to your site by mistake, and genuinely have no interest in the content. However, many others did have a real reason for visiting your site, and the question you need to ask is how can you make your site stickier – more likely to keep them long enough that they will find that it contains material they are interested in? What quick wins can you give new users that will make it clear to them what they can do with your collection?

The Oxford podcasting study found that the most popular podcasts attracted people to listen to other podcasts not just on the same topic, but on other topics available in the collection. Using the most popular aspects of your resource to attract people to other parts of the collection via features such as suggested links and recommendations for further information can increase the time spent with your collection, and can potentially increase the likelihood of the collection having a demonstrable impact.

The *Vision of Britain* site provides a small caveat in dealing with the media, when the study authors note:

> *The website's success in reaching a broad audience has not been the result of effective publicity: both the initial launch in 2004 and the re-launch in 2009 were effectively publicised, including TV appearances, but major teething problems with the site and its server meant that users were unable to access the site, and the re-launch in 2009 was actually followed by a slump in usage. Relying on grant funding makes it almost inevitable that money to publicise the site will have to be spent precisely when we have just made major changes to server, software and content; but this is precisely when the site will be least ready to meet a sudden surge in usage.* (Aucott, et al., 2010, p. 15)

This experience underscores the note above that being able to capitalize on relationships with the media can have the unintended effect of driving users away from your site, and these users can be hard to regain after having a negative experience. AVoB has certainly done well in terms of usage and impact regardless of these rocky launches, but their experience should stand as a cautionary tale to others.

Working with Web 2.0

We have already presented the evidence from blogs, but in some ways blogs have become fairly established forms of non-mainstream media over the last few years. There are many more emergent forms of communicating interesting content to others, including Twitter,[38] Facebook,[39] Delicious,[40] Connotea,[41] Zotero,[42] Mendeley,[43] CiteULike,[44] Academia.edu,[45] YouTube,[46] and a whole host of others. None of the twelve projects detailed in this report have made extensive explorations of whether these Web 2.0 applications are being used to enhance the impact of their collections. However, including tools for this is an area of growing interest and the TIDSR site is currently in the process of adding suggested methods for collecting and analyzing these sources of impact.

Kelly and Oppenheim (2009) argue that "Web 2.0 concepts are being adopted across the cultural heritage sector" and that it is necessary to exploit these resources while being aware of the risks associated with them. In particular, they argue that it is possible to use the social web to help maximize awareness and use of cultural and scholarly resources, because so many people today receive their information via the social web.

Evidence from the logs

Log file analysis, while demonstrated to be useful in other studies (Warwick, et al., 2008), continues to be problematic for a number of reasons. First of all, many technical teams do not preserve log files over the long term, instead using automated routines to overwrite old files on a regular basis to save space and clutter on network servers. Second, log files can be very large, particularly in the case of services with a lot of traffic, and thus are difficult to analyze using free or inexpensive tools. Third, the technical skills to understand log files beyond the most basic measures are somewhat more difficult to master, and thus log files are more difficult to interpret than Google Analytics, for instance. Nevertheless, many interesting things can be best discovered via log files, including detailed information about how users navigate through a collection.

In the UOP study, for instance, the log files had been saved, but had several problems that hindered interpretation. First, because the site received a lot of traffic, dealing with the large files was a bit of a logistical problem, underscoring the difficulty some of the freely available tools have dealing with data as it scales up in the case of larger resources. In the case of Oxford's project to enhance their impact, the team determined that neither free nor commercial software was available for their needs, and thus they created their own SQL-based stats system. Second, and more importantly, many of the requesting IP addresses in the log files did not have valid reverse lookup information available, so it was impossible to learn much about their origin in the original analysis. Again, in building their bespoke analysis tools, the *Listening for Impact* project that did the work reported here, these issues were addressed to make the final data more reliable.

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[38] http://twitter.com/
[39] http://www.facebook.com/
[40] http://www.delicious.com/
[41] http://www.connotea.org/
[42] http://www.zotero.org/
[43] http://www.mendeley.com/
[44] http://www.citeulike.org/
[45] http://www.academia.edu/
[46] http://www.youtube.com/

After solving these issues, some very interesting patterns were able to be drawn from the UOP data. One of the most striking is the proportion of traffic originating outside the United Kingdom, particularly from two markets: the United States (38%) and China (29%). The UK accounted for 18% of traffic during the sample period. The log files also uncovered evidence that "podcasts are continuing to increase their distribution and the average rate of downloads continues to increase even after 2.5 years of publishing" (Geng, Marshall, & Wilson, 2011, p. 13).

This is a very interesting finding, and suggests something that needs to be taken into account for many of the resources of the type that JISC has been supporting: for most, there is a very long shelf-life, and for some, the shelf-life is essentially permanent. Unlike popular materials which quickly enter the cultural space but just as quickly become dated and lose their value, many of the materials we are discussing here are timeless, or at least have demonstrated lasting interest and importance. This is why some of the models for understanding impact on the web in terms of attracting lots of attention in a short amount of time are not applicable. Consider, for instance, starting a business selling items on the web, or trying to build a social networking service. For those efforts to have an impact, they need to quickly build an audience and get that audience to purchase their products or participate in their network. Failing to achieve a quick impact tends to result in the failure of the project.

For digital research materials, however, it is a slightly different story. Certainly, it is still important to garner attention and users so as to demonstrate the value of a new collection. However, the impact, rather than spiking and dropping off, can easily continue to grow for materials in the collection. A trial from the Old Bailey records, for example, may not garner much attention until it is cited in an influential academic paper, but then may get considerable additional attention. Or, in the case of a lecture podcast on a relatively timeless topic such as philosophy or Shakespeare, the attention can continue to grow as more listeners find it useful. This separates these materials from, for instance, YouTube viral memes that garner millions of views for a few days or weeks, but are less likely to keep their value over time as the public attention turns elsewhere.

Income

Income generation is only associated with some digital content. The most obvious case involves content being delivered by a commercial partner, such as the Gale/Cengage partnership with the British Library to provide access to the BLN collection, and the PP partnership with ProQuest to include the 18th Century Parliamentary Papers in the larger House of Commons Parliamentary Papers collection.[47] In these cases, income data may or may not be available, depending on the commercial providers' agreements with the resource provider.[48]

In the case of AVoB, however, a different sort of financial information was available to measure the impact of not just the site, but of various portions within the site. *A Vision of Britain* is free-to-the-user, but generates income through Google Ads on the website, as well as by licensing data to commercial companies and having co-marketing partnerships.[49] The Google AdSense revenue for the site, while small by commercial measures (approximately $12,ooo USD in the ten months ending February 2011), the general trend of the revenue is steadily growing (Aucott, Healey, & Southall, 2011, p. 5). The AVoB team based their revenue model on BHO; while BHO didn't include

[47] http://parlipapers.chadwyck.co.uk

[48] At the time these two projects were examined as part of the TIDSR project, the researchers examining their impact were not given access to financial information pertaining to subscriptions.

[49] For instance, new data download facilities currently being implemented will be available only to members of the UK Federation, but some of the data is also being licensed for commercial enterprises elsewhere.

an analysis of income in their project impact report, their advertising generates between £700 and £1200 per month, depending on the time of year, and additional revenue comes from content subscriptions as BHO uses a mixed model approach.

Branding

Multiple sources of evidence pointed to the importance of branding, particularly for resources affiliated with a well-known name. This could be the fact that the resource itself is widely known, or that the institution hosting it is well-known and respected, or that the resource has built a brand over time.

