JISC

JISC Final Report

Project Document Cover Sheet

Project Information	
Project Acronym	**DiSCmap**
Project Title	Digitisation of Special Collections: mapping, assessment, prioritisation
Start Date	01 September 2008 **End Date** 05 June 2009
Lead Institution	Centre for Digital Library Research (CDLR), University of Strathclyde
Project Director	Mr. Dennis Nicholson
Project Manager & contact details	Dr. Milena Dobreva Centre for Digital Library Research, University of Strathclyde 12.12 Livingstone Tower, 26 Richmond Street, Glasgow, G1 1XH email: milena.dobreva@strath.ac.uk :: tel: 0141 548 4753
Partner Institutions	Centre for Research in Library and Information Management (CERLIM), Manchester Metropolitan University
Project Web URL	http://discmap.cdlr.strath.ac.uk
Programme Name (and number)	JISC Digitisation Programme
Programme Manager	Paola Marchionni

Document Name	
Document Title	Final report
Reporting Period	September 2008 – April 2009
Author(s) & project role	Milena Dobreva, Project manager
Date	25.04.2009 **Filename** Discmap_finalreport.doc
URL	*tbc*
Access	Project and JISC internal ☑ General dissemination

Document History		
Version	**Date**	**Comments**
V1-V4	25.03.-15.05.	Drafts 1-4
V5	18.05.2009	Final draft
V6	30.09.2009	Final (applied suggested revisions by PM)

DiSCmap

Digitisation of Special Collections: mapping, assessment, prioritisation

Final Report
Duncan Birrell, Dr. Milena Dobreva, Gordon Dunsire, Jillian Griffiths,
Professor Richard Hartley and Kathleen Menzies
August 2009

Acknowledgements

Executive Summary

Traditionally, digitisation has been led by supply rather than demand. While end users are seen as a priority they are not directly consulted about which collections they would like to have made available digitally or why. This can be seen in a wide range of policy documents throughout the cultural heritage sector, where users are positioned as central but where their preferences are *assumed* rather than solicited. Post-digitisation consultation with end users is equally rare. How are we to know that digitisation is serving the needs of the Higher Education community and is sustainable in the long-term?

The "Digitisation in Special Collections: mapping, assessment and prioritisation" (DiSCmap) project, funded by the Joint Information Systems Committee (JISC) and the Research Information Network (RIN), aimed to:

– Identify priority collections for potential digitisation housed within UK Higher Education's libraries, archives and museums as well as faculties and departments.

– Assess users' needs and demand for Special Collections to be digitised across all disciplines.

– Produce a synthesis of available knowledge about users' needs with regard to usability and format of digitised resources.

– Provide recommendations for a strategic approach to digitisation within the wider context and activity of leading players both in the public and commercial sector.

The project was carried out jointly by the Centre for Digital Library Research (CDLR) and the Centre for Research in Library and Information Management (CERLIM) and has taken a collaborative approach to the creation of a user-driven digitisation prioritisation framework, encouraging participation and collective engagement between communities.

Between September 2008 and March 2009 the DiSCmap project team asked over 1,000 users, including *intermediaries* (vocational users who take care of collections) and *end users* (university teachers, researchers and students) a variety of questions about which physical and digital Special Collections they make use of and what criteria they feel must be considered when selecting materials for digitisation. This was achieved through workshops, interviews and two online questionnaires.

Although the data gathered from these activities has the limitation of reflecting only a partial view on priorities for digitisation – the view expressed by those institutions who volunteered to take part in the study - DiSCmap was able to develop:

– a "long list" of 945 collections nominated for digitisation both by intermediaries and end-users from 70 HE institutions (see p. 21);

– a framework of user-driven prioritisation criteria which could be used to inform current and future digitisation priorities; (see p. 45)

– a set of "short lists" of collections which exemplify the application of user-driven criteria from the prioritisation framework to the long list (see Appendix X):
  o Collections nominated more than once by various groups of users.
  o Collections related to a specific policy framework, eg HEFCE's strategically important and vulnerable subjects for Mathematics, Chemistry and Physics.

- o Collections on specific thematic clusters.
- o Collections with highest number of reasons for digitisation.

Profile of the long list

From the data collected a profile of the long list of collections emerged, including:

- **Curatorial environment:** 53% of collections are housed within Libraries; 39% within Archives; 7% in museums and 1% are departmental collections (see p. 25).
- **Institution type:** 51% of the collections are from UK pre-1960 Higher Education Institutions (HEIs); 15% are hosted in Post-Robbins HEIs; and 8% are hosted in Post-1992 HEIs; in addition although DiSCmap targeted HEIs, 27% of the nominated collections – 252 in total, are stored in institutions outside of the HEI sector (see p. 26).
- **Age range:** the highest number of nominated collections is from the first half of the 20th century (366 in total) followed by 340 collections from 19th century and 300 collections from the second half of 20th century. Amongst the nominated collections were 237 collections dated before the 18th century; and 100 collections from the 21st century. The total numbers are higher than the total number of nominated collections because some collections cover wider time spans. It is worth noting that oldest collections do not come as most popular nominations, as one could expect; the interest in modern materials is evident (see p. 27 for more details on the age range distribution).
- **Subject area:** top 5 subjects are History, Economic and Social History (219 collections), Combined subjects (168 collections), Creative Arts, Design and Music (130 collections), followed by Languages and Literature (79 nominated collections) and Social, Economic and Political Studies (53 collections). These most popular subjects confirm the better expressed need in digitised materials in the Humanities and Social Sciences (see p. 28).
- **IPR status:** it is worth noting that almost half of the collections had unknown copyright status (409); the IPRs for 141 collections are held by the institution and for 184 collections are held by another party (see p. 29).
- **Material type:** the most popular materials across the nominated collections included archival materials (in 178 of the nominations), books (172 nominated collections), manuscripts (135 nominated collections) and images (122 collections). Audio, maps, serials and video are nominated in a considerably lower number of cases (between 15 and 35 collections), see p. 30.

Key findings:

The analysis of the data from the long list and the criteria for digitisation advanced by both user communities shows that:

- The communities of both intermediary and end users are willing to express their view on prioritising digitisation of special collections; the participation in the project was a matter of good will and the good response (see p. 25) makes evident that there is definitely interest of the professional communities to express their opinion on the matter of digitisation needs. It should be noted here that the community of intermediaries sees collections on a finer level of granularity; end users often refer to super-collections such as the holdings of an institution.
- The top user-driven priority criteria that emerged from consultation with both intermediaries and end users are: Improve access; Enhance impact on research and/on studies; Enhance impact on teaching; Allow for collaboration; Improve access outside HE (see p. 44).

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- The geographic and institutional boundaries of collections nominated for digitisation are wider – this study was aimed at the higher education institutions in the UK, but 14% of the nominated collections were from institutions outside of the higher education sector, and 6% were from overseas (see p. 27).
- The complementarity of collections is strongly favoured by both users' communities (see section 5).
- The criteria for digitisation nominated by intermediary and end users include general criteria but also a number of criteria where metrics can be applied; thus allowing to establish a ranking mechanism (see p. 45)

Recommendations

Based on the analysis of the data gathered, the following recommendations are made in three areas: collections and prioritisation framework; resource discovery; and use and impact of special collections:

Collections and prioritisation framework

1. ***The long list of collections should be harmonized and sustained into the future.***
   The long list as it currently stands illustrates the feasibility of applying a user-driven framework as a component of prioritising digitisation. The list was created from five different data sources and could potentially be even more useful if the data were harmonized and further expanded. The maintenance of the list through a web service is one possible approach to develop the current static list into a sustainable dynamic resource.

2. ***The user-driven framework developed by DiSCmap can be seen as a tool to support a flexible approach to prioritising digitisation of Special Collections.***
   Rather than applying the framework to the "long list" in order to generate one single "short list" of prioritised collections, a flexible use of the framework is proposed. This would allow for the testing of multiple different hypotheses and could be supported by a specialised decision making tool which allowed for the selection of priority criteria and their application to the "long list" of collections.

3. ***A suitable infrastructure which would offer services for nomination of collections, discovery of collections and prioritising collections is not available currently;*** such an infrastructure could implement recommendations 1 and 2 above in one common solution.

Resource discovery

1. ***A comprehensive collection description and finding utility is needed in the UK.***
   The availability of multiple collection description services, portals, and inventories (such as Archive Hub, AIM25, Michael UK, SCONE) aids resource discovery, but in *ad hoc* fashion. These services are either not scalable or lack essential functionality and, therefore, what is now needed is an *ad modum*, cross-sectoral, UK-wide collection description resource and finding aid.

2. ***Granularity issues of collection description facilities need to be revisited.***
   The above services describe collections at different levels of granularity and structure relationships between collections – in hierarchical or derivational ways. It is recommended that a standard approach to collection description be adopted where the relationships between a collection and its "super-collections" and "sub-collections" are clearly presented. This would support resource discovery. In addition, facilities to

allow the creation of virtual collections, mash-ups or contextual groupings should be introduced. The appropriate model for doing this needs to be identified.

3. *Metadata issues for collection level description need to be better addressed.*
It is commonly accepted that the key to resource discovery resides in the availability of high quality metadata. However, our research reveals that even elements such as the collection title are not unified across different electronic resources. A common collection description and discovery facility could address this issue in a systematic fashion.

Use and impact of special collections

1. *A stronger connection should be established with the actual use of digitised resources in the wider context of research/learning/entertainment.*
The lack of clarity as to how the digitisation of collections might transform their use for teaching and research has contributed to the large amount of digitised materials currently fulfilling mainly a preservation function. Wider involvement with communities of end users prior to digitisation and a greater transparency as regards possible uses, such as within an institutional Virtual Learning Environment (VLE) or specialised Virtual Research Environment (VRE) would help increase the chances for a more intensive use of the digital resource. The identification and promotion of good practices on collaboration between VLEs/VREs and digitisation projects might boost future use of digitised content in research and teaching.

2. *Information literacy related to resources presenting collections can be further enhanced.*
More work needs to be done in improving the skills of the end users in resource discovery and the subsequent use of digitised collections.

3. *Further work can be done on the impact of "to-be" digitised resources (qualitative and quantitative methods).*
The project revealed a number of quantitative and qualitative measurements which represent facets of user demands. More detailed research into these to discover better ways to evaluate the impact of a resource nominated for digitisation would be beneficial.

DiSCmap has analysed a comprehensive range of end user digitisation priorities that are directly related to teaching and research. In doing so it has made considerable advances in identifying and understanding *the actual digitisation needs of the scholarly community*. It has done so with the aim of removing the element of guesswork and assumption hitherto inherent in our understanding of user requirements in this area. Additionally, its combination of intermediary and end user studies provides a richness of view points which highlight the many important and differing aspects related to the end user dimension in digitisation.

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List of Abbreviations

AIM25	Archives in London and the M25 area
CDLR	Centre for Digital Library Research, University of Strathclyde
CERLIM	Centre for Research in Library and Information Management, Manchester Metropolitan University
DfIUS	Department for Innovation, Universities and Skills
DRAI	Digital Repositories and Archives Inventory
HE	Higher Education
HEFCE	Higher Education Funding Council for England
HERO	Higher Education and Research Opportunities in the UK
HEI	Higher Education Institution
JISC	Joint Information Systems Committee
NOF	New Opportunities Fund
OCLC	Online Computer Library Center
RIN	Research Information Network
RLUK	Research Libraries UK
RSLP	Research Libraries Support Programme
SCONE	Scottish Collection Network
SCONUL	Society of College, National and University Libraries
SOUDAAM	Source -Orientated User-Driven Asset-Aware Model
SUSCAG	Scottish Universities Special Collections and Archives Group
SSI	Small Specialist Institution
NLA	National Library of Australia
NLNZ	National Library of New Zealand
UMG	University Museums Group
UMIS	University Museums in Scotland
VLE	Virtual learning environment
VRE	Virtual research environment

1   Context and Background

1.1   After the Gold Rush

> *"We ought to take a fresh look at tradition, considered not as the inert acceptance of a fossilized corpus of themes and conventions, but as an organic habit of re-creating what has been received and is handed on."*
> *(Harry Levin in his 1960 preface to "The Singer of Tales" by Professor Albert B. Lord)*

The use of the Web to present digital surrogates of physical, difficult-to-access cultural and scientific heritage materials, theoretically facilitates a "liberation" of resources, something of enormous potential benefit to the teaching and research communities. Accepting and working on this assumption has ensured the ready availability of millions of pounds worth of funding from publicly funded schemes such as the New Opportunities Fund (NOF), the Research Libraries Support Programme (RLSP) and the JISC Digitisation programme. The ensuing "gold-rush" of large-scale digitisation projects has produced a landscape of activity which the Invitation to Tender for this research (JISC, 2008a) called "copious, if fragmented." It can be convincingly argued that digitisation has heretofore been driven by the surfeit of supply rather than by the rigour of demand. The mass of heritage and archival materials is large enough that it has perhaps been thought piece-meal digitisation is better than none; the potential for increased access and collaboration via digitisation and online availability has to a large extent been seen to be an end in itself.