The UOP project, for instance, found that their podcasting resource attracted considerable attention partly because of the association with two global brands: Oxford and Apple. The effect of this was both that the Oxford iTunes resource was more likely than other less well-known or well-regarded university partners to be mentioned in news articles about iTunes U, and also that both brand-holders had incentives to publicize the association. Thus, Apple's marketing materials included Oxford's resource frequently, and Oxford also publicized the relationship with Apple.

Likewise, the British Library projects benefitted both from the considerable abilities of the British Library to promote collections, and from the presence during the period the projects were studied of an Engagement Officer who was tasked with increasing awareness of and engagement with various BL resources.

Some projects create their own brand. *Histpop*, for example, created the name of the resource as part of the original digitisation efforts, and was popular among users interviewed. They reported liking the fact that the name was simple and catchy, while being descriptive. Thus, over time, the name has come to be well-known among portions of the historical research community.

Understanding your audience

Taking the time to step back from the day-to-day operations of a collection, which may only be a small part of an institution's overall goals, provides an opportunity to take stock of the needs of current users. As the OBPO project found:

> *What was most helpful were the interviews we carried out with academics and the focus group sessions we held with students. In these not only did we get useful answers to the questions we posed, but several important issues were raised which we had not anticipated.* (Howard, et al., 2011, p. 8)

It is always surprising the extent to which online resources have little awareness of their actual audiences. One of the common things we hear time and again, not just from the projects highlighted in this report but elsewhere, that online resources have been built based on assumptions and guesses about potential uses and users, and that there is often a great deal of uncertainty about who is actually using the resource and how they are using it (Birrell, et al., 2009; Herold, 2010; Marchionni, 2009). In one way, it is ironic that in this age where our every move online is traceable and every purchase at the supermarket is analysed, non-commercial providers of materials still don't have the same tools and data available to help them understand more about their users and audiences.

The University of Oxford podcasting service, for instance, has an interest in serving the students of the university, and an additional interest in serving interested listeners elsewhere. So far, however,

their data suggest that "most listeners of Oxford's podcasts are people outside the University of Oxford" (Wilson, et al., 2010, p. 11). When they surveyed incoming students, they found that three-quarters were aware of the Oxford iTunes U podcasts, but only 29% had listened to the Oxford podcasts. In a different survey of students enrolled in a course, even these students were not strongly attracted to the podcasts: only about half had listened to the Oxford podcasts. These data raise two issues for a project like UOP and others in a similar situation: if you find that a portion of your audience is not using the resource at the rate you desire, how can you increase the chances that they will do so? Secondly, if you discover that you are attracting large audiences of particular types to your material, how can you leverage that to increase the impact of your resource? At the University of Oxford, the *Listening for Impact* project is one way that the resource is gathering evidence to help them decide how to address their various audiences and aims in the future.

AVoB also discovered data that tended to confirm their concern that one of their audiences, academic researchers, was not using their resource as much as they hoped. *A Vision of Britain* has several audiences, including amateur historians, teachers, and students, but their analytics data showed that most visits to the site consisted of either a single page view, or just visiting a handful of pages. Academics using the site for research would be much more likely to use multiple pages on the site in a systematic fashion, but only 2.6% of visits viewed 20 or more pages. While this is still a large number of visits by some measures (40,131 visits in the 14-months ending 28 February 2011), it is dwarfed by the three-quarters of a million visits that only looked at a single page. These single page views are also a bit worrying – although one interpretation offered by the project is that users may be finding exactly what they need as a result of search, a pattern such as this for any site merits deeper investigation into the nature of these single-page visitors. In the case of AVoB, the design of the site *may* explain much of this data, particularly because of its optimization for discovery via Google searches for specific places. However, other sites should be careful of bounce rates this high, and even AVoB should keep a close eye on it over time to ensure that users have short stays because they *found* what they wanted, not because they failed to find what they wanted (something reflected in the worrying fact that 51% of visits lasted less than 10 seconds, which the AVoB is trying to address).

The AVoB website, however, is only part of the story with respect to academic researchers. The data underlying the website is also available for download from the UK Data Archive[50] and EDINA,[51] and both of these collections have been downloaded regularly since 2004, at a rate averaging approximately 120 downloads per year from the data archive, and the EDINA data (UKBORDERS) was downloaded approximately 400-600 times per year until a spike up to about 1000 downloads in 2010. However, the collection reports that "*the most often requested change is the addition of a download facility, currently being done with JISC funding. These come from a wide range of academic disciplines, not just historians, but also geographers, environmental scientists, sociologists, public policy and medical researchers, who all want to add a geographical dimension to their work*" (Aucott, et al., 2010, p. 12). It will be important for AVoB to follow up this work with additional efforts to learn whether the improvements have increased use among the intended audience of academic researchers.

Discovery

The means by which users find a collection is of interest in understanding how the impact of a resource grows over time. Several of the projects report data that is striking on this topic. *British*

[50] http://www.data-archive.ac.uk/
[51] http://edina.ac.uk/ukborders/

History Online, for instance, found via their analytics data that 81% of referrals to site were via search, indicating that much of their traffic is looking for specific information that happens to be located with the collection, rather than traffic that is coming to the collection to look for information. On the other end of the scale, the SDR dance archive traffic primarily originated from direct links to the site (68% of traffic), indicating that people are being made aware of the site via links and partnerships, and then visit the site to see if it contains items that are of interest to the them.

The *Vision of Britain* collection has paid particular attention to the ways in which users discover their resource. This is because the use of the collection is somewhat anomalous. Rather than land on the home page and navigate through the site, most users enter the collection via a geographically specific page discovered via web search.[52] This function is by design, and has been taken into account during a redesign of the site in 2009: users arriving on the site via a primary place page are shown a map and a short description, and have appropriate content for a landing page, as opposed to being an arbitrary page deep within the site.

> *...Our overall information architecture is semantic as much as spatial, providing literally hundreds of thousands of links between geographical entities which are exposed on the site, enabling spiders to systematically move between places and units. In particular, as well as the administrative hierarchies linking "units", we constructed a separate hierarchy of "places" which starts with ten very major cities...associates each with ten nearby and slightly smaller places...down until the smallest village is linked in. These relationships are displayed as links at the bottom of each place page, and the specific choice of ten did follow advice from a US search engine expert...One consequence of this structure is to allow "page rank" to in effect trickle down from our home page to our geographically specific pages. We know of no other geographically-based site with such a systematic approach to creating "findability".* (Aucott, et al., 2010, p. 9)

This innovative approach that gives the collection a distinct advantage via search appears to be very effective.[53] It also underscores the need to think outside the traditional view of dissemination via press release, publication, and word-of-mouth. Increasingly, search (and specifically Google search) is the way people find content on the web, and optimizing the chances that users searching for content like that housed in your collection will land in your collection greatly increases your potential impact, particularly if you increase the chances of the user landing in a spot that contains the information they are seeking.

A top source of traffic noted by SPH was Wikipedia, which has several articles linking to the *Stormont Papers* as a source (Knight, Hughes, Ell, Yeates, & Dobreva, 2010, p. 50). This brings up a possible way that resources can increase discovery, which is to include appropriate links to the resource in Wikipedia, *if* it can be done in a way that conforms to the Wikipedia terms and is an actual contribution to an article. In other words, we are not suggesting that anyone use Wikipedia simply to drive traffic to a resource (and spam-like behaviour such as this is likely to be detected and deleted by the Wikipedia community anyway). However, taking a proactive approach, or encouraging your users to do so, in contributing content to Wikipedia that links to material in your collection can be an effective way to aid discovery. We know from other work that students in

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[52] Primarily Google, followed by Yahoo and Bing, with diminishing prominence of Ask and AOL.