However, there is increasing recognition that the sheer amount of available material and the limited nature of funding means that a more measured and targeted approach is necessary. Studies such as the "Sustainability and Revenue Models for Online Academic Resources" (Guthrie, Griffiths and Maron, 2008) report, commissioned by the Strategic Content Alliance (SCA), have begun to suggest sustainable business models based on corporate theory to be used in the creation of Online academic resources. Such measures are designed to take ephemeral ideas like "value", "impact" and "usage" and link them to financial costing exercises, in order to inform management decisions, yet, as the report advises, "The value of a project is quantified by the benefits it creates for users – what it allows them to do that they could not do before." The question how to measure the scholarly value of a resource and how to combine this with emerging business models does not have a trivial answer. It was only recently that the evaluation of the impact of digitised resources is approached on a systematic way[1]. But it is not easy to say what would be the impact of resources which have not been digitised yet and, consecutively, not clear how to assign priorities to collections which are "candidates" for digitisation. DiSCmap addresses this issue, looking in particular into the matter of identification of user needs in the case of scholarly and educational use of the digitised collections in the context of the higher education institutions in the UK.

While positioned as a priority, end users have not historically been consulted directly about which collections they would like to have made available digitally or why. This can be seen

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[1] See the Toolkit for the Impact of Digitised Scholarly Resources (TIDSR) developed within the JISC-funded project Digitised Resources: A Usage and Impact Study in the Oxford Internet Institute. Available on http://microsites.oii.ox.ac.uk/tidsr/welcome

in a wide range of policy documents throughout the cultural heritage sector, where users are positioned as central but where their priorities are, in effect, assumed rather than comprehensibly understood (see. e.g., the review on the use of records in the archival collections of Anneli Sundqvist (2007), noting that "the general knowledge of user behaviour is a mixture of common sense, presumptions and prejudices" (p. 624), or the finding of the Institute of Museum and Library Services (IMLS) that "The most frequently-used needs assessment methods do not directly involve the users" (IMLS 2003, p. 2).

For example, the "National Library of Australia Collection Digitisation Policy" (2008) states that:

> "*The Library's digitisation activities take account of user evaluation and feedback. Users are encouraged to provide feedback and make suggestions through the Digital Collections user feedback form or other ways.*"

Similarly, the "National Library of Wales: Digitisation Policy and Strategy" (National Library of Wales, 2005) says that selection will be made according to

> "*An appreciation of user requirements which will drive the selection and delivery of digitised material...the Library will seek user feedback, including that of current and potential users, by means of online surveys, structured evaluation, web metrics (collecting and interpreting data)* [which] *will include quantitative and qualitative data.*"

JISC (see the JISC Digitisation Strategy (JISC, 2008b) seeks to clearly define its terms of selection in relation to users *before* the actual digitisation, wishing to "continue to fund the digitisation of high quality collections of core relevance to learning, teaching and research in the UK" while also "understand[ing] both more about the condition and potential of new collections to be digitised (particularly those held within the JISC community) and also to understand where areas of the highest demand for new collections may exist." (JISC, 2008b).

This chimes with the sentiments of others in the public cultural heritage sector, and such developments may be beneficial to them. The National Library of Scotland state in their 2008 – 2010 Strategy document that

> "*We will maintain awareness of the needs of our various user (and potential user) communities through market research, consultation and involvement, in order to develop our services in the most appropriate way.*" – National Library of Scotland (2008).

It is now clear that a commonly adoptable framework for the assessment of priorities should be constructed to ensure 1. Value for money in digitisation and 2. That the stated, implied and predicted needs of end users are being met by digitisation practices.

This will have implications beyond HE as collaborations and partnerships are sought, in line with the vision of the Strategic Content Alliance (see Strategic Content Alliance, 2009).

As JISC suggests in their analysis of the pivotal 2005 report on Digitised Content in the UK Research Libraries and Archives Sector (Loughborough University, 2005), "the very interconnectedness of the elements of the digitisation process, where each impacts on the other, makes it both easier and more essential to place them within a framework which can make formal links that resonate across all operations. The shortcomings identified by Loughborough's study can therefore begin to be addressed (from inadequate metadata to lack of collaboration) by uniting the various sectors through a UK framework for digitisation" (JISC, 2005, page 3).

DiSCmap represents a beginning of the process whereby such a more detailed user-oriented framework might be developed. It seeks to place alongside the technical and economic imperatives for the creation of digital resources to serve the UK HE community (i.e., the need for "effective networking of expertise across different sectors" envisaged by JISC (JISC, 2005, page 4), an understanding of the current needs and future requirements of the *end and intermediary users*[2] of physical and digital Special Collections. It can be seen to respond directly to Recommendations 1.2.1 (Establish a UK Framework for Digitisation) and 1.2.3 (Investigate users' needs) of the JISC report (page 7).

In focussing on the actual needs and requirements of teachers and researchers in HE, DiSCmap sought, therefore, to uncover the current values of *the scholarly community* of end users and additionally those of information professionals in the field, which are informing the identification of digitisation priorities.

1.2   Drivers for digitisation in HE

Shifting focus to consider some of the complex and inter-connected factors involved in digitisation practices within specific institutions (for example, the influence of competing priorities), we can identify a number of issues around the selection of digital materials and the motivations underlying and shaping local digitisation policy and practice.

The British Academy has pointed out in its recent study *E-resources for Research in the Humanities and Social Sciences* (2005) that as technology increases the ease of access to a given resource, the user base for that resource grows correspondingly. One of the two key drivers for digitisation is **the ability to increase access to material via an enhanced and innovative form of resource discovery**. As digital resources become more commonplace, they set a precedent which future developments must acknowledge and exceed.

Desktop access is now the norm, and the availability of material online is changing the way research is being done. New forms of access, such as keyword searching, the complex indexing and cross-referencing that electronic cataloguing allows, and the facilities of onscreen comparison of physically disparate material, produce an increasing demand not only for the availability of digital material itself but for an instantaneous and satisfactory response to search terms. At its worst, this can foster an attitude that "if it's not on the Internet, it doesn't exist"; at best it acts as a powerful incentive to bring increasing quantities of material online to keep up with demand, breathing new life into heritage material and opening it up to new lines of research.

The second key driver for digitisation is **the ease with which fragile and inaccessible materials can be preserved and conserved by transferring the burden of use to a high-specification digital surrogate**. Turning the Pages, a commercial application devised by Armadillo Systems and promoted by the British Library, for example, has allowed the general public and researchers detailed interactive exploration of digitised rare books in quantities which would be prohibitive in a normal reading room environment.

These are significant drivers for anyone involved in research and digitisation, but it is unfortunate that their influence on projects is ad hoc and localised.

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[2] DiSCmap addresses two types of users: "intermediaries" such as librarians, archivists, curators and collection managers, and "end users". We use the term "end user" throughout the report, which is more popular than the term "direct user" which was used in the Invitation to Tender document.

According to Loughborough report's findings[3], manuscripts and archives are the most frequently digitised type of material in libraries and archives (the capture procedure is easy and dramatically improves access to materials), although other types, including artefacts, have also been digitised. The bulk of the material available electronically is most relevant to the fields of arts and humanities, and the social sciences, although there are still significant gaps in provision in many disciplines, including those seemingly well served. The gap in the sciences may reflect different research methodologies between hard science and the humanities, with scientists preferring current journals and articles which are often born digital. Nevertheless, the issue of digitisation of back-runs of journals is relevant to researchers in the sciences.

In addition, many UK digitisation projects have focused on specific themes or topics, or on making representative selections from their holdings to serve as a taster for more comprehensive collections, with digitisation effectively becoming a marketing and publicity tool. Whilst not denying the value of such activities in promoting the profile and use of Special Collections, there is now growing demand from end users for electronic access to apparently *hidden* materials rather than to a series of representative online samples.

Both drivers identified above (adding to the resources and preserving the originals) come into play for individual digitisation projects. There is often a question of whether material should be digitised just because it is **rare or valuable**. Librarians and archivists have a good track record in making sound judgements as to what content will be useful, and tend to take a long-term view which prioritises the maintenance of the collection for access. Nevertheless, digitisation projects are seldom initiated as a direct response to researchers' needs, and this is a matter for concern. Indeed, little has been written on the current and future requirements of researchers for digitised material, although the Research Support Libraries Group's (RSLG) *Researchers' Use of Libraries and other Information Sources* (2001) provides useful insights, as does the aforementioned British Academy report. RSLG found that **biological and medical research relies heavily on e-journals and active full-text databases** while **arts and humanities researchers prefer physical access and value serendipitous browsing**. **Pure scientists prefer focused searches**. Another finding was that **non-conventional research resources, such as moving images and broadcast materials, are rarely used**. This may be because they are not currently well established and it remains to be seen whether the creation of resources such as NewsFilm Online will influence and alter research methodologies by providing new forms of digital source material.

Loughborough's questionnaire survey of 34 institutions with digitisation experience found that "**improved access to unique material**" was by far the most commonly cited reason for undertaking such projects. Selection criteria, however, vary among institutions; some organisations have established strategies while others digitise according to user demand and feedback. The most frequent response in considering past projects was "**relevance to aims and objectives of the institution**", reinforcing the sense that digitisation continues to take place at an ad hoc, localised level, despite the boundless reach of online resources and the potential to link projects in order to build a picture that transcends individual institutions.

The formation of selection criteria can be influenced by a wide range of variables from collection size to usage statistics which themselves may differ from one institution to the next. These might include **user feedback**, **focus-group opinion**, **response to market trends**, and **popularity of courses in a given discipline for which relevant material can be digitised**. In some cases, **collaboration between publishers, libraries, academics and**

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[3]See JISC (2005). Available on http://www.jisc.ac.uk/media/documents/publications/digiuk.pdf

curators has determined the content to be digitised. Respondents cited "**value for research and teaching"** as the most prominent reasons for digitising material in the future. The most significant barrier to digitisation was, inevitably, lack of funding. Put simply, digitisation cannot happen without significant financial support, usually from an external body.

Many of Loughborough's interviewees pointed out that their institutions held many more resources that should be digitised and made available to the research community, but that this would only happen if further funding could be secured. Although many institutions have taken practical steps such as establishing appropriate posts or "ring-fencing" funding for opportunities that might arise, significantly, **the survey found no generally accepted methodology or cohesive framework (user orientated or otherwise) in place for the development of future digitisation projects.**

It was an imperative of the DiSCmap project that such analysis of digitisation drivers and strategies be examined in more depth, refined, and expanded, in order that sounder justifications for the selection of content for digitisation can be made by professional working to serve the range of requirements of research and teaching in HE. In this section we presented a succinct introduction to the drivers for digitisation. More details on digitisation frameworks and particularly on the user-driven criteria which emerged within DiSCmap are presented in Sections 4.2.4. and Appendix VIII.

The digitisation of all items held in UK HE Special Collections departments may be an admirable goal but is currently unlikely; thus, future developments in the provision of online collections must adopt instead, strategies informed by the current and future needs of teachers and researchers. The so-called "gate-keeper" instincts of intermediaries must now evolve to address the rapid growth in **scholarly expectations** for resources to be made available in the digital domain.

1.3   Definitions of "Special Collection"

In attempting to establish a framework of priorities for the digitisation of Special Collections in an age of electronic mass media, it was necessary to address both their changing forms of use and the shifting contexts of their reception. Amidst such complexity, it is beneficial to start from the fundamental question posed in June 2008 by Alice Prochaska[4] (Prochaska, 2008).

"What are Special Collections today, and what will they be in the future?"

In an attempt to answer this, we surveyed a range of definitions, an illustrative sample of which are given below:

> "*Special Collections are defined as those collections of library materials which, by virtue of their physical form content or depth of subject coverage are distinguished from the general stock of the Library. As a result the collection management policies which apply to Special Collections may be different to those which apply to the rest of the library stock. They are maintained as separate and identifiable collections and may contain materials which are not included in the library catalogue. A list is available on the Special Collections page."* - Northumbria University (2007). Special Collections and Rare Books Policy (2007).

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[4]Prochaska was formerly director of Special Collections at the British Library for the Rare Books and Manuscripts Section (RBMS) (http://www.princeton.edu/~ferguson/rbms.html) of the Association of College and Research Libraries (ACRL).

> "*For the purposes of this project, Special Collections are rare, often unique materials generally housed in secure, monitored environments. Archives are unique collections associated with a specific individual or organization. By not defining these terms prescriptively, we hope to encourage a process that is encompassing and revelatory.*" – CLIR (2008). Cataloging Hidden Special Collections and Archives: Building a New Research Environment.

> "*By definition, a Special Collection implies a limited scope and definite purpose... Materials acquired for Special Collections support research of students, faculty, post-doctoral researchers and established scholars and authors.*" - Haworth, K. (2007). York University Libraries, Special Collections Policy.

Our working understanding of a Special Collection was greatly informed by the conceptualisation proposed by Michael Heaney, whose granular, entity-relationship based "Analytical Model of Collections and their Catalogues" (Heaney, 2000) can apply to any Collection, Special or otherwise. This inclusive model helped us defining the structure of our survey instruments used for the study of intermediaries and end users. We believe that this model accommodates well the differences between museum, library and archival views on the groupings of objects.

Due to the ambitious but time-constrained nature of the project, and with an understanding that collection description is itself a question which can be debated interminably, it was decided to approach the definition of "Special Collections" pragmatically. Special Collections, were therefore accepted as being collections identified as such by the staff of libraries, museums and archives, arranged and curated as such, and (at least to some extent) already made accessible to researchers and the public under their special conditions of use.

2   Aims and Objectives

The aims of this study were to:

– Identify priority collections for potential digitisation housed within UK HE's libraries, archives and museums as well as faculties and departments.

– Assess users' needs and demand for Special Collections to be digitised across all disciplines.

– Produce a synthesis of available knowledge about users' needs with regard to usability and format of digitised resources.

– Provide recommendations for a strategic approach to digitisation within the wider context and activity of leading players both in the public and commercial sector.