[53] According to the study authors, "*A Vision of Britain through Time* is the number four result in a search of google.co.uk for "old maps", and the only academic site in the first ten results" (Aucott, et al., 2010, p. 15).

particular are likely to consult Wikipedia when starting their research projects,[54] and that Wikipedia is frequently a top result in Google searches.

Having a search-friendly resource name is also very helpful in terms of allowing people to unambiguously discover a resource. The TIDSR resource itself is a good example of this: using that set of initials in a search results in all the top hits pointing to the toolkit and to discussion of the toolkit. The TIDSR team chose this name after searching Google and other search engines and determining that essentially nothing in the world was using this made up term. Choosing something "cuter" may have been tempting (such as TIDES for instance, e.g., "using TIDES to measure the rising impact of a collection" may have seemed clever at the time), but would have been buried among the results for tide tables in coastal cities. With this unambiguous name, however, searching for "tidsr jisc" easily shows that over 700 pages currently mention the toolkit, with no obvious false positives in the list of pages mentioning the resource. Likewise, with *Histpop*, the term is unique and unambiguously points searchers to the correct resource via over 150 web pages.

For the projects here, which are generally either uniquely named or have risen to such prominence that results pointing to their resource dominate the top of the search results, ambiguity is not a problem. However, it is important to keep the question "can a potential user search for, and find, our collection easily?" in mind when naming a new collection. One only need to search the European Commission's list of recently funded projects[55] to find hundreds of examples of projects with names which are unsearchable, because the project acronym is a common English word.

Learning from focus groups

Focus groups can help to understand how users view a resource, how they use it, what problems they have with it, and how they think it could be improved. One of the advantages of focus groups over one-on-one interviews is that the participants in a well-run focus group begin to talk with one another, and not just to the interviewer. This can often yield deeper insight into how users understand the resource, and how it is having, or is failing to have, an impact on their work, research, education, or practice. For instance, the SPH focus groups uncovered the finding that the Stormont content would be more useful for research if additional parliamentary papers that relate to the debates – for example, acts, bills, and committee papers – were also available.

For the UOP project, it was clear that academic users of the resource were interested in the question of impact, and specifically how podcasting could help them extend and demonstrate their public impact and engagement with society. As discussed in the introduction to this report, demonstrating impact is increasingly a requirement of funding bodies and evaluation exercises. For a resource such as the Oxford podcasts, then, the stakeholders who are contributing to the resource by recording the podcasts have a vested interest in helping the resource extend its impact, and vice versa.

Demonstrating this link between the impact of the podcasting resource and the impact of the academics and units contributing materials also helps build a case for continued support of the resource. By linking the success of the resource to a core activity of the institution – in this case the university's core mission of engaging with wider society – can increase the institutional support for

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[54] Even though students are routinely taught not to cite Wikipedia as an academic source, consulting it as an initial source of information on a new topic and as a source of citations and links to other primary and secondary material is normal practice for many students (Meyer, et al., 2009, p. 124).

[55] http://cordis.europa.eu/fp7/projects_en.html

the resource in the long term. Sustainability is always an issue for digital resources, but evidence of this sort can be part of a business case for continued development and support.

Building community

Building online communities is a long-standing, but often elusive, desire of many online resource providers. Some of the resources examined for this report have attempted to support the emergence of community in relation to their resource, but have had variable success in doing so.[56]

For instance, the *HumBox* project provides the ability to comment on resources in the collection, but has seen little uptake of this feature. The system (which contains over 2800 resources) only has 429 comments on 341 resources, and many of these comments came from the original *HumBox* project team. However, by another measure, *HumBox* has a clearly motivated community of users: in a survey of users, 51% of users who had registered for an account had also uploaded resources, thus contributing to the growth of *HumBox* (Borthwick, Millard, & Howard, 2011). The *HumBox* project also has noted that there are two distinct patterns of contributions: *"Some users contribute more gradually depositing items throughout their usage where as some have spikes of activity depositing a lot in a single month followed by a period of relative inactivity"* (Hargood, McSweeney, Millard, Carr, & Howard, 2011, Submitted, p. 5).

The TIDSR resource used by the projects to measure impact also had a problem with enabling commenting – the appearance of large amounts of spam in the comments that the team had to remove from the database. The spam was clearly being generated by automatic bots that discovered websites with commenting enabled, and then posted the spam content. The TIDSR team then implemented a registration system and a moderation queue for comments, but the number of legitimate comments is small enough to suggest that the commenting system is not really necessary (at this time) for the resource.

Online community exists at multiple levels. Using the loosest definition of community, all of the resources in this report have attracted communities of users. However, with a narrower definition of community, which is evidenced by a shared sense of belonging and purpose, there is less data to show that the digital resources examined here have built strong communities. In one way, it is understandable given the nature of most of the resources, which tend to offer fairly traditional content-delivery models rather than enabling user-generated content (with the exception of *HumBox*). None of the twelve operates in the style of Wikipedia, which has been extraordinarily successful not just in enabling user-generated content but also in building a strong sense of community among the contributors. It remains up to individual projects to decide whether they wish to continue with this content-delivery model, which offers consistency and control to the institutions providing the resource, or if they wish to explore user-driven content, which has far less institutional control but also offers a possibility of increased impact and enthusiasm among a community of contributors and users.

Another way to understand the community of users is via online surveys, which a number of the projects used. However, there was little consistency across the surveys, so little cross-project information can be extracted from the survey data. Nevertheless, the projects that used survey methods often were able to use them to get a sense of which features would be most welcomed by

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[56] The difficulty of engaging community was also noted in the 2009 evaluation of JISC Phase II digitisation programme, in which "most projects scaled back on plans to use emerging social networking platforms and processes to engage users" (Glenaffric Ltd., 2009, p. 5).

users. However, in the future, it may be worthwhile to have projects agree on a set of shared core questions, with project specific extra questions, to make synthesis of these data possible.

Understanding partnerships

Partnerships are an important way to build traffic because of the link structure of the Internet. Being linked from a more widely seen source can be an important source of new users.

For instance, for RePlay, over 50% of the links to this relatively small collection were from the main site of the Siobhan Davies dance company[57] and 75% of the traffic directly referred to the site came from there, making it nearly as important a source of traffic as Google search in this case.

Another important 'partnership' for RePlay is the GCSE dance curriculum. While not a partner in the traditional sense of an organization, the fact that the Siobhan Davies choreographed performance of *Bird Song* is part of the GCSE dance curriculum results in the page for *Bird Song* becoming the most viewed performance on RePlay helps understand the types of users who will come to the site looking for that material. RePlay seems to be successful at keeping this audience interested, as 84% of visitors to this page went on to view other content on the site.

Some partnerships are less obvious. For *Histpop*, the top referring site was the General Register Office for Scotland,[58] which includes *Histpop* on its "Statistics - Useful Links" page.[59] Knowing that a link is generating considerable inbound traffic can help the collection designers anticipate what the users are hoping to find. In the case of AVoB mentioned elsewhere, the considerable Google traffic coming to place pages in the collection helped the site designers focus on making sure that these pages contained useful content, provided in a clear way, so as to increase the chances that users arriving on the page were not lost deep within the site.

The most striking partnership in evidence among these projects is the University of Oxford partnership with Apple and iTunes U. This partnership has had a number of effects discussed throughout this report, including considerable free advertising as a result of being included in Apple's promotional materials, increased global reach, much greater traffic (approximately 10 million downloads so far), and increased visibility on emerging platforms (15% of accesses were from iPods, iPhones, and iPads, which is much higher than the 4% share of general web traffic originating from mobile devices (Geng, et al., 2011, p. 14)). As the *Listening for Impact* project team note, however, even a strong partnership such as the one Oxford has with Apple has unintended consequences:

> *This in turn raises questions about how to manage institutional resources being devoted to promoting the service. As noted in the findings, the results of promotional activities undertaken by the team tend to be dwarfed by the results of Apple promotion and the resulting 'residence' in the Top 100 downloads charts of certain podcast series. In turn, these series become the 'news-worthy successes' of the project and this drives traffic to them even more. This 'feedback' effect is probably unavoidable, but does work against the presentation of the University's podcasts as all being equally valuable.* (Geng, et al., 2011, p. 20)

Whether relinquishing some control in exchange for increased impact is, in balance, a good trade-off is something each organization needs to decide individually, of course. However, using methods

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[57] http://www.siobhandavies.com/
[58] http://www.gro-scotland.gov.uk/
[59] http://www.gro-scotland.gov.uk/stats-links.html

such as those synthesized here can help evaluate and re-evaluate those partnership decisions using empirical evidence of the effects of the partnering arrangements, such as the Oxford podcasting project has done.

Conversely, failure to establish appropriate partnerships (even simple 'partnerships' involving linking to a resource) can make a resource harder for potential users to find. Interviews done with potential users of the *Stormont Parliamentary Hansards* indicated that one of the reasons that the resource was not widely known among the research community was that it was not integrated with the main resources where likely users would find it, such as the holdings of the Public Record Office Northern Ireland, contemporary and historical Hansards for Westminster, and a range of other highly relevant collections with higher perceived visibility. In fact, the one "partnership" that provided the most traffic to the SPH was Wikipedia, which was the top referrer in both the Google Analytics and the log file data for the site.

Teaching: Impacts on a new generation of scholars

One of the ways that digital resources will increase their impact in the long term is to become embedded in the work practices of new scholars who are just learning their craft. On the one hand, the so-called Digital Natives of technically savvy students currently studying for degrees and in post-graduate studies are less likely to be wary of digital resources, and may be more likely to embrace them. For instance, when the D-TRACES project asked students being trained to use RePlay to share videos of dance practice and reflections about dance, almost all the students were already using Facebook and YouTube to post thoughts, comments, images, and videos; the challenge, then, was to get them to think about RePlay in the same terms, as a place to document their dance process in a way that is as immediate, relevant, and easy as documenting their social lives on Facebook.

The impacts of materials on teaching can transcend disciplinary boundaries once the materials are easily available online. OBPO, for instance, found evidence that while the main focus of many courses using the Old Bailey Proceedings was crime and criminal justice, it was also being used by courses focused on the use of primary sources, such as special subjects, and methods and skills courses.

The Oxford University podcasts also drew in students because of the easy and free availability online and via iTunes U., but then kept the students there because of the quality and relevance of the podcasts. Comments on the "excitement and clarity" and "exemplary and passionate delivery" demonstrated in the podcasts reflected the enthusiasm of students for the material (Wilson, et al., 2010, p. 9).

Features of a collection can also draw teachers to include the resource because it fulfils particular pedagogical needs. The OBPO, for instance, reports that *"some teachers use the statistics function to introduce students to quantification, noting that it provides an 'unscary' way of introducing students to numerical analysis"* (Howard, et al., 2011, p. 4). *Histpop* interviewees pointed out the same effect:

> *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.*" (Meyer, et al., 2009, p. 26)

RePlay also fulfils an interesting niche for the teaching of dance, since it provides access to dance works otherwise unavailable to teachers, as reflected in these two quotations:

> *[RePlay] helped me to develop new teaching methods. Makes teaching more interactive. Students feel much more engaged with professional dance world when they analyse work from SDDC RePlay. Access to older works e.g. Sphinx is vital to delivery of A Level Dance spec. as it's difficult to get hold of dance works.*

> *I am able to do a successful scheme of work based on Siobhan Davies, whereas with Alston and Cohan there aren't many of their early works available, so I talk about their early works but have no clips to show the pupils-therefore they don't learn as well.* (Marsh & Evans, 2010, p. 12)

Other projects also served teachers well. AVoB, for instance, reported this user feedback:

> *I want to congratulate you on the splendid work you've done. This semester I'm teaching a course on the literature of the British countryside, and imagine my delight to find how easily my students can locate on-line excerpts from Defoe's Tour of Great Britain, Young's Annals of Agriculture, and Cobbett's Rural Rides. Without your work, this course would be much poorer in content. -USA University User, January 2009.* (Aucott, et al., 2011, p. 3)

These sorts of small-scale impacts disappear when comparing broad numerical measures (remember that RePlay receives far less web traffic that the more broadly used resources), yet are a reflection that when the *right* users have access to a resource, the impact can be significant even in small numbers. One user, for instance, indicated that it is the easy availability of RePlay that resulted in the decision to teach Siobhan Davies on their curriculum.[60]

The D-TRACES project had a central pedagogical focus, which was to embed RePlay into the Personal Development Plans (PDP) of students. To support this, students took part in a series of seminars and workshops focusing both on the dance content and on the skills needed to use RePlay as part of their PDP development:

> *The introductory session provided students with a range of 'guided tours' through the archive to identify content via different enquiries. Students then created their own virtual 'scrapbooks' by browsing, searching and finding content on RePlay. These 'guided tours' are posted on the project blog and will be added to RePlay to assist other users to navigate through the archive.* (Whatley, et al., 2011, p. 7)

In this way, the students have become both users of, and contributors to, the RePlay resource.

Teachers also have a desire to be able to share what their work practices and examples with their students. One OBPO user who was enthusiastic about the new workspace features OBPO introduced because s/he could use it to teach students how projects can endure over the course of time, but also wanted to be able to share the searches in the teacher's workspace as a way to provide examples to students. This is a similar issue to the question of how to build collaborative workspaces discussed above.

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[60] However, a lack of local support can easily negate these gains, such as for the survey respondent who indicated that while "all of my students should listen to [the interview with Davies]...I am not sufficiently adept to put it on a computer and project it, partly because it is so awkward to do so in this particular college."

Teachers using the UOP resource commented that the enthusiasm and clarity in the podcasts were an inspiration for their own teaching, and gave them new ideas for material and also for methods of presentation. This type impact is very indirect, and difficult to measure beyond anecdote, but nevertheless suggests that collections that can stand as exemplars have the possibility of spreading their influence indirectly, but inspiring similar levels of quality in other resources.

The opportunity for students to engage with primary source material at a much earlier stage in their academic careers has been noted previously (Meyer, et al., 2009, pp. 26, 106, 148). OBPO, for instance, reports that students in focus groups had reported this aspect of working with the resource: *"For all of them, it had been their first real opportunity to engage with a substantial set of primary sources that had not been pre-selected by a teacher. This was something they found exciting and stimulating because it allowed them to find and interpret material for themselves"* (Howard, Hitchcock, & Shoemaker, 2010, p. 7).

Histpop was also noted for its impact on students: "*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*" (Meyer, et al., 2009, p. 26).

Tutorials and study guides: Training the users

The question of how to train new users is a bit of a vexing problem. Even when digital resources have well-designed, intuitive interfaces, discovering advanced features and learning to use the full power of the tools available can be difficult for the newcomer. In addition, attracting new users to digital resources can be a challenge. While institutions such as libraries and computing services may offer resource seminars, we have found that peer-training grounded in real, demonstrable, domain-specific applications is often more effective (Eccles, 2010).