All of these aims have been successfully met. Specific objectives satisfied were:

– To survey and consult with both direct end users (researchers, teachers, subject-specific societies) and intermediaries (librarians, curators and collection managers) to gauge their view on the collections to prioritise for digitisation.

– Devise a list of priority Special Collections as candidates for potential future digitisation based on users' need and demand.

– Survey the strategic approach to digitisation of key players in the field, in the public, not-for-profit and commercial sectors, in order to examine the complementarities of digitisation activities pursued by different players and on that basis to provide informed strategic recommendations on future digitisation to JISC and RIN.

– Produce a synthesis of previous and current studies which have focused on identifying researchers' needs with regard to issues of usability and consumption of digital resources.

We fulfilled only partially one of the project objectives:

– Create a high-level list of Special Collections that have already been digitised. This will contribute to provide some high-level context for the above, and will highlight subject areas that are currently well-catered for as well as "orphan" areas.

Many collections are simply not listed online, with the information provided on library and archive web pages often only partial, if not entirely absent. Many directories (including DRAI[5]) combine collection and item level descriptions without disambiguation, or include information on resources not compatible with DiSCmap's objectives – for example, institutional repositories or temporary "virtual exhibitions", which do not fall within our definition of Special Collection. An initial list of portals and repositories which provide access to digitised collections is presented in Appendix IX.

We also did not carry out *in-depth* case studies of hidden departmental collections, due primarily to time constraints. For the purposes of comparison it was decided to provide "illustrative snapshots" of two departmental collections with widely differing levels of

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[5] A report on the JISC-funded DRAI project is available on
http://www.jisc.ac.uk/publications/documents/draifinalreport.aspx

visibility, discoverability and use, one *hidden* (unprocessed) within the Department of Biomedical and Life Sciences at University of Glasgow and the other *visible* (processed), curated by the Archives of The University of Stirling within the Department of Film, Media & Journalism (see Appendix V).

3 Methodology and Implementation

3.1 Methodology

Using a combination of qualitative and quantitative methods, we structured our work within four Workpackages, the first run by CDLR, the second by CERLIM, and the remaining two jointly.

Workpackage 1 - Quantifying collections: Identification of as yet un-digitised important Special Collections held within UK HEI libraries, archives, museums, faculties and departments. This included the creation of a framework of criteria for the assessment of "importance" based on the suggestions of intermediaries, a literature review and consultations with the DiSCmap Advisory Board. This workpackage produced a **List of potential collections for digitisation**.

Workpackage 2 - Identifying users' needs: Determination of the needs of current users of digitised content which will be synthesised with regard to usability and format of digitised resources in the context of research and teaching in HE institutions. This workpackage produced a **Report on User Needs**.

Workpackage 3 - Analysis and recommendations: Synthesis of results to produce a long-list of priority collections for potential future digitisation and strategic recommendations for the future digitisation of Special Collections. This workpackage produced a **Long list of mapped, assessed and prioritised Special Collections in HE** and a **Framework for the assessment of prioritisation in HE**.

Workpackage 4 - Project management: Ensuring efficient organisation, good communication, adherence to milestones and timely delivery of project outputs.

At the outset of the project an expert Advisory Board was established**,** consisting of nine specialists from within the community who have expertise in prioritising digitisation and/or use of digitised material in research and teaching. In addition to two meetings during the project, emails and an online forum were used to gather input from the Advisory Board at irregular intervals.

3.2 Implementation

Rather than describing in detail all the tasks within the project work packages, in this section we will sketch what activities contribute to achieve the project outcomes, and in Section 4 we discuss these outcomes in detail. The project delivered:

- A long list of collections;
- A framework of user-driven criteria for digitisation;
- Analysis of the application of the framework of user-driven criteria in order to produce a short-list for digitisation.

The implementation of DiSCmap was organised seeking to make its results:

- Representative (by a fair UK wide regional distribution).

- Non-hierarchical (includes Ancient, Old, Redbrick, Post-Robbins and New/Post-1992 HEIs - in our terms, for simplicity, "Pre-1960", "Post-Robbins" and "Post-1992").

- Granular (by surveying both intermediaries and end users).

- Functional (deliver the resources users want and need).

3.2.1   The work on the long list of collections

In order to gain the most comprehensive picture of current digitisation priorities for Special collections within UK HEIs, a twofold strategy was adopted centring on the deployment of discrete questionnaires. CDLR questioned "intermediary users" – librarians, archivists, curators (see Appendix I) and CERLIM the scholarly community of "end users" (see Appendix II), later combining the findings of the two.

At the same time as the DiSCmap survey was being undertaken, Research Libraries UK (RLUK) was engaged in surveying their own members as to their digitisation priorities for Special Collections. A decision was taken by JISC to exempt RLUK member libraries from the DiSCmap survey due to take up problems which may arise from "survey fatigue" with an agreement that the RLUK survey outputs would be integrated with the CDLR's survey of intermediary users.

The work on the long list included more than just mechanical gathering of data on collections; correction and de-duplication of records were part of the process. In addition the project team compared the nominated collections with an established collection-level description service, SCONE, which provided additional insights on the structure of nominated collections and revealed some metadata problems, described in Appendix VII.

The basic stages of the work on the long list and their timeframe are presented on Fig. 1.
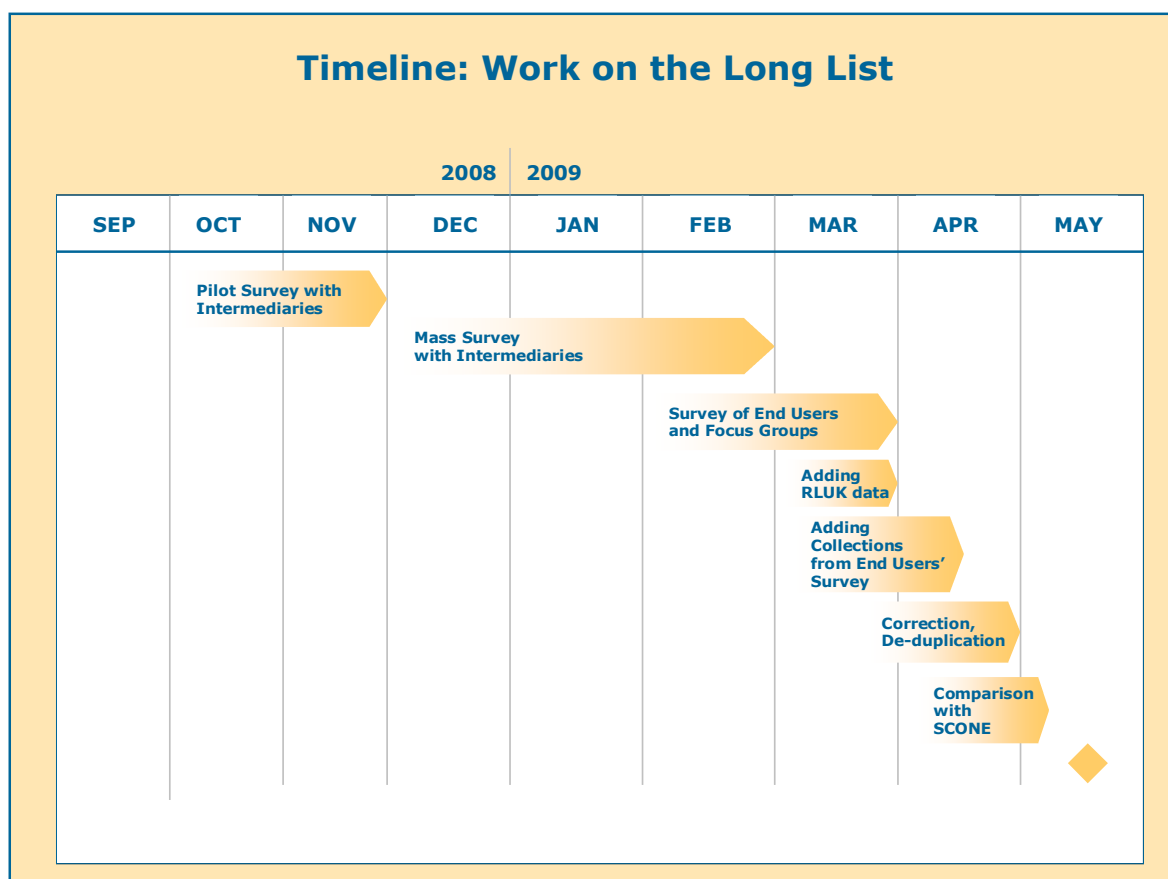
Figure 1. Timeline of activities on the data gathering and processing for the DiSCmap Long List of Special Collections

As a result, data on 945 collections[6] were included in the long list (from 988 nominated collections in total which included some repetitive nominations). Fig. 2 presents the sources of all collections in DiSCmap, and in Section 4.1. we present descriptive data which pinpoint what type of queries can be done using the long list.

DiSCmap used Microsoft Access for gathering the data on collections nominated to the long list. The origin of the data influenced the level of detail provided and in particular allows to highlight differences in the way intermediary and end users are currently understanding what a Special Collection is; this is discussed in more detail in Section 6.1.1.

We should warn that the different level of detail provided by the various sources which were used to compile the long list makes it inhomogeneous. In order to fully exploit the possibilities of such a specific set of data, it is highly recommendable to harmonise the data and fill in any gaps; this could be done through additional consultation with intermediaries or additional desktop research.

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[6] It should be noted that the RLUK data included a spreadsheet with detailed data (called here RLUK survey) and a list of collections which consisted only of collection titles (called here RLUK list). The RLUK survey also included complementary collections and we added them to the long list, because in multiple cases these collections were not nominated by the institutions where they were kept.
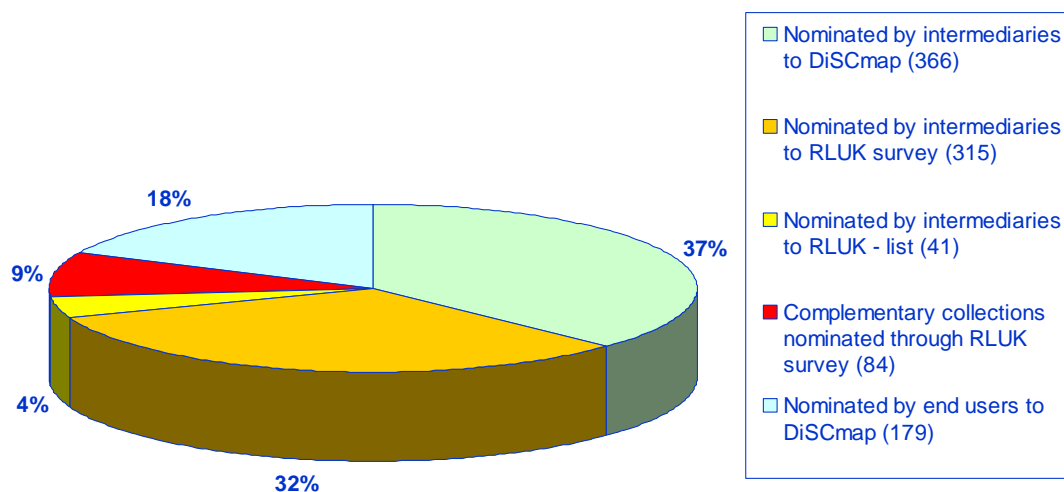
Figure 2. The collections in the long list according to their source

3.2.2 The work on the user-driven framework of criteria for digitisation

In order to collect a wide range of professional opinions, DiSCmap conducted two surveys: with the intermediary and the end users, presented respectively in Appendix I and Appendix II. Both surveys contributed to the better understanding of user-driven criteria for digitisation.

It was decided to use different approaches when surveying the intermediaries and end users. The survey of intermediaries asked to provide justification of digitisation reasons and thus DiSCmap collected a rich set of compact digitisation cases. At the pilot stage of the survey with intermediaries, content analysis was used to group the most popular criteria emerging, and during the mass survey intermediaries had the chance not only to provide a case as to why a collection should be digitised, but also to select from a list of five criteria for digitisation which are relevant to a particular nominated collection.

Thus the intermediary survey allowed constructing a set of user-driven priorities based on the evidence in the digitisation cases. This emerging framework of priorities is presented in Section 4.2.

The end user survey adopted a different approach which suggested a wide range of possible digitisation reasons. This list was based on a combination of the findings based on the analysis of the pilot survey with the intermediaries and on the analysis of seven frameworks suggesting priorities for digitisation (they are presented in Appendix VIII). Fig. 3 provides a very high-level view of the criteria suggested by these frameworks and identifies clusters of identical or similar criteria suggested by these frameworks.

Figure 3. Criteria for digitisation suggested by seven frameworks
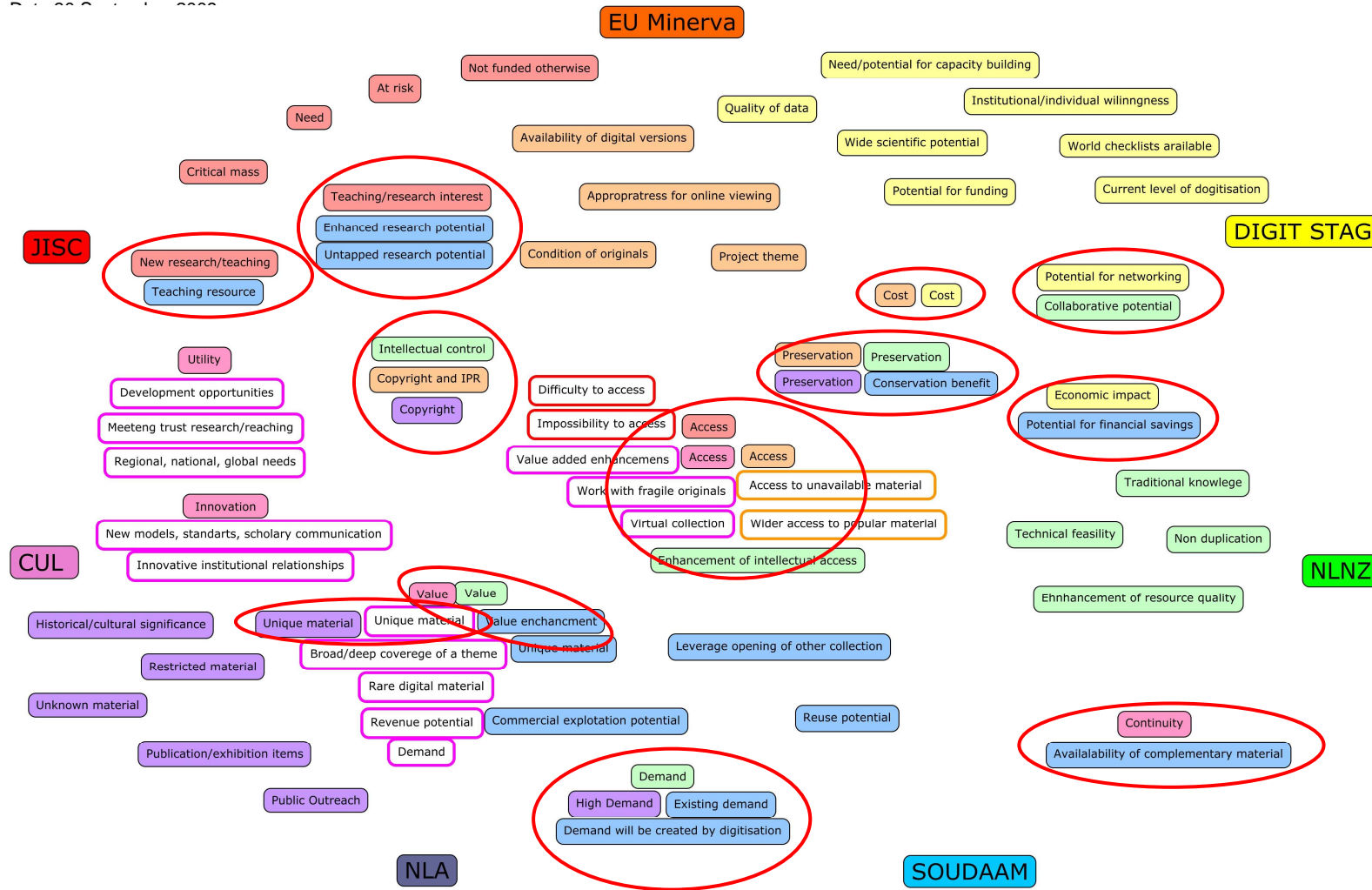
This diagram groups criteria nominated by seven digitisation frameworks/strategies. Seven different colours were used in order to represent visually the different sources. JISC (in red) represents the criteria from JISC (2008b); EU MINERVA (in orange) the criteria suggested by MINERVA Woking Group 6 (2004); DIGIT STAG (in yellow) criteria nominated by the Report of the Meeting of the Digitalization of Natural History Collections STAG of GBIF. (2002); NLNZ (in green) the criteria suggested by the National Digital Forum (2007); SOUDAAM (in blue) the criteria nominates by S. Ross (1999), NLA (in indigo) criteria nominated by the National Library of Australia (2008); and CUL (in violet) – criteria nominated by the Cornell University Library (2005). The primary criteria are presented in solidly coloured shapes, and second level criteria are distinguished because they are in white shapes with a border in the respective colour. The criteria are grouped and repetitive or similar criteria are circled in red.

The outcomes of this survey provide valuable quantitative data which allow ranking the importance of the suggested criteria according to the end users' views. This is discussed in Section 4.2. which also presents the framework of emerging user-driven criteria for digitisation.

Thus, the framework of end user criteria was developed as a combination of the content analysis of the digitisation cases suggested by the intermediary users with the quantitative analysis of the end user survey data and was also informed by the JISC Digitisation Strategy and six frameworks for digitisation.
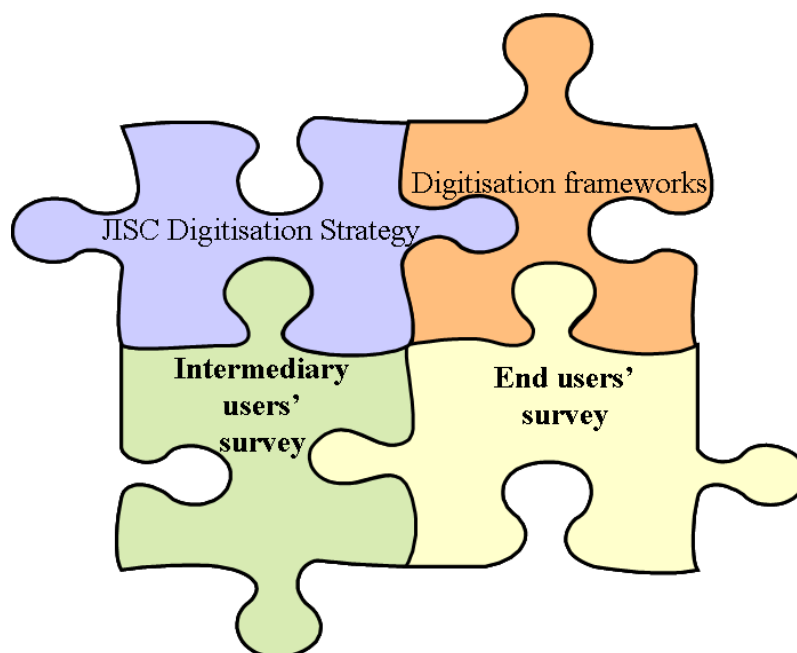
Figure 4. The sources of contribution to the user-driven framework of priorities for digitisation

3.2.3   The work on the short list for digitisation

The work on the user-driven framework of criteria for prioritising digitisation provided valuable insights to this process and the differences between intermediaries and end users. During the work on the project the team consolidated around the opinion that instead of producing one single short list (like a snapshot of the moment and a selected subset of criteria) it should motivate the use of a flexible approach in obtaining short lists.

The use of Microsoft Access to store the data on the collections from the long list allowed us to use queries which would model a single criterion or a combination of criteria. The outcome of this work is presented in Section 4.3. As an illustration of this idea, several prioritisation scenarios and resulting short lists are presented in Appendix X.

This flexible approach provides the necessary freedom in future decision making process on prioritising digitisation, and is of special advantage of multifaceted domains such as user-driven priorities in digitisation.

4 The long list of collection

Composition of the long list and descriptive statistics

This section provides a set of descriptive statistical data on the collections in the long list.[7]

Some differences between the sources which supplied the data are summarized below:

- DiSCmap received a larger contribution from the University Archives and Museums sectors than anticipated (and in comparison to that received by the RLUK survey), due to the interest shown in the aims and objectives of the survey by the National Archives and the involvement of professional organisations such as the Scottish Universities Special Collections and Archives Group (SUSCAG) and both the University Museums In Scotland (UMIS) and the UK wide University Museums Group (UMG) in the dissemination of the survey.

- RLUK survey included institutions beyond the HEI sector[8] which was in the focus of the project.

- RLUK supplied their survey outcomes and an additional list including collections from the University of Aberdeen. This list includes only titles and the additional data which DiSCmap and RLUK survey with intermediaries gathered is not available; however we included all the collections nominated in it to the long list of collections.

- Collections nominated by end users went not only beyond the HEI sector, but also beyond the boundaries of the UK.

Below we present tables and diagrams which illustrate what data had been collected; this illustrates the richness of potential future uses of the long list.

- ***Total number of collections***

After normalisation, de-duplication and consolidation, the total number of collections is 945.

- ***Collections by source***

The distribution of collections by their source is illustrated on Fig. 2; Table 1 provides further detail on the provenance of the data in the long list.[9]

It is essential to know what the sources of the nominated collections are, because the level of detail in the data differs in the various sources. Appendix XI provides information on the mapping of the data coming from the various sources.

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[7] We again would like to emphasize that the various nature of the sources of the collections in the long list, the data are not always homogeneous; in this section we include warnings when this is the case. DiSCmap collected a huge amount of initial data but did not have the resource and the time to fill all missing data – this would require to contact intermediaries responsible for the respective collections. Such a harmonisation and homogenisation task would help to provide a long list of unified quality.

[8] The focus on the HEIs was suggested by the funding bodies in order to make the task scalable.

[9] Please note that the key values from this table (A-E) will be used further when it is necessary to distinguish the sources of data.

Collections can have more than one source and be nominated more than once within a source, so overall total figures do not match source figures. Figures "by source" count nominations, not distinct collections.

Key	Source	Total	Note
A	DiSCmap survey of intermediaries	366	The data on these collections are most complete.
B	RLUK survey	315	Complete excluding data on impact.
C	RLUK list (Aberdeen University)	41	This was just a list of titles of collections and thus the records are incomplete.
D	RLUK survey complementary	84	The RLUK survey asked for collections which would complement the nominated collections; these have been treated as additional nominations. One of the reasons was that institutions holding collections mentioned as complementary collection to other collections did not normally nominate these collections for digitisation or have not responded to the survey at all.
E	DiSCmap survey of end users (CERLIM)	192	These collections were mentioned by end users. The data on them are also incomplete. One specific issue about these collections is that the level of granularity seen by the end users differs from the understanding of the intermediaries. End users nominate super- or sub-collections (e.g. the collections of the British Library, or the manuscripts within a particular collections) as collections.

Table 1. Sources of data on collections

- *Collections by curatorial environment*

The "curatorial environment" of the nominated collections breaks down as shown on Fig. 5.

A follow-up of the project may target specifically the museums and the departments which still are not strongly presented in the long list.
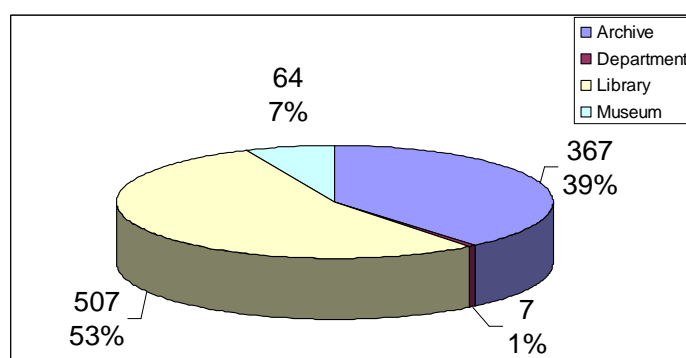
Figure 5. Collections by curatorial type

- *Collections by region*

The distribution of the nominated collections by region is shown on Fig. 6. It clearly illustrated that there are regions which are not well represented in the long list.

Since the nomination of collections was a matter of good will of intermediaries which decided whether they would like to respond to DiSCmap survey, a future effort might target especially those institutions which have not answered this survey.
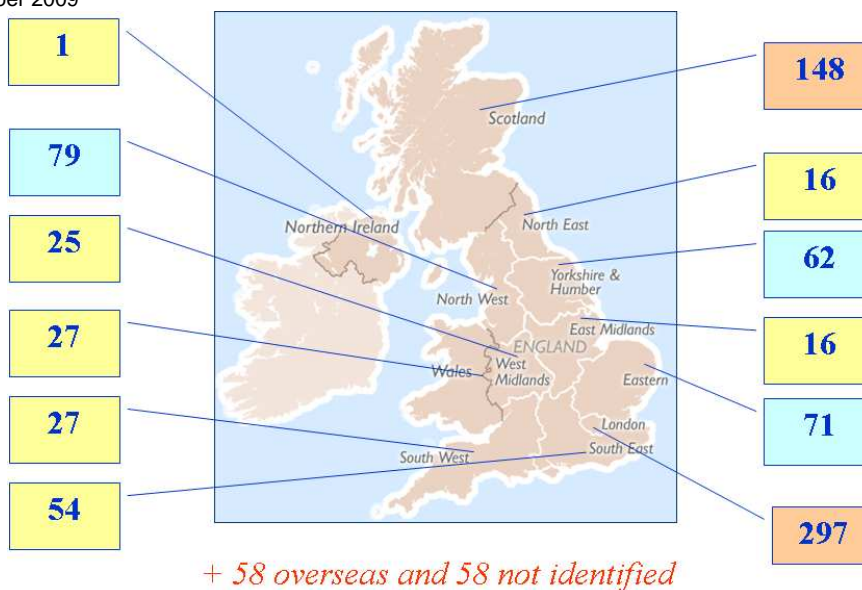
Figure 6. Collections by region

Note: The map of the UK HE regions is taken from the HERO website (www.hero.ac.uk).