The RePlay / D-TRACES project took this approach to training students:

> *The dancers...led three sessions with the students. These sessions combined practical, studio-based work to reinforce the value in students thinking about how to use digital resources for reflection and thought alongside practical activity. The dancers also introduced the dancer blogs that are available on the RePlay site, to provide examples of how artists approach the documentation of process on a blog site and to share experiences of how to approach 'blogging'. The day gave the students a real understanding of why and how this way of working could be useful to them as students and some of them (although not all) did begin to understand how a blog could be a useful tool to enhance their journey as a student and artist... This seemed to work very well in capturing the interest of the students who were willing to listen to working professionals who have direct experience of using the blog as a tool for critical analysis, reflection and publishing in their own creative process and practice.* (Whatley, et al., 2011, p. 7)

While this approach is small-scale and does not scale well, it supports the contention that there is considerable value to be gained from providing authentic training by real users of a resource.

One way that digital collections can address the need for authentic training is via online tutorials or study guides. BHO, for instance, created screencasts (narrated demonstrations of using the resource as a user would see it) to introduce content and sources. This new feature received views when it was originally publicized via Twitter, but whether it attracts sustained attention remains to be seen.

Likewise, the OBPO created tutorials based on feedback from their user survey, focusing on both interpretation ("How to read a criminal trial") and skills ("Organising research and using OBPO with reference tools such as Zotero and Endnote"). Initial feedback suggests these were particularly popular with lecturers who planned to assign them to their students.

OBPO also uses tutorials to explain how to use the more advanced features of their website, such as a planned tutorial around the forthcoming API on "Using the API to Measure Linguistic Change". It will be useful to see how frequently this tutorial is viewed, and whether it is possible to correlate this with significant API use.

Lack of training materials can have a negative impact for the collection. Some respondents to the RePlay survey suggested they found the site difficult to use, and experienced difficulty in solving these issues. One specifically requested a "handy users' guide to digital online resources for dance in HE". Other anecdotal evidence from users suggested that people were impressed with RePlay but were "unsure what to do with it". This has emerged as a focus for RePlay going forward, to provide concrete guidance on ways that the resource can be and is being used.

Time and place

Clearly, one of the impacts that digitisation has had on the humanities is the speed and ease with which sources can be discovered, consulted, and analysed. An *Old Bailey Proceedings Online* user reported:

> *When I started, you had to write things out, copy them by hand, it wasn't of course searchable or indexed in any way. And so the amount of time I now spend doing that kind of very mechanical, laborious, time consuming work is much smaller. You can do things now in five seconds which it took you three months to do a few years ago.* (Bulger, et al., 2011, p. 27)

We haven't yet considered how to quantify the impact of this aspect of digitisation. While nearly every person we have interviewed in work related to this has mentioned the fact that doing things with digital material is far faster and more convenient than working with physical items, in some ways this is at once the most important yet least interesting impact of digitisation. After all, getting the same materials, but more easily, cheaply, and conveniently was one of the original reasons behind digitising resources, so if they couldn't allow users better access, they would have to be considered utter failures.

Workspaces and workflows

The question of whether to provide a workspace for users is quite resource-specific. For the OBPO, there is now a workspace where users can bookmark trials and other documents in the system, save their searches, and organize their material. This feature was only recently implemented, so only time will tell whether users who initially set up accounts will become regular users of the workspace.

If a resource is one where the user spends a lot of time regularly, creating user workspaces can make a lot of sense, saving users from starting from scratch each time they connect to the collection.

On the other hand, for resources which are typically less frequently used with long periods between uses, requiring users to log in to access features such as this may create an unnecessary barrier to users, who will have forgotten the username and password from the last time they logged in.

The question of how to build workspaces that enable researchers to collaborate with one another is not a simple one. The British Library is currently exploring this question as part of their *Growing Knowledge: The evolution of research* project.[61] One of the central problems is that as digital resources proliferate, researchers increasingly require ways to link and gather materials from a variety of sources into a single workspace. Thus, providing numerous individual workspace solutions in the short term may prove to be only an intermediate step toward linking resources into more standardized workspaces that have yet to become commonly available.

The United Kingdom and the world

One of the questions that is important to think about is the relationship between resources which have been funded, developed, and supported by public funds in the United Kingdom, and the desire of the rest of the world to have access to these materials.

On the one hand, the cultural materials in the United Kingdom rival those of any in the world, and it has often been commented that the UK higher education and research sector "punches above its weight" in terms of influence relative to size. Efforts such as those by JISC and the UK funding councils to create digital resources across the sciences, medicine, social sciences, arts, and humanities have reinforced this position, by digitising and making materials from the UK available on the web. Whether these materials are free to the world or are made available for a fee, they represent a significant contribution to global knowledge.

It goes without saying that making a resource available for free (to the user) tends to increase its impact. Of course, free-to-the-user resources are not at all free-to-the-provider. As a result, resources have to make the difficult decision regarding whether the benefit of increased impact of a free resource is worth the cost of providing it.

For the resources in this synthesis, a variety of free-to-the-world, free-to-the-UK, subscription, mixed models, and other approaches are in place. The evidence available from these studies is not sufficient to categorically state that one model is in all cases preferable to others. It may be true that different types of resources and collections would have the highest impact benefit / cost ratio using very different sustainability models.

For instance, the University of Oxford has a large non-UK audience (82%) for their podcasts. These users consists of some people who may eventually apply to attend Oxford, but by and large consist of learners at other universities or independent learners simply interested in their content. This large audience is partly due to the partnership with Apple's iTunes U, which the evidence suggests has a reinforcing effect. In particular, the podcasts in the Oxford collection are not pre-existing documents, but must be created and contributed by academics at the university. The global reach of iTunes U, and the positive feedback the podcast authors get back from around the world, helps to increase the likelihood that academics will see the resource as a valuable use of their time, which in turn helps the collection grow, which increases its ability to increase its impact both within and outside the UK. Thus, in this case a free-to-the-world model is proving effective both at increasing the impact of the collection, and contributing to the sustainability of the collection in the sense that

[61] http://www.growingknowledge.bl.uk/

demonstrating the institutional benefits of a large, influential, and growing resource helps to secure additional institutional commitments to maintain and building the resource.

New topics and new questions?

One of the persistent questions asked about digital resources is whether they simply make research easier, cheaper (to the researcher), more convenient, and less time consuming, or whether there is evidence that they open up *new avenues for research*.

The *Old Bailey Proceedings Online* study gave a mixed answer to this question:

> *A brief analysis of the content of these publications indicates, as is to be expected, that most publications have been concerned with the history of crime and justice. However, this is not the only use being made of OBPO. Many facets of London life were documented in the Proceedings and its easy searchability has opened the source to research into, for example, gender, sexuality, material culture, ethnic minorities, medicine and science. OBPO has been cited by legal and criminological scholars whose main interests are contemporary but who use it as a historical and comparative source. There is also a significant strand of work in historical linguistics. The sophistication (and extent) of scholars' engagement with the source is, however, variable... Overall it seems that much work by historians using the OBPO has adopted quite traditional approaches to textual scholarship, which is simply made more convenient by the ease of keyword searching and searches for specific offences and punishments.* (Howard, et al., 2011, p. 3)

So, while there is evidence of new *audiences* for the OBPO material beyond the traditional historians of crime and justice, there is less evidence that completely new research questions have emerged.

There are indications from some sources, however, that new researchers are being drawn to the possibilities of digital resources and use them to do new kinds of research:

> *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.* (Meyer, et al., 2009, p. 28)

The *British History Online* impact report also discussed the question of how research practices are changing. The project found via surveys that academic users were using BHO for a wide variety of tasks: "*from resource discovery activity at the beginning of a research project ('finding new works') to the consultation of known works and tasks associated with writing ('checking references')*" (Blaney & Webster, 2010, p. 5). In response to a question about whether BHO has changed the respondents' research practices, half of respondents answered that it had done so. This ranged from increased availability and ease of use, to a greater ability to discover "unexpected treasures." As with the OBPO material, at least one user suggested that they probably prioritised the digital source over the printed version, and another suggested that the easy availability of BHO meant that they "*were more likely to make the attempt to fill in more of the detail surrounding that edition, given that speculative enquiries could now be carried out without a great investment of time*" (Blaney & Webster, 2010, p. 5).

How these perceived changes result in new research questions across the humanities in the long run is still emerging, however.

Non-traditional uses

Many of the questions asked about the impact of a resource or collection assume that the uses will follow fairly traditional models of scholarly research and writing, supporting teaching at all levels, or uses by non-academic but enthusiastic members of the public to support lifelong learning. However, influences on practice are both less commonly discussed, and also much harder to find evidence for. In the case of the *Siobhan Davies RePlay* collection, 22% of respondents to their user survey indicated that they use the collection as an important resource for their professional practice as dance artists. These sorts of uses are not traceable in metrics – only by asking users the right questions can these sorts of uses become apparent.

The citation problem

One of the consistent and persistent problems with assessing the impact of digital resources is that scholars continue to cite materials as if they consulted only the paper, non-digital version of material. Without some indication that a citing author consulted an online resource, it is difficult or impossible for the resource to demonstrate the full extent to which their resource is being used in research. It might be possible to infer an effect because of increased citations to the materials in the collection post-digitisation, but we can only really find possible correlation using this method, not causation. The *Old Bailey Proceedings Online* study, for instance, found that:

> *Before digitisation, significant barriers to access meant that the Proceedings were used by few researchers, although this source was widely recognised as important for the study of history of crime and law. According to the Scopus database of journal citations (which is not comprehensive, and fails to capture other forms of publication – especially books), citations of the Proceedings in published work increased from an average of 2.5 citations per year between 1995 and 2002 to 14 per year between 2005 and 2010, with 26 citations found in 2010 alone. The significant increase in citations in 2009-10 suggests that even academic use of the site was encouraged by the extensive media exposure the site has received since 2008.*
>
> *The impact of OBPO may also be inferred from a significant shift in the way scholars refer to this publication. The term used by scholars before 2003, 'Old Bailey Sessions Papers', has been almost entirely replaced with the OBPO's preferred title, 'Old Bailey Proceedings'.* (Howard, et al., 2011, p. 3)

While this appears to be a reasonably clear correlation between digitising the material and increased citation, for many resources, understanding increased usage would require further inquiry such as contacting authors and asking whether they used the digital resource to read the material they cited. This approach obviously does not scale, so is not a practical solution for every resource.

Instead, we need to consider how to nudge[62] users toward citing material in ways that allow us to see that the digital resource has been used.

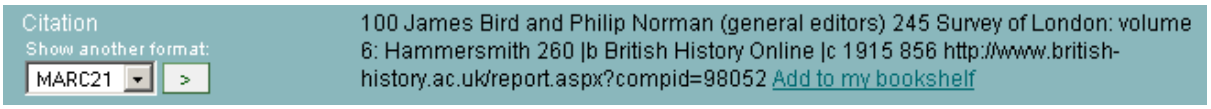
In the *British History Online* case study, the authors noted "*One of the history teachers we interviewed commented that he insisted upon his students citing print versions of text rather than the online version. His reasoning was that a string of arbitrary numbers is a very unhelpful form*

[62] The use of the term "nudge" here refers to the work by Thaler and Sunstein (2008) suggesting that people can be effectively and efficiently redirected towards desired behaviours using seemingly small but effective nudges in the right direction. Thus, making an easy-to-find and easy-to-copy citation that includes a reference to the digital resource is a nudge, a suggestion that can influence people without imposing requirements or rules.

of citation because it tells the reader nothing about the source being cited" (Blaney & Webster, 2011, p. 9).

The BHO approach to addressing this particular criticism of online links is worth noting, since it addresses at least part of the concern: by adopting Cool URIs, which have human-readable meaning embedded in them.[63] For instance, *The Journal of the House of Lords* on BHO now follows the format www.british-history.ac.uk/lordsjrnl*n*, where *n* is the journal number. Unlike the confusing and sometimes excessively long links often generated by database driven web applications, these links give the human reader contextual information about the link *without having to visit the link itself*, just as seeing a citation to a work provides context to the knowledgeable reader without needing to consult the original document (Blaney & Webster, 2011).

Providing suggested citation formats is also an approach that can increase measurable citations to a resource. BHO, for instance, has added drop-down boxes such as the following to the top of each text page:



This allows the user to display, and then copy-and-paste, the citation in several popular formats, including BHO, MLA, Turabian, Chicago, MARC21, and Wikipedia. The choice to include Wikipedia is noteworthy, as this subtly encourages the use of BHO as a resource for non-academic forms of knowledge generation as well.

Old Bailey Proceedings Online also provides suggested citations that include a reference to the OBPO URI, version, and date accessed, along with the reference number of the document. This is provided in a single format, and is copy-and-paste rather than exportable. In Bulger, et al. (2011), users of Old Bailey reported that the citation instructions were helpful and something they passed along to their students, although none of the respondents in that study reported citing the OBPO when it was used to do something simple like confirm a date or locate a print resource.

RePlay is also planning to implement a copy-and-paste facility to allow users to cite the reference, something they found was currently rarely happening.

A further step is to make the citations not just copy-and-paste, but also exportable to major citation management tools (such as Zotero and EndNote).

These approaches only address part of the problem of course. The conservatism of scholars is a much more difficult issue to address. For instance, some *Old Bailey Proceedings Online* users, even while using part of the OBPO suggested citation format didn't "see the point" of including the date the resource was consulted, and so excluded that information. The MLA also no longer requires that URLs are included in citations, arguing that most sources can be found via search,[64] which may compound the problem in terms of discovering uses of a collection to demonstrate impact.

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[63] See http://www.w3.org/Provider/Style/URI for a description of the logic and theory behind the Cool URI.
[64] http://owl.english.purdue.edu/owl/resource/747/08/

Consistency

One of the dangers of the current web is the problem of disappearing links, also called linkrot. According to one study *"13% of Internet references in scholarly articles were inactive after only 27 months. Another problem is that cited Web pages may change, so that readers see something different than what the citing author saw"* (Dellavalle, et al., 2003; cited by WebCite, 2010).

Beyond the inconvenience factor, an insidious unanticipated consequence of this is that it reinforces the habits of researchers to include as few URLs as possible in their scholarly work. Thus, when online resources try to assess their impact using techniques such as webometrics, the lack of links makes their resource appear to have less of an impact. Second, it makes readers trying to track down the sources of information work all that much harder as they try to discover not only the correct source of the citation, but also the version of that source that was cited as the pages may have changed considerably.

Some of these dead links are due to re-organization of a website, a process which all too often is made at the purely technical levels of an organization without considering how changes to web page addresses will affect the overall goals of an organization or collection.

Even decisions which are made early in a project can have important consequences. The RePlay collection was called the Siobhan Davies Dance Archive (SDDA) until shortly after launch in 2009. However, the D-TRACES project found that users are still referring to the project as the SDDA, including in recent publications. The main URL for the page from the original site[65] automatically redirects to the current address, but multiple names and multiple web addresses complicate the process of tracking down impacts.

Measurement challenges

Some resources are more easily measured than others. The University of Oxford podcasts, for instance, are distributed on multiple sites, including the Apple iTunes U platform and multiple portals and RSS feeds hosted by Oxford. The fact that podcasts can be accessed from multiple locations significantly increased the complexity of using tools such as log file analysis. Log files were not available from iTunes, so the project team could only focus on the files they had available locally, which means that any picture they can provide of use is incomplete. More importantly, it may be incomplete in ways that make it difficult to understand whether, for instance, different types of users (and thus potential impacts) access the collection via one interface or another.