Collections by institution type

The distribution of collections in the long list according to the type of institution which is taking care of them is presented in Fig. 7.
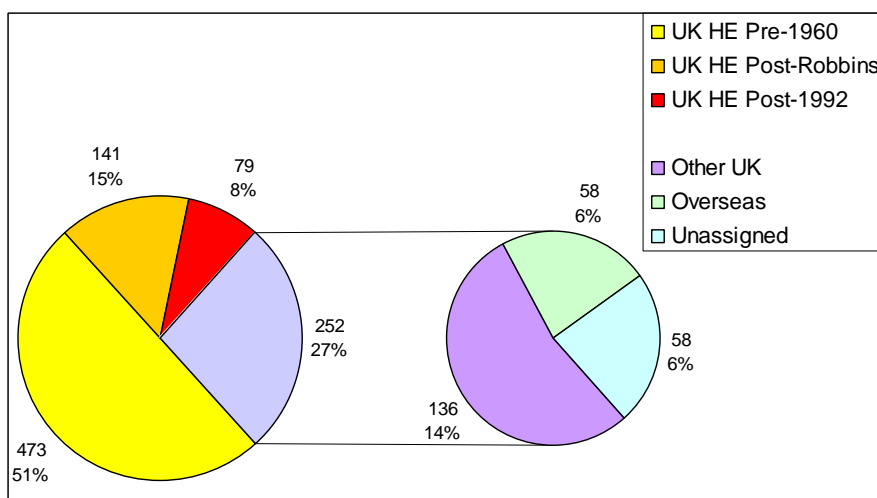
Figure 7. Collections by institutional type

Although 51% of all nominated collections in the list belong to the holdings of HEIs founded before 1960, the diagram on Fig. 8 shows that the most active in terms of responding to the survey were the institutions founded after 1992 (57% of them responded to the survey). Respectively, 47% of the pre-1960 institutions and 35% of the Post-Robbins institutions responded to the survey. Having in mind the nature of the project, where the participation of the intermediaries was a matter of good will, the overall response from 44% is very satisfactory.

For individual HEIs, the number of nominated collections varied from 1 to 67 collections.
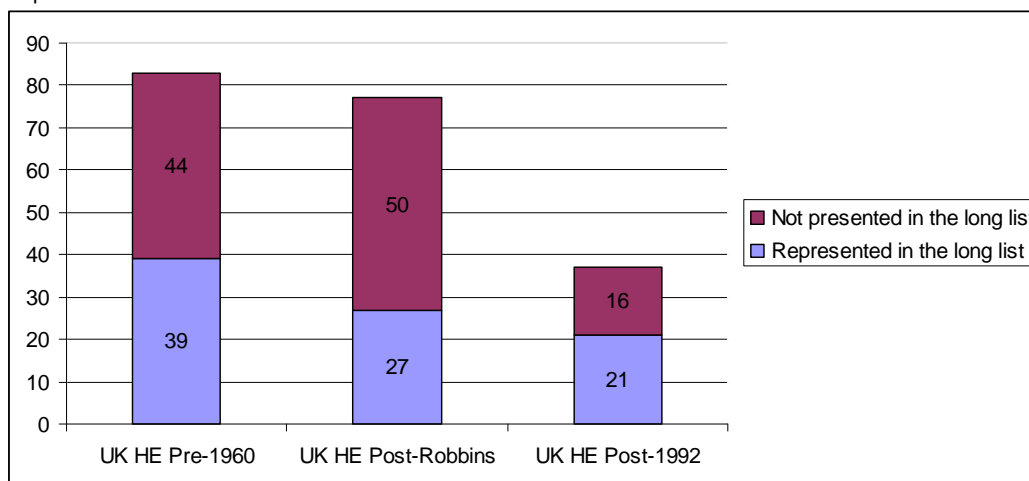
Figure 8. Participation in the survey according to the HE type

- *Collections by age range*

Collections can have more than one age range. Table 2. presents the number of collections which contain items from particular time period. The key used in the table is the same as in Table 1.

Range	A	B	C	D	E	Total
-1799	90	153	0	1	8	237
1800-1899	192	157	0	1	10	340
1900-1949	233	139	0	1	9	366
1950-1999	221	86	0	1	5	300
2000-	85	16	0	0	2	100

Table 2. Collections by age

A - DiSCmap survey of intermediaries, B - RLUK survey, C - RLUK list (Aberdeen University),
D - RLUK survey complementary collections, E - DiSCmap survey of end users (CERLIM)

- *Collections by subject*

The number of collections across subjects is presented on Fig. 9. The subjects are aligned to high-level HESA subject codes (Appendix III provides information on them), extended with several additional subjects within the Humanities and Arts in order to understand better the structure of the nominated collections in these domains. This is the area where digitisation is still most popular, as suggested by the Loughborough Study (see JISC 2008b).
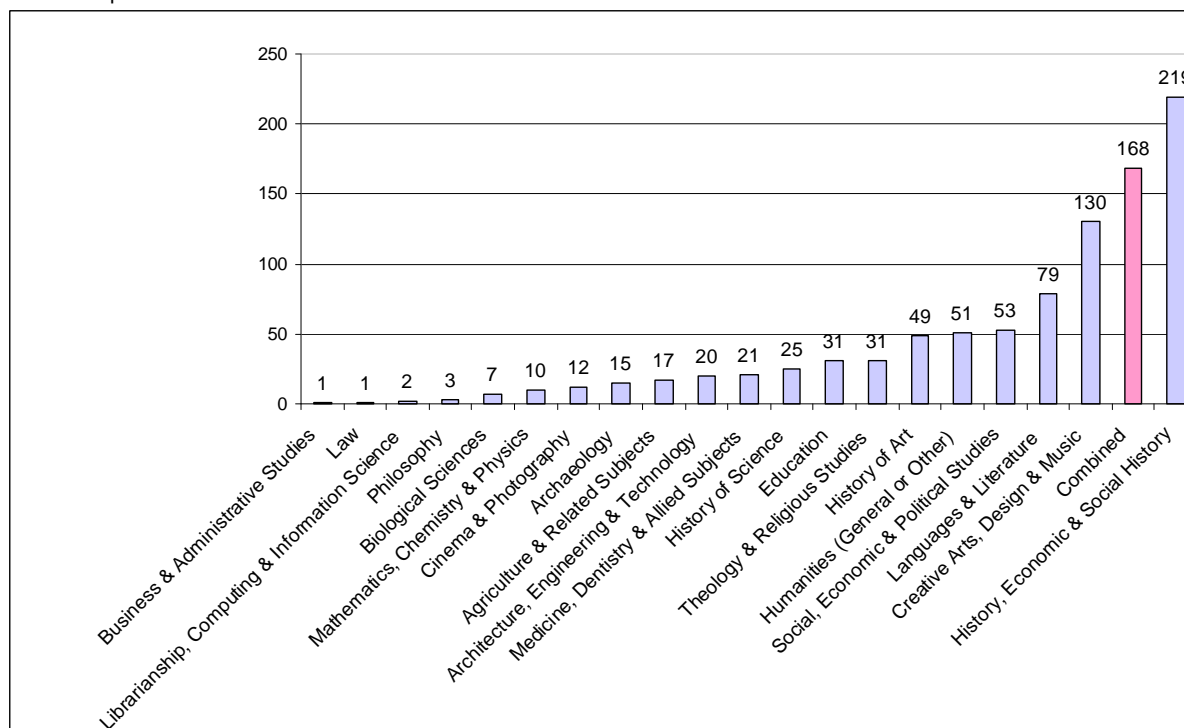
Figure 9. Collections by subject

- *Collections by language*

The following table provides information on collections which include materials written in languages other than English. This table should be used carefully because the multiple zeros do not mean that different languages can not be found in the nominated collections from a particular source, but that such data was not provided.

Please also note that collections can have more than one language.

Language	A	B	C	D	E	Total
Arabic	1	5	0	0	0	6
Czech	2	2	0	0	0	4
Dutch	4	1	0	0	0	5
English, Medieval	0	1	0	0	0	1
French	24	5	0	0	0	28
French, Medieval	1	0	0	0	0	1
Gaelic (Irish and Scottish)	5	0	0	0	0	5
German	22	8	0	0	0	29
Greek	5	4	0	0	0	8
Hebrew	1	1	0	0	0	2
Italian	12	3	0	0	0	14
Japanese	4	2	0	0	0	6
Latin	14	2	0	0	0	15
Other	0	9	0	0	0	9

Persian	1	3	0	0	0	4
Portuguese	3	2	0	0	0	5
Russian	2	2	0	0	0	4
Sanskrit	0	2	0	0	0	2
Spanish	5	3	0	0	0	8
Tibetan	0	2	0	0	0	2
Urdu	1	1	0	0	0	2
Welsh and Breton	4	0	0	0	0	4

Table 3. Collections by language

- *Collections by digitised status*

The next table provides information on the digitised status of collections. Please note again that the high number of "not known" values is a result of the lack of detailed data.

Status	A	B	C	D	E	Total
No	298	11	0	1	101	384
Not known	0	302	0	81	8	384
Part	51	0	0	1	54	93
Selected	17	1	0	0	2	17
Yes	0	1	0	1	22	21

Table 4. Collections by digitised status

A - DiSCmap survey of intermediaries, B - RLUK survey, C - RLUK list (Aberdeen University),
D - RLUK survey complementary collections, E - DiSCmap survey of end users (CERLIM)

- *Collections by IPR status*

IPR issues are amongst the standard criteria for digitisation. The next table provides information on them. We again are not drawing any conclusions and these data should be used just as a rough guidance because of the vast number of collections where information on the IPR was not supplied by intermediaries.

Status	A	B	C	D	E	Total
Held by another party	124	62	0	1	2	184
Held by institution	123	19	0	1	4	141
None	34	141	0	1	6	170
Not known	85	93	0	81	180	409

Table 5. IPR status of nominated collections for digitisation

A - DiSCmap survey of intermediaries, B - RLUK survey, C - RLUK list (Aberdeen University),
D - RLUK survey complementary collections, E - DiSCmap survey of end users (CERLIM)

- *Collections by preservation status*

The need in preservation is another popular digitisation criterion. The following table provides information on them. Again, this information needs to be collected for collections coming from sources other than DiSCmap survey of intermediaries (code A).

Status	A	B	C	D	E	Total
Yes	75	1	0	0	0	75
No or not known	291	314	41	84	192	870

Table 6. Collections by preservation need

A - DiSCmap survey of intermediaries, B - RLUK survey, C - RLUK list (Aberdeen University),
D - RLUK survey complementary collections, E - DiSCmap survey of end users (CERLIM)

- *Collections by distributed status*

The DiSCmap survey included a question if the collection is distributed (see Appendix I). The RLUK survey included a question what complementary collections to the nominated one can be listed. Table 7 presents the numbers of collections which are *distributed*. The presence of such collections, as of complementary collections, has one major consequence: how to arrange priorities in digitisation when one institution holding a part of a distributed collection is nominating it, and the other institution(s) have not done so? Similar question is in place for the complementary collections; in the majority of the cases the collections nominated as complementary collections had not been nominated by the institutions which are holding them.

Status	A	B	C	D	E	Total
No	301	11	0	1	6	300
Not known	3	302	0	82	186	539
Yes	62	2	0	1	0	65

Table 7. Number of distributed collections

A - DiSCmap survey of intermediaries, B - RLUK survey, C - RLUK list (Aberdeen University),
D - RLUK survey complementary collections, E - DiSCmap survey of end users (CERLIM)

- *Collections by material type*

Type	A	B	C	D	E	Total
Archival materials	153	29	0	2	4	178
Audio	27	8	0	0	0	35
Books	139	62	0	0	6	172
Images	85	40	0	0	2	122
Manuscripts	80	56	0	0	4	135
Maps	9	6	0	0	0	15
Serials	22	0	0	0	4	22
Video	15	2	0	0	0	17

Table 8. Types of materials across collections in the long list

A - DiSCmap survey of intermediaries, B - RLUK survey, C - RLUK list (Aberdeen University),
D - RLUK survey complementary collections, E - DiSCmap survey of end users (CERLIM)

The DiSCmap survey gathered data on the amount of materials of different types in the collecions (see Appendix I). RLUK survey also collected data on the size of the collections. Table 8 provides a general idea on the types of materials present across collections. Please note that one collection can include a mixture of different types of materials.

The detailed data on the collections include indicative sizes of holding which could be helpful in estimating the digitisation efforts needed in the case of the specific collections.

4.1.1   Caveats on the long list

The long list provides a valuable initial set of collections and can illustrate various issues in the area of prioritizing digitisation; from this point of view we believe that it is already one useful outcome of DiSCmap.

However, we also understand that the quality of data in it can be improved and this will make the long list even more useful for future prioritizing purposes.

1. The data in the long list can be enriched and harmonized. The different sources feeding into the long list resulted in various level of detail of the supplied data. This can be fixed within a follow-up action which would aim to complete the missing data through consultation of intermediaries and desktop research.

2. The list itself can be extended in order to provide a more solid basis for future prioritization decisions, addressing specifically institutions which have not answered DiSCmap. It can also be extended ingesting data from existing repositories of special collections, but this can be done after some research on the compatibility of the data models used. In such a process again intermediaries might need to be contacted especially with regard to the data which are based on their professional judgment on research and teaching impact.

5   The user-driven framework

In order to develop a user-driven framework of criteria for prioritising digitisation, we analyzed the cases for digitisation provided by intermediaries (see section 4.2.1) and gathered quantitative data on the priorities seen as most essential by end users (see section 4.2.2). More general end user study outcomes are presented in section 4.2.3.

Finally, the concept map of the emerging user-driven criteria framework is presented in section 4.2.4.

5.1 User orientated digitisation criteria emerging from the mass survey of intermediaries

The following list of 10 separate User oriented digitisation criteria is an inclusive one discerned from the content analysis of the DiSCmap intermediary survey response[10].

– to improve/facilitate access

– to meet evidence of user demand

– to enhance teaching of undergraduate and taught masters course

– to enhance teaching of networked courses for distance learners

– to support ongoing research

– support research in multiple disciplines (interdisciplinarity)

– a means of furthering collaborative research projects

– potential to create a new subject area for research

– create / support research and teaching using new media

– potential impact for users beyond the boundaries of HE

Here no attempt has been made to establish a ranking in order of priorities or in the order in which intermediaries or end users advanced them – nor was the user-related criteria solely advanced by end users in the survey. The wider range of criteria are included in Appendix IV.

Below are provided some elaboration on how/why these criteria were discerned.

Intermediaries' criterion 1 – to improve / facilitate access

Access is a key criterion for both intermediary and end users. The South Wales Coalfield Collection at the University of Swansea sees "Digitisation as a means of improving access to historical records".

Improving digital access will help meet the emerging requirements of curators and researchers for the discovery of physical objects.[11]

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[10] Because some of these are broadly similar, they were latterly conflated when preparing the Final Framework.

[11] RIN (2008) *Discovering physical objects: Meeting researchers' needs*
http://www.rin.ac.uk/files/Discovering_objects_REPORT.pdf

Among the "Faculty voices" who have advocated collections they see as priority candidates for digitisation is a lecturer in the School of English, Sociology, Politics and Contemporary History at the University of Salford who nominated The Walter Greenwood Collection on the basis of its being "an invaluable but relatively inaccessible resource for academics working on working class and regional writers.'

Intermediaries' criterion 2 - to meet evidence of user demand

Some respondents provided quantitative evidence of end user demand as the primary criteria for digitisation.

Illustrative of the rich quality of data contributed to the DiSCmap mass survey, a Professor of Theatre Studies at the University of Manchester was another end user and "Faculty voice" who nominated the Stanley Houghton Collection at the University of Salford for digitisation, and did so partly to aid access to the collection for performance historians based in the U.S.

Intermediaries' criterion 3 - to enhance teaching of undergraduate taught Masters courses

Support for teaching ranked high amongst response by intermediaries, many of whom tied their nomination of a Special Collection for digitisation to a specific taught course at their University.

Intermediaries' criterion 4 - to enhance teaching of networked courses for remote and distance learners

Within this level of Criteria, intermediaries also advanced Collections for digitisation as a means specifically to enhance and support the delivery of online courses for distance learners and remote users.

Intermediaries' criterion 5 - to support ongoing research

There was a clear convergence between "scholarly expectations" and "gatekeeper instincts" regarding the need to digitise certain Special Collections to support the current research projects of end users. However, there was a divergence in places as to the understanding of who actually constitutes the "end user" with an assumption within some respondents from the academic community that it represents a member of the scholarly class, whilst for intermediaries it refers to "the whole spectrum of lifelong learning".

Intermediaries' criterion 6 - to support research in multiple-disciplines/interdisciplinary research

A key UK government report "*Science & Innovation Investment Framework 2004-2014*" (HM Treasury, 2004) sets a clear focus on promoting inter-disciplinary research practice, concluding that "genuine and optimal frameworks" are needed to encourage researchers to "breach the traditional disciplinary boundaries". In addition to many other such policy initiatives a recent European report (DEA/FBE, 2008) "*Thinking Across Disciplines – Interdisciplinarity in Research and Education*" addresses the new imperative of Inter-disciplinarity, which it defines as the practice where interactions "may forge a new research field or discipline".

Many intermediaries responded to DiSCmap's call to nominate digitisation priorities from within their Special Collections holdings by advancing the criteria of their support for multi- and inter-disciplinary research. OCLC Program Officers Merrilee Proffitt and Jennifer Schaffner in their study *The Impact of Digitizing Special Collections on Teaching and*

Scholarship[12] raised concerns of an identifiable "gap" between "scholarly expectations" and the "gatekeeper instincts" of intermediaries. The rich levels of DiSCmap response, however, shows that many intermediaries have an informed understanding of the changing paradigms of contemporary scholarship.

The bringing together of distributed collections in an online digital environment was viewed as key to meeting the needs of end users.

Intermediaries' criterion 7 - furthering collaborative research/digitisation projects

The bringing together of distributed collections in an online digital environment was viewed as key to meeting the needs of end users.

Whilst collections were also advanced for digitisation as a means of furthering collaborative research projects both nationally and internationally.

Intermediaries' criterion 8 – to create or support research in new subject areas

The Small Specialist Institutions (SSIs) throughout the UK appeared to advance the digitisation of their Archives and Special Collections as a means to help create new subject areas for research, to attract potential PhD students and further potential collaborative bids for strategic funding.

SSI status was introduced in 2000[13] [14]. Small specialist institutions currently specialise in practice-based creative disciplines and are often viewed as lacking the economies of scale present in larger institutions. The three SSIs in Scotland (RSAMD, Edinburgh College of Art and Glasgow School of Art) for example, each qualify for levels of support in excess of their formula funding from the Scottish Funding Council[15]. A recent SFC document on the requirements of SSIs concluded that "special attention on the problems of the small specialist institutions is justified, because their room for manoeuvre is most limited."[16].

Intermediaries' criterion 9 – to create or support research using new media

The Keith Foley Photographic Archive at Liverpool John Moores was nominated for digitisation in order to facilitate the delivery of teaching and research in both the Department of Journalism and the iMedia Department at the Liverpool Screen School. Digitisation was viewed as crucial to such cross departmental teaching and research support as many projects incorporate the use of web technologies, digital images and podcasts.

Intermediaries' criterion 10 – impact for users beyond the boundaries of HE

Many Special Collections were advanced for digitisation based on the User related Criteria that provision of online access would result in improved usage by the user community beyond the boundaries of Higher Education. Reasons for doing so, extended to the social,

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[12] Proffitt, Merrilee and Schaffner, Jennifer (2008) *The Impact of Digitizing Special Collections on Teaching and Scholarship, Reflections on a Symposium about Digitization and the Humanities* OCLC Programs and Research, p. 8. http://www.oclc.org/programs/publications/reports/2008-04.pdf

[13] HEFCE Report 00/51 Funding of specialist higher education institutions http://www.hefce.ac.uk/pubs/hefce/2000/00_51.htm

[14] SFC (2000) Circular: Designation as a Small Specialist Institution http://www.sfc.ac.uk/information/info_circulars/shefc/2000/he3700/he3700_annex_A.pdf

[15] SFC (2000) Consultation Paper HEC05/00: Process for the Designation of Small Specialist Institution Status http://www.sfc.ac.uk/information/info_consultations/shefc/2000/hec0500/hec0500.pdf

[16] SFC (2007) Scottish Funding Council strategy for supporting creativity and culture http://www.sfc.ac.uk/about/new_about_council_papers/about_papers_26jan07/paper_sfc0712.htm

historical, political, religious, ethnic, gender and contemporary content of the institution's collections.

Alice Prochaska offers argument in support of such priorities,

> *Digitization of collections that relate to particular communities be they local or defined by ethnic or cultural origin can bring great social and educational benefits to users and political benefits to originators.*[17]

5.2. User orientated digitisation criteria as seen by end users

The current and future needs of end users of digitised content (teachers, researchers and students in the HEI in the context of DiSCmap) were sought via 1) a thorough analysis of studies and research undertaken within the field focussed on end users 2) consultation with direct end users.

We conducted a literature search and identified key studies for analysis and review, including key studies already identified by JISC.

The main findings of our survey and consultation with end users are summarised in the following series of charts, tables and graphs, with additional detailed analysis being provided in Appendix VI.

Breakdown of participants

Respondents were able to select multiple roles, for example a lecturer may have wished to indicate that they both actively teach and undertake research. The responses indicated that the participant's roles comprised:

- Lecturers – 25%
- Students - 22%
- Researchers – 20%
- Intermediaries – 18%
- Readers and Professors – 8%

Few participants described themselves as "Other"; these roles included Administrative Assistant, Retired, and Designer.

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[17] Prochaska, Alice. (2008) *Digital Special Collections: the big picture* (p. 9)
http://www.library.yale.edu/about/librarian/DigitalSpecialCollections.pdf

Participants' Role/ Roles in Institution

Other: 7%

Librarian: 12%

Archivist: 2%

Special Collections Manager: 4%

Research Student: 6%

Post Graduate Student: 10%

Undergraduate Student: 6%

Academic Professor: 7%

Academic Reader: 1%

Academic Senior Research Fellow: 1%

Academic Research Fellow: 4%

Academic Research Associate: 2%

Academic Researcher: 13%

Academic Lecturer: 25%

Figure 10. Breakdown of end user survey participants

Criteria for prioritisation of a collection for digitisation

Participants were asked to indicate their own criteria for a Special Collection to be digitised by selecting as many criteria from a list as they felt important. This set of criteria was identified through: 1) analysis of secondary material and existing frameworks for digitisation, see Appendix VIII; 2) interviews with Intermediaries and, 3) results of the Intermediaries' survey as described in Section 4.2.1.

This approach is different from the approach used within the survey of intermediaries. Intermediaries were asked to describe the reasons for digitisation and the analysis of their responses informed a detailed list of suggested criteria. In the case of end users, a list with criteria had been suggested and this allowed obtaining numerical ranking of the end user preferences. These rankings are not representative but can be useful as an indication which priorities are most popular (or least popular) amongst end users.

The following chart represents these responses:

Users' criteria for prioritising digitisation of Special Collections
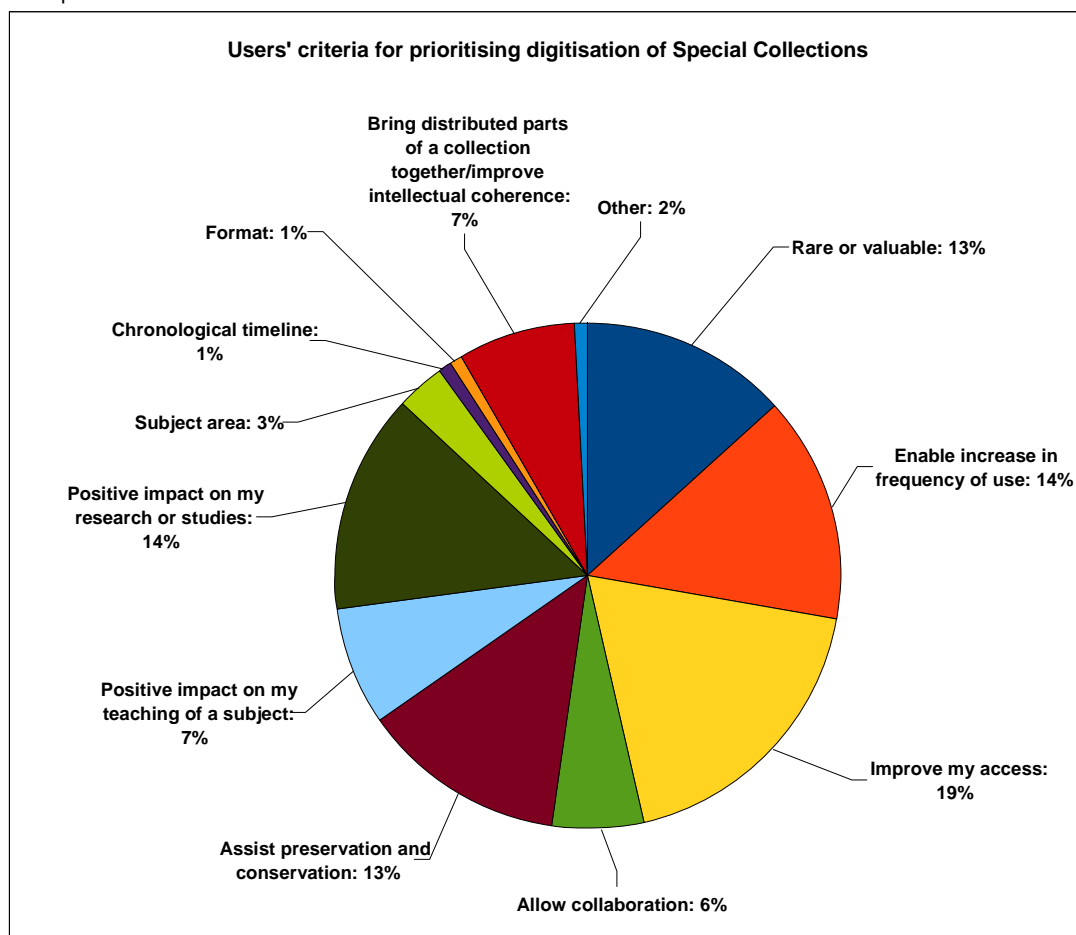
Figure 11. End users' view on the criteria for digitisation

Criteria eliciting greatest responses are presented first:

- Improve access – 19%

- Positive impact on research or studies AND Enable increase in the frequency of use – both 14%

- Assist in preservation an conservation of a collection AND Because a collection is rare or valuable - 13%

- Positive impact on teaching AND Bring distributed parts of a collection together, improve intellectual coherence – 7%

- Allow collaboration – 6%

Few participants suggested additional criteria, these included:

- Widening access to collections to communities inside and outside higher education institutions, for example:

 "As a Special Collections manager, I'm also interested in widening access to audiences outside HE, in support of widening participation, community engagement and research and knowledge transfer activities"

- Improve navigation within a collection, for example:

 "Because (hopefully) it would allow some searchability with a "Find" button"

"Digital editions of 19thC magazines that were originally published anonymously i.e. with no attribution for articles, have great opportunities for adding value, if they integrate modern indexes of authorship and author profiles, as well as advanced search facilities"

"Material should be mapped with optimal further reference threading possibilities"

– Copyright issues, for example:

"Copyright criteria to be minimized" and *"Teaching palaeography is transformed by the accessibility of copyright-free digitised manuscript materials"*

– Physical issues, for example

"Because the originals are large and unwieldy, and surrogates more convenient to access"