This was an even bigger problem with the *Wellcome Medical Journals Backfiles*. None of the digitised material was made available at a project website, but was instead deposited into the vast PubMed Central collection of biomedical and life sciences journal articles. As there was no specific collection of URLs or even keywords which could find the digitised collection easily, measurement becomes a difficult or impossible task.

What may not work?

Many of the resources reported elements of their digital collection that did not appear to be enhancing their impact considerably.

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[65] http://www.siobhandaviesarchive.com

OBPO, for instance, reported that the site's wiki experienced low traffic, low user awareness, and little user input. Only 12.5% of respondents to a user survey used it even occasionally, and some felt it was overly complicated, and even suggested that the wiki label itself had dissuaded them from using the feature due to a perception that Wikipedia was inaccurate, which coloured the user's opinion of the OBPO wiki. Eventually, OBPO withdrew the wiki altogether.

OBPO also reported comparatively less use and awareness of the background pages on the main website compared to the main pages. *Siobhan Davies RePlay* also had a related problem with their help page, which saw about 50% of users leave the site immediately after consulting this page. The question of how best to support users who have questions, based on these observations, may not be best served by these sorts of static background/help pages.

Another experiment with limited success was the UOP effort to use Twitter to draw attention to selected podcasts. While the Twitter channel @oxfordpodcasts was able to attract over 1500 followers, no single tweet was able to attract more than 20 click-throughs. The team attributed this modest effect to two factors: first, that their use of Twitter was relatively simple and non-interactive, and second, that the eclectic nature of the podcasts means that even having someone register general interest in the podcasts didn't mean that they would be interested in a lot of the specific topics being podcast. For other resources with more homogenous collections, however, approaches such as this might be an effective way to communicate about new and interesting content, if you can build a following on Twitter or using other Web 2.0 tools.

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Conclusions

Splashes and ripples – big and small impacts – are evident throughout this report. The twelve projects outlined here range from large, heavily trafficked collections such as *British History Online* to small specialist collections such as *Siobhan Davies RePlay*. Some are used heavily world-wide, such as the University of Oxford podcasts with 82% non-UK traffic, and some are primarily used within the United Kingdom, such as *A Vision of Britain through Time*, with 78% UK-based traffic.

Some are heavily linked to on the web, such as *Old Bailey Proceedings Online*, with nearly 7,000 links to the collection, while others have few direct links but are embedded into large and important collections, such as the *Wellcome Medical Journals Backfiles* which are housed within *PubMed*, a central resource for biomedical and life sciences publications.

Some resources can demonstrate a clear impact on scholarship, such as *British History Online*, with at least 401 published items containing citations including a link to the collection, while others are used primarily for teaching and learning, as evidenced by qualitative interviews, such as The University of Oxford podcasts and *Siobhan Davies RePlay*[66].

This report was not intended to evaluate the success of any of these projects, but rather to measure the types of impacts identifiable based on the evidence collected about the digital resources. All the projects, however, have clearly demonstrated some forms of impact more strongly than others.

JISC have identified five "Impact Areas" which are aligned with the strategic aims and core principles of the organization. These areas are:

I. Maintain research excellence
II. Maintain teaching and learning excellence
III. Be more effective / save money
IV. Have a positive impact on wider society
V. Be ready for technology needs in the future
(Hutchings, 2011)

Of the five, all have been to some degree examined by the various collections examined in this report. Research excellence is an important goal, and projects such as *British History Online* and *Old Bailey Proceedings Online* clearly demonstrate this through the large number of academic citations with identifiable links to the collections; smaller projects, however, also show evidence of enhancing research, such as *Histpop*, which three-quarters of users in a survey of humanities scholars (Meyer, et al., 2009, p. 143) felt was important to their research and to their field. The *Stormont Parliamentary Hansards* have made otherwise difficult-to-find documents available to researchers, and the *18th Century Official Parliamentary Publications* collection has made the larger *House of Commons Parliamentary Papers* collection much more complete and valuable for political historians.

Teaching and learning excellence is evident in projects such as *Siobhan Davies RePlay*, which engages dance students with professional dance and choreography materials, *HumBox*, which

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[66] *Siobhan Davies RePlay* was originally designed to be principally a research resource, but has been slow to enter that sphere as the dance community has been relatively slow to engage with digital resources. However, teachers and students at all levels, who were originally thought to be secondary users of the resource, have reported their gratitude for access to the dance content that SDR provides.

provides teachers with a repository to save and share their instructional materials, and the University of Oxford podcasts, which allow learners world-wide to listen to some of the world's great scholars teach in their areas of expertise.

Increasing effectiveness and saving money is also in evidence, such as the advertising revenue that is being used to provide ongoing financial support to *A Vision of Britain through Time* and *British History Online*, and the community contribution model for the content in *HumBox*.

A positive impact on wider society is evident in a number of digital resources, particularly those with content that is of interest to amateur historians, primary and secondary school students, and lifelong learners. *A Vision of Britain through Time* is popular with local historians, *British History Online* is of broad interest to British history enthusiasts, the *Old Bailey Proceedings Online* are frequently used by genealogists, and the podcasts at the University of Oxford are listened to world-wide.

Finally, in terms of being ready for the technological needs of the future, the collections housed in the British Library (*19th Century British Library Newspapers* and *British Library Archival Sound Recordings*) are continually supported and upgrading due to the technical expertise available in the BL, and the University of Oxford podcasts *Listening for Impact* project team has created new tools for tracking visitors and logging activity tailored to the needs of large, high-traffic collections.

In an ideal world, all digital resources would strive to excel in all five of these impact areas. There is less evidence that all 12 of the projects have succeeded in demonstrating impact across all five areas, although a few at least have arguably made strides in each. This report has highlighted some of the ways that projects have been able to demonstrate their impact, and will hopefully lead to an enhanced ability for future projects to follow in their footsteps.

An additional area to consider is what the relationship is between digital resources and the institutions within which they are housed. As mentioned in the introduction to this report, digitised collections such as those described here are just one form of digital output for universities, libraries, museums, and other institutions engaged in delivering digital content. The role of institutions in maintaining collections is not without areas of contention. Boyle, et al. (2009) note that institutions do not necessarily accept the responsibilities of protecting resources and providing access to materials in the short-term (less than five years) or long-term (over five years, particularly as IT infrastructure is replaced).

The best projects will not just live alone, tucked into a dark corner of their institutions much as some of the materials were stored away in the dusty archives in the past, but will enhance the life of the institution as well. For instance, the *Listening for Impact* project, which measured and enhanced the impact of the podcasting services at the University of Oxford, has a first-order effect of distributing high-quality content around the world, but also has had demonstrable impacts on the University of Oxford: current students use the podcasts to revise course material, and prospective students report listening to lectures and being inspired to apply to the university. In fact, podcasts related to "admissions and university life" were popular podcasts (Geng, et al., 2011, p. 9).

These twelve digitisation projects are just part of the broader picture presented by digital content in the UK and beyond. Tanner and Deegan (2011) have looked at the broader context of the impact of digitised resources, particularly with regard to their role in creating a Digital Britain. While much work has been done over the last 15 years, the challenges and opportunities are even greater in the future:

> *Imagine walking into one of Britain's great cathedrals. As you take in the architectural, cultural and religious ambience, your mobile device automatically engages with content on your behalf. So, just when you ask for it, the local tour is available in your own language. But there is much more: images and information on the stained glass too high to view, videos of famous ceremonies, 3D walk-throughs showing how the cathedral may have looked in previous centuries, full text of historic and literary references, a list of people buried, baptized or married, choral works performed, oral histories of local residents, news reports through the centuries: this list of opportunities could and will grow even longer.*
>
> *The opportunity to engage actively with British content that is educational, entertaining and deeply enlightening is here. Technology exists to drive forward a vision of intelligent environments that supply the right information to the right person at the right time. Paradoxically, what is missing is the depth of digitised content to make such technical developments more significant than mere playthings.* (Tanner & Deegan, 2011, p. 6)

To achieve the digital future imagined by Tanner and Deegan will require imagination, work, vision, funding, and cooperation. However, the stepping stones are mostly in place. The UK benefits from a culture that places value on its heritage. It is contingent upon institutions, individuals, funding bodies, and public and private sector organizations to take advantage of those shared values to bring Britain's past into the future, where digital resources are available to all, linked together, reliable, and compelling.

Some of the steps toward this goal are reflected in the list of recommendations which follow. These include easy, short-term steps that digital resource providers can take to enhance their impact, to suggestions for better engaging with the broader community of humanities scholars, students and the public. Suggestions for improving measurement, particularly in ways that scale sufficiently to measure impact in a connected, digitally-enhanced future, are also important if we hope to continue to enhance impact. And, as always, sustainability is key, for unless a resource continues to exist and to grow and change with the times, it risks becoming a dusty digital archive.

The future is upon us. The splashes and ripples on the ponds, lakes and seas in our cultural landscape will continue to shape and reshape the boundaries of knowledge.

> *The best way to predict the future is to invent it. (Kay, 1995)*

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Recommendations

Clearly, some of the efforts to enhance the impact of the digital resources described here are having a splash, whereas others are simply resulting in small ripples in the pond. Even ripples, however, can contribute to change over time. In order to increase the likelihood of splashes – the larger impacts which resonate more widely – the evidence in this report suggests a number of approaches.

For Digital Resource Providers

Plan ahead to measure impact. Understanding the impact of a resource takes time, and some of the measures such as analytics need to be collected from as early on in the process as possible to understand the change over time, particularly as new features are implemented. Items like log files need to be preserved for analysis, which may not be the default option depending on how your systems are configured (see page 26).

Use the media to your advantage. One of the undeniable advantages that arts and humanities resources have in the United Kingdom is that there is considerable public interest in these topics. Taking advantage of this can draw public attention, but can also increase the number of academic users who become aware of and then consult the material. The *Old Bailey Proceedings Online* project has benefitted from inclusion in popular BBC programmes (see page 11), and the University of Oxford's podcasts have grown in popularity in part due to the collection's inclusion in Apple iTunes advertising (see page 24).

The media and the public are influenced by numbers and metrics. Being able to demonstrate your impact numerically can be a means of convincing others to visit your resource, and thus increase the resource's future impact. For instance, the amount of traffic and size of iTunesU featured prominently in early press reports (see page 22).

Make your resource easy to find. This can involve a number of strategies, including search engine optimization (SEO), partnerships with more prominent related sources (see page 33), links in related sites, and inclusion in Wikipedia and other sources. *A Vision of Britain through Time* has been the most proactive resource in this regard, redesigning their site to accommodate search and the methods people use to arrive on their site (see page 29), but the *Stormont Parliamentary Hansards* are also worth noting for their inclusion in multiple *Wikipedia* articles (see page 30).

Give your resource an unambiguous name and acronym/initials, both to increase the likelihood that your resource turns up at the top of relevant searches, and to make measuring mentions of your resource result in as few false positives as possible. *Histpop*, for instance, is an unusual, descriptive, and unambiguous name that makes the resource easy to remember and easy to find (see page 28). The TIDSR resource is an example of an easy-to-find set of initials (see page 31).

Create quick wins for new visitors to your collection. By finding things that they can quickly learn, do, see, or contribute, you can increase the stickiness of your site, and increase

the likelihood that your resources will be used. Oxford University's podcasts, for instance, are easy to immediately access and hear (see page 24).

Leverage your wins. Using the most popular aspects of your resource to attract people to other parts of the collection via features such as suggested links and recommendations for further information can increase the time spent with your collection, and can potentially increase the likelihood of the collection having a demonstrable impact.

Make resources easy to navigate without sacrificing functionality. A number of resources were given feedback that the resource was difficult to use for certain functions. Paying regular attention to under-used features and talking with users about what they have difficulty doing should be part of regular re-development efforts.

Adopt Cool URIs as persistent, consistent, human-readable, and citable links to digital resources. The *British History Online* collection has used this method to increase the readability of its links (see page 41).

Provide automatic citations that are easy to copy or download that reference the digital resource without creating unnecessarily long and complex links. *British History Online* does this on each page (see page 41).

Provide the ability to export citations directly to reference management software such as Zotero and EndNote. Even though these tools are not as widely used among humanities researchers as in some other disciplines, their use appears to be growing[67] and providing this functionality may nudge some users toward adoption.

Create training materials using examples from real research rather than simply technical demonstrations of interface features as a way to engage users and to make the materials valuable as a teaching tool. *Siobhan Davies RePlay*, for instance, provided students with training materials from active dance professionals, making the content directly relevant to their futures (see page 34).

Making teaching materials available can attract teachers to your resources, which in turn influences the next generation of scholars. For instance, *Old Bailey Proceedings Online* has introduced statistics functions which provide teachers a less imposing way to introduce their students to historical statistics (see page 34) and *British History Online* created a series of screencasts aimed at helping improve both skills and interpretation (see page 36).

Allowing users to comment on or modify items may sometimes be desirable, but can be difficult to predict or control. Features to allow this should be implemented with care (see page 32).

APIs are the future. Linked data, apps, and other ways that enable researchers to access and combine the data in your resource will increase its utility. *Old Bailey Proceedings Online*

[67] In the OBPO final report, the tutorial on how to use Zotero was the second most popular guide on the site (with 353 views) after the "Getting Started" guide (563 views).

is implementing an API, and the project team are also creating tutorials on how to use it (see page 37).

For Improved Measurement

Remember in advance that you will want to contact your users. A number of projects had a difficult time finding users to survey or interview, but users are a key resource that you will want to approach from time to time. It is important not to create barriers to use (such as would happen if all casual website users were required to login – this would not be a good idea for a free resource), but ways to entice users to register in exchange for added value can help you build a database of users.

Develop webometric tools that scale well to larger resources. The current limitations of webometrics are the result of limitations inherent in Google and Yahoo, which only return about 1,000 results. For larger resources, this limits the conclusions that can be drawn based on current tools.

Analytic tools that scale are also needed for collections with high traffic. The Oxford podcasting team developed bespoke tools for this; making these or similar tools available more widely could benefit similar high-traffic collections (see page 26).

Develop methods to better accommodate collections that are distributed via multiple channels. Many of the current methods are geared toward measurement of a single site, and are difficult to use when measuring collections that are, in practice, a collection of collections.

Develop strategies for **archiving log file data and analytics** for analysis in the future (Meyer, Thomas, & Schroeder, 2011).

Centralize hosting where possible to better monitor access and impact.

Develop standardized measures, and then encourage or require projects to contribute to a central data archive, which will enable cross-project comparisons.

For Future Sustainability

Innovative revenue models may be appropriate for some resources. For example, the free-to-the-user model combined with Google AdSense revenue used by *A Vision of Britain through Time* and *British History Online* (see page 27) is potentially a source of modest, steady income that can defray operating costs.

Develop Cool URI standards that are consistent across resources and thus more likely to be adopted by the community more broadly.

Active sites are perceived positively by users, but keeping a site active beyond its initial development requires that funders and institutions develop sustainability models that allow for future growth and development.

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