"My subject area (Egyptology) relies heavily on a number of rare and out of print sources; these are often not available in the library for one reason or another, and cannot be replaced in the current library budget allocation"

"Few copies of the material available"

– Adding value to the collection, for example:

"Making material more accessible means it can be more easily promoted and so raises the value of holdings - because usage can be higher - this obviously also means that information can be more widely reached by users, so improving the potential for public understanding of related issues and increasing the likelihood of the materials having influence in current research"

Some concerns were also raised, including:

"Don't confuse digitisation with preservation/conservation - it does little for the original objects other than reduce exposure to handling"

"Historical civil engineering literature is not a national priority"

"Am not aware of what is or is not digitised at other institutions"

Subject areas, chronological timelines and formats not sufficiently digitised

Although these figures are not statistically significant it is worth including here a list of those subject areas, time periods and formats which users felt were not adequately represented by digital materials at present (see Tables 9-11):

Subject area	Number of respondents
16th century British History	1
Civil Engineering	1
Computer Science (Logic and Automated Reasoning) Mathematics (Finite Algebra)	1
Early Modern Art history	1
Egyptology	2
English Modern Literary Manuscripts (18-20C)	1
Garden History	1

Geological collections	1
Heritage Studies	1
History	1
History of Classical Scholarship	1
Hittite Empire and Turkish political revolution	1
Medieval resources	4
Law	1
Music	1
Art	1
Onomastics	1
Performing arts, Dance Theatre	1
Post-war British popular culture	1
Renaissance intellectual history	1
Textile design	1
The English medieval church	1
Theology	1
Tudor Church History	1
UK co-operative movement c.1880-1920	1
Veterinary Science & Medicine	1
Weekly journals edited by Charles Dickens, 1850-1870	1
Women's History / Women's Studies	1
Women's Studies Second Wave feminism; contemporary women's writing	1
Working-class writing	1

Table 9. List of subject areas which respondents felt were not adequately represented by digital materials at present

Chronological period	Number of respondents
1500-1700	1
19th and 20th century	3
1930s	1
1950 - 1980	1
European late medieval and early modern period	1
Mid-Victorian era: we are quite well served with other magazines and newspapers from this era: but Dickens's journals have special significance	1
New Kingdom Egypt Late Bronze Levant	1
Pre-printing	1
Records that contain place-name evidence might come from any period, although the early sources include a lot of MS materials	1
Tudors	1

Table 10. Chronological timelines not sufficiently digitised

Format	Number of respondents
Adobe	1
Aerial Photography	1
Ecclesiastical archives	1
Images from books	1
Manuscripts	1
PDF	1
Online museum catalogues	1
Sound recordings	1
Victorian art history journals such as Athenaeum, Magazine of Art, Art Journal, Studio, etc.	1

Table 11. Formats not sufficiently digitised

The following digitization criteria are derived from the analysis of the DiSCmap end user survey and focus group and interview data. We provide examples of end users opinions; as we did with intermediaries, because this provides more insight on the opinions within this user community.

End user criterion 1 – to improve access

Improving access elicited the greatest number of responses to the online survey, thus:

> *"Allow quicker and more thorough access, which in turn would allow more time for research on other collections"*

> *"Allowing ease of access would be paramount"*

> *"Be more accessible"*

> *"Being able to find collections might influence me to using them"*

> *"It would not usually replace consultation of the original, but it would often extend the period over which one may have access to the material beyond the period one is able to spend in person at the repository which holds the collection"*

> *"It would significantly alter the research done in site: less data gathering, more in-depth analysis of the physical format of the object; correct transcriptions prepared in advance."*

The importance of this criterion also formed part of the focus group discussion, with one participant commenting:

> *"as more and more people are working either part-time or from a distance, it's nice to be able to access material from your own home, even on the train and not be dependent on being in a university institution or a library"*

End user criterion 2 – to enhance impact on research or studies

Impact on research or studies also featured highly in end user's digitisation criteria – more so than impact on teaching. Comments from the focus group and online survey emphasised how important digitisation of Special Collections is to research and studies:

> *"We've had to do it the hard way in the past; it's an absolute ... quantum leap in research capability. I'm totally astonished almost every time I look at something about what I can see and what's just become available"*

> *"Primarily use would be for research and consequently it should be more efficient to access the relevant material"*

> *"I could work on the project outside of library opening times. However, there is no substitute for handling the documents themselves, in my opinion"*

> *"Improve access to collections and materials not known to exist outside current small communities"*

> *"Increase speed of information retrieval, and reduce expense of research. Assist in initial survey of material to judge usefulness or scope"*

There was also a recognition that in some respects digitisation of resources may be seen as a driver of research being undertaken by academics:

> *"It's a simple fact of life if you want to do a PhD you've got to come up with a research proposal and for it to be cogent you've got to specify some sources that are really going to deliver the goods. You can't talk in terms of going round every archive in the country hoping to find something, so naturally you'll be able to focus your research proposal on major collections which are accessible. The big digitized collections are the obvious ones to go to"*

> *"as a supervisor putting together a proposal it's much easier to have a good look at all the digitized authors, get as much information as you can and say a bit about this"*

End user criterion 3 – to increase frequency of use

Frequency of use elicited an equal number of responses from participants to the online survey. This criterion is clearly linked closely with improving access but is distinct in that it highlights the ability to use and re-use source material in a way that may not have been possible with a non-digitised collection.

> *"I spent a long time travelling around the country to look at a book ... published sometime in the 16th century and the only copy was at the University of Wales and that involved a lot of travel and then trying to get as much information as you in the day. Having all these books online means that you can go back to them and you get a lot more done "*

> *"The beauty of digitized material is you can scope it, work over the particular collection is likely to be of interest, you may find a few prize items and then there's nothing to stop you going to the original collection and toying over the documents looking for things and you can just focus your efforts much more effectively"*

> *"Would use it more frequently"*

> *"Would enable much more use"*

> *"Would it would make me make greater use of it"*

> *"Would use more online but visit rarely"*

End user criterion 4 – to enhance impact on teaching

Impact on teaching provoked fewer responses than that of impact on research from participants to the inline survey. Discussions from the focus group and comments made via the survey suggest issues surrounding this area. That is, whilst the participants were in favour of introducing digitised collections to students concerns were raised as to the level of technical literacy of students. Others issues concerned with the importance of introducing students to the original source material and the need for time to integrate digitised collections into teaching programmes.

"Digitization gives you greater scope to kind of bringing engagement with students, somewhat at undergraduate level, but mostly at post graduate level particularly."

"PhD students obviously they get taken to the archives and introduced at various levels."

"I'm staggered by the amount of undergraduates who tell me they don't know how to use the computer properly. They can't send attachments, they don't know how to type in URLs and things that I've told them to look at, they say they can't do it."

"Pretty much interested in bringing students at the earliest into contact with original source material, not in transcriptions."

"I need to transcribe and make material available - very time consuming."

"The impact is low because undergraduates rarely NEED to know about the contents of Special Collections. But, for example, I shall next week by SHOWING my students the original Dickens journals in which the novel "Hard Times" was serialised. I'll probably still want to do that, even when the journals are digitized."

"Digitisation would enable my students to interact with the material in ways other than they already do; it would increase access and place less pressure on the materials and resources themselves and on the library staff. Having said that digitisation would not replace the consultation of the original materials."

"Students are not trained to use these materials."

"Only the most motivated students will visit archives; digitization would improve engagement."

"When teaching on-line courses to distance learners the lack of these resources hampers the student experience in relation to those I can teach on site."

End user criterion 5 – to bring together distributed collections and improve intellectual coherence

Bringing distributed collections together was also seen as a criterion for digitisation by both respondents to the survey and participants of the focus group.

"Material will be dispersed between say 50 archives round the country but is worth bringing together because if you aggregate the holdings of any number of people on social conditions you will actually get a very good idea of what's going on at the national level."

End user criterion 6 – to allow collaboration

Furthering collaboration was regarded as an important criterion to participants of the online survey and was also commented upon within the focus group:

"The "Feminist Academy" is increasingly fractured through gender mainstreaming and interdisciplinary approaches. Online resources are a key tool in creating online communities across formal subject structures to support academics working in the same subject area"

"Could be much more cross-disciplinary and international content if digitised collections were widely available"

End user criterion 7 – to increase digitized collections by subject discipline

Subject disciplines were suggested requiring additional digitised Special Collections, these are listed in 4.2.2.3. Additionally comments provided by participant also indicate the need for increased resources, such as:

"the greater availability of sources for medievalists is always welcome"

"I am not aware of many special collections in my subject area"

"Lack of core sources available means that students physically have to visit one site. This is not necessarily beneficial in a world where students approach to research is very different - e.g. with a different approach through the internet and also with more students working/ having commitments outside of taught hours"

Some participants did indicate that a good range of Special Collections are available for some subject areas (one example being overseas collections):

"So many American research libraries now have digital collections I am rarely at a loss to find suitable material to bring to seminars in my research area (Civil War America)"

"There's enough out there for one to give undergraduates the flavour"

End user criterion 8 – to increase digitized collections by chronological timeline

Chronological timelines were suggested requiring additional digitised Special Collections, these are listed in 4.2.2.3.

End user criterion 9 – to increase digitized collections by format

Specific formats were suggested by participants for the digitisation of Special Collections, these are listed in 4.2.2.3

End user criterion 10 – to improve access outside higher education

A number of participants raised improving access to digitised Special Collections to those outside the higher education community.

"Aid public access to rare materials held within universities - for example using sources for local or family history"

"Would also put into the public domain rare materials that would have wider public appeal"

End user criterion 11 – to improve navigation and searchability within a collection

Improving navigation and searchability within collections was seen as an important criteria for digitisation of a Special Collection by participants, for example:

"I hope it might make the material searchable"

"technological capacity and user-friendliness"

"Search capabilities"

5.3. The user-driven priority framework

The Venn diagram on Fig. 12 presents the criteria proposed by both End Users and Intermediaries for prioritising the digitisation of Special Collections. Criteria common to both groups are contained within the diagram's intersection. These common criteria are quite generic, addressing the concepts of improving "access", "collaboration" and the "impact of digitisation on research and teaching".
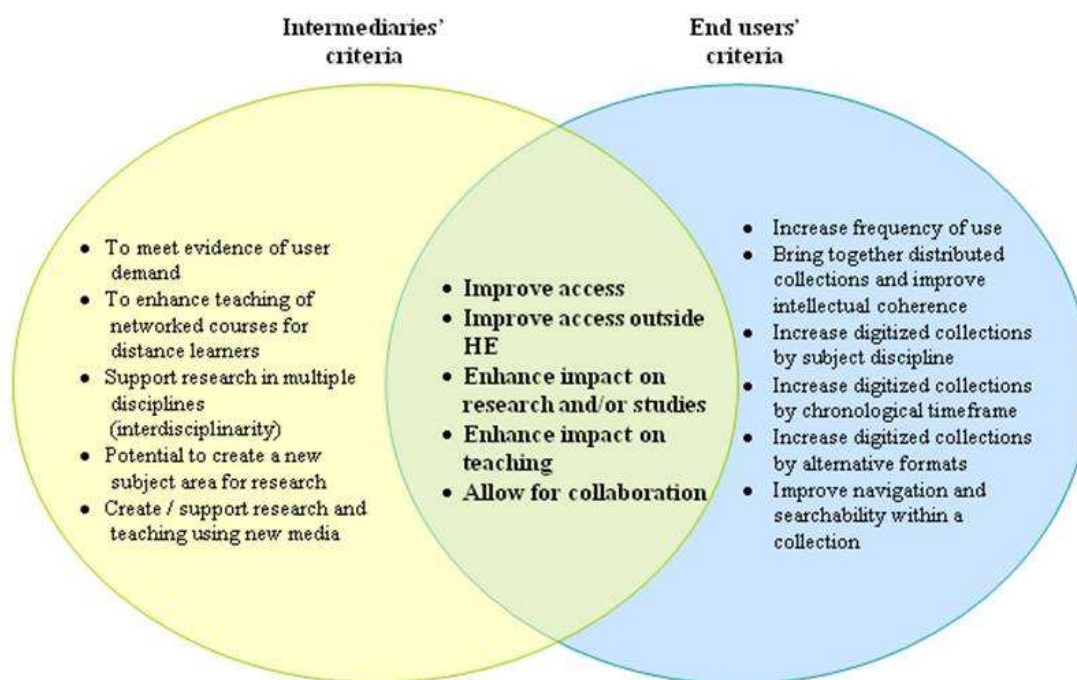

Figure 12. Summary of user-driven criteria

However, to reflect the subtlety inherent in the criteria being used, we must identify and analyse the level of *complexity* (or, in DiSCmap's terms, *granularity*) embodied in any one criterion. The number of issues or components contributing to any given criterion will vary - these *must* be understood before any evaluation system (whether metrics or otherwise) can be formulated from them; and only then will the subtlety of user needs be accurately reflected.

DiSCmap identifies 16 separate user-driven criteria, each of which differs in granularity. In some instances these can be considered to possess similar levels of complexity and embody a similar set of issues, thus they be usefully combined. For example: access to digital collections for users from Higher Education (HE) and access for users *outside* of HE might be combined into a higher-level criterion which estimates the improving of access in *general*.
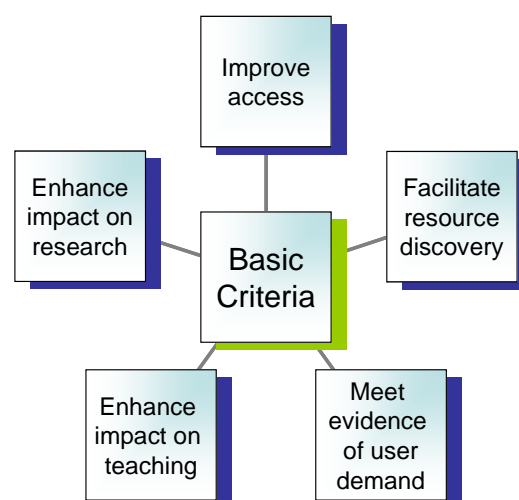

Figure 13. Five top-level user-driven criteria for prioritising digitisation of special collections

Having closely analysed the set of user-driven criteria and each contributing criterion, the "top-level" criteria for the prioritisation of digitisation were specifies (see Fig. 13).

These top-level criteria could be used as a high-level check list, against which the professional opinions of a respondent answering questions about a *collection* could be assessed. Would the collection improve access? Facilitate resource discovery[18]? And so on. These criteria were nominated by users from the HE domain (or were informed by desk-research relevant there) thus are particularly applicable in that context. They are not intended to be exhaustive.

If a specific organisation wished to analyse a collection proposed for digitisation according to a more detailed level of granularity, decomposing these top-level criteria would be beneficial. This is shown in Fig. 14 below, which elaborates on the issues addressed in each of the top-level criteria.

Improve access	• Is digitisation of the collection improving access?
	  • for users within HE;
	  • users outside HE.
	• Is the collection a subject to restricted access?

Facilitate resource discovery	• Does the digitised resource improve navigation? • Does the digitised resource improve searchability?

Meet evidence of user demand	• What qualitative measures could be applied?
	  (e.g. collection of national/international standing)
	• What quantitative measures could be applied?
	  (e.g. frequency of use, number of linked distributed collections, digitised collections by subject/chronological timeline/ alternative formats)

Enhance impact on teaching	• What teaching level is addressed ? (undergraduate, master, PhD) • Is new media usage promoted through digitisation? • Is digitisation enhancing distance learning or VLE?

Enhance impact on research	• Does digitised collection improve innovation? • Does digitised collection improve collaboration? • Does digitised collection facilitate interdisciplinary studies? • Does the digitised collection enhance ongoing research?

Figure 14. Elaboration of top-level criteria, reflecting a more detailed level of granularity

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[18] Resource discovery can be considered in two contexts – improved visibility of the analogue collections, or resource discovery in the digital environment, when the collection will be digitised.

Here, lower-level criteria are expressed as questions to show how they might be transformed into components of a check-list. According to the particular institutional policies of a given organisation, different weights might be assigned to any of the top or lower-level criteria presented.

These criteria could also be used by institutions seeking to allocate finances, staff or other resources to a digitisation project according to order of priority; by defining which criteria are deemed most essential, collections could be 'ranked' accordingly. For example, if an institution's top priority is "improving innovation", this will be the key criterion used to assess any collections being considered for digitisation.

Further research on the measurability of these criteria would be helpful for institutions which plan to prioritise collections based on user-driven criteria however this was not in scope for the DiSCmap project.

Nevertheless, to illustrate how such a framework could be applied (even when only the most general information on collections is available), examples of short lists have been provided (in Appendix X of this report). These were extracted from the DiSCmap long-list, using various prioritisation criteria taken from both the top and lower-levels of granularity. Below, the methodology used in the compilation of these lists is explored in relation to the criteria described above.

5.3.1. Shortlist 1. Collections nominated by various groups of users

This short list includes collections nominated by different groups of user - these were: the intermediaries participating in both the DiSCmap and RLUK surveys, and the end users with whom issues were discussed through the DiSCmap focus group. All nominations were made according to the professional judgement of participants.

Criteria given by these groups when asked why they had selected the nominated collections were as follows:

- *Improve Access*
- *Meet evidence of user demand*
- *Enhance impact on teaching*
- *Enhance impact on research*

Fig. 15 highlights these criteria in red. This list has 21 elements, demonstrating that the proposed evaluative process can result in a highly compact and succinct list.

The process of a constructing such a list might be undertaken by setting up a webpage where relevant stakeholders could vote for collections, selecting (through checkboxes or radio buttons) those criteria which they feel apply to the collections proposed or nominated.

It should be noted that all examples herein were derived from interaction with carefully chosen user groups exercising *professional judgement*; in the online environment, nomination or selection processes could lead to untrustworthy outcomes unless the right security mechanisms are in place to determine who is allowed to participate.

Improve access	• Is digitisation of the collection improving access?
	  • for users within HE;
	  • users outside HE.
	• Is the collection a subject to restricted access?

Facilitate resource discovery	• Does the digitised resource improve navigation? • Does the digitised resource improve searchability?

Meet evidence of user demand	• What qualitative measures could be applied?
	  (e.g. collection of national/international standing)
	• What quantitative measures could be applied?
	  (e.g. frequency of use, number of linked distributed collections, digitised collections by subject/chronological timeline/ alternative formats)

Enhance impact on teaching	• What teaching level is addressed ? (undergraduate, master, PhD) • Is new media usage promoted through digitisation? • Is digitisation enhancing distance learning or VLE?

Enhance impact on research	• Does digitised collection improve innovation? • Does digitised collection improve collaboration? • Does digitised collection facilitate interdisciplinary studies? • Does the digitised collection enhance ongoing research?

Figure 15. Criteria applied to the long list of collections for constructing Shortlist 1

5.3.2. Shortlist 2. Collections related to policy framework (HEFCE)

This shortlist consists of collections relating to specific subject areas identified by HEFCE in the "Strategically important and vulnerable subjects" Final Report (HEFCE, 2008). Thus, the key criterion here is *improving the availability of digitized resources by subject.*

For this example, the DiSCmap team checked which collections had been nominated across subject areas (the distribution of collections by subject and across domains is shown in Fig. 9 of this report), choosing those which correspond to an area considered by HEFCE to be strategically important or vulnerable. This ensured that specific evidence of demand and need was established in the compilation of the shortlist.

The ten collections selected relate to Mathematics, Chemistry and Physics and are detailed in Appendix X. Fig. 16 below shows the criteria used to construct this list.

Improve access	• Is digitisation of the collection improving access?
	    • for users within HE;
	    • users outside HE.
	• Is the collection a subject to restricted access?

Facilitate resource discovery	• Does the digitised resource improve navigation? • Does the digitised resource improve searchability?

Meet evidence of user demand	• What qualitative measures could be applied? (e.g. collection of national/international standing) • What quantitative measures could be applied? (e.g. frequency of use, number of linked distributed collections, **digitised collections by subject**/chronological timeline/ alternative formats)

Enhance impact on teaching	• What teaching level is addressed ? (undergraduate, master, PhD) • Is new media usage promoted through digitisation? • Is digitisation enhancing distance learning or VLE?

Enhance impact on research	• Does digitised collection improve innovation? • Does digitised collection improve collaboration? • Does digitised collection facilitate interdisciplinary studies? • Does the digitised collection enhance ongoing research?

Figure 16. Criterion applied to the long list of collections for constructing Shortlist 2

5.3.3. Shortlist 3. Collections on specific thematic clusters

This shortlist consists of collections with titles which identify them as a part of a *thematic cluster*; this corresponds to the idea of creating virtual collections which would accommodate resources from different collections which address the same theme.

Improve access	• Is digitisation of the collection improving access?
	  • for users within HE;
	  • users outside HE.
	• Is the collection a subject to restricted access?

Facilitate resource discovery	• Does the digitised resource improve navigation? • Does the digitised resource improve searchability?

Meet evidence of user demand	• What qualitative measures could be applied?
	  (e.g. collection of national/international standing)
	• What quantitative measures could be applied?
	  (e.g. frequency of use, **number of linked distributed collections**, digitised collections by subject/chronological timeline/ alternative formats)

Enhance impact on teaching	• What teaching level is addressed ? (undergraduate, master, PhD) • Is new media usage promoted through digitisation? • Is digitisation enhancing distance learning or VLE?

Enhance impact on research	• Does digitised collection improve innovation? • Does digitised collection improve collaboration? • Does digitised collection facilitate interdisciplinary studies? • Does the digitised collection enhance ongoing research?

Figure 17. Criterion applied to the long list of collections for constructing Shortlist 3

5.3.4. Shortlist 4. Collections with highest number of reasons for digitisation

This shortlist includes all collections nominated to DiSCmap by intermediary users for which the intermediary users stated that the collections should be digitised because they meet the following priority criteria:

- *Collaboration*
- *Preservation*
- *Increase usage*
- *Facilitate access*
- *Other*

The diagram does not include "Other". It should be noted that this is the opinion of intermediaries - actual quantitative evidence was not provided. The actual shortlist is based only on collections nominated by intermediaries to DiSCmap (for collections nominated by RLUK and end users a consultation with intermediaries would be necessary).

This example is specific because it includes various granularity levels.

Improve access	• Is digitisation of the collection improving access?
	   • for users within HE;
	   • users outside HE.
	• Is the collection a subject to restricted access?

Facilitate resource discovery	• Does the digitised resource improve navigation? • Does the digitised resource improve searchability?

Meet evidence of user demand	• What qualitative measures could be applied? (e.g. collection of national/international standing) • What quantitative measures could be applied? (e.g. **frequency of use**, number of linked distributed collections, digitised collections by subject/chronological timeline/ alternative formats)

Enhance impact on teaching	• What teaching level is addressed ? (undergraduate, master, PhD) • Is new media usage promoted through digitisation? • Is digitisation enhancing distance learning or VLE?

Enhance impact on research	• Does digitised collection improve innovation? • **Does digitised collection improve collaboration?** • Does digitised collection facilitate interdisciplinary studies? • Does the digitised collection enhance ongoing research?

Figure 18. Criteria applied to the long list of collections for constructing Shortlist 4

The examples above illustrate that one could use one or more criteria in prioritising, under the condition that there are data available on the specifically selected criteria, or a person who can make a good quality professional judgement based on experience.

Instead of promoting few criteria as "most important" we believe that prioritisation should be fine-tailored to the organisational needs and thus suggest a general framework which could be used in a number of different ways, as illustrated above.

5.4.   The user-driven framework and JISC's digitisation strategy.

It is necessary to assess how the series of priorities advanced by intermediaries and end users to DiSCmap are aligned to the existing JISC Digitisation Strategy of February 2008[19].

JISC's Digitisation Strategy enumerates a 13 point plan "to provide world class leadership in the innovative use of Information and Communications Technology [ICT] to support education and research". Point 2 of this plan indicates that digitisation programmes are being supported to further JISC's mission "to provide access to content as widely as possible" which appears to prioritise *digitisation for access* above the range of other available priorities. It is a position which, if taken in isolation, would apparently support a mass digitisation approach such as that advocated by researchers at OCLC (Online Computer Library Center) (See Appendix XII for DiSCmap's engagement with the mass digitisation debate).

Point 3 confirms JISC's commitment to the digitisation of collections viewed as being of "core relevance" to teaching and research. The range of priorities advanced by both intermediaries and end users reflecting current and emerging requirements of teaching and research (see section 4.2 above) should better assist the future identification of such collections of *core relevance*.

The DiSCmap survey of intermediaries and end users has brought to light almost a thousand potential new collections to be digitised from within the JISC community, a key objective of JISC Digitisation Strategy point No. 4, and through the creation of a number of "short lists" (see section 4.3 of this report and Appendix X) has helped to better identify these "areas of the highest demand".

Prior to DiSCmap's findings, JISC has given its own inventory of 7 digitisation priorities, listed under point 5 of its February 2008 strategy:

- Make the hidden visible: enable access to and use of difficult or impossible to access collections;
- Address a recognised need or gap within learning, teaching or research provision;
- Map to a particular area of the curriculum or research interest;
- Inspire new avenues of research, or new approaches within learning and teaching;
- Contribute to creating critical mass within a given area or help to create a theme across previously unassociated materials;
- Would not otherwise be funded, or be able to attract significant funding from other sources;
- Are at risk from being lost to our community through sale, deterioration or disaggregation.

It is necessary to enhance this existing set of priorities with the finer level of granularity which DiSCmap has brought to the understanding of the current needs and changing requirements of end users for digitised Special Collections, as articulated by both the intermediary and end user surveys and presented in section 4.2.4.

Each of the user orientated criteria to emerge from DiSCmap can successfully help to develop and refine the existing JISC digitisation strategy. The principle criteria now revisited being Point 5 priorities I – V of the existing JISC strategy.

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[19] JISC Digitisation Strategy. February 2008
www.jisc.ac.uk/media/documents/programmes/digitisation/jisc_digitisation_strategy_2008.doc

The JISC digitisation strategy articulates the need to *Make the hidden visible: enable access to and use of difficult or impossible to access collections,* and DiSCmap's key priority of the continued need to facilitate wider use of Special Collections by the creation of digital surrogates as well as finding aids to improve access confirms this basic principle.

An undisputed priority for the digitisation of Special Collections, for intermediaries, was *to meet evidence of user demand*. The demand for digitised Special Collections arises from both HE teaching and research. Teaching demands such as *to enhance teaching of networked courses for distance learners* and additionally *to enhance teaching of undergraduate and taught masters courses* are pertinent to the current JISC strategy II and III of *addressing a recognised need or gap within learning, teaching or research provision* as the need for digitised resources to *Map to a particular area of the curriculum or research interest*.

JISC digitisation strategy IV & V indicate the current priorities for the digitisation of Special Collections to support research. Strategy V articulates the need to *Inspire new avenues of research, or new approaches within learning and teaching*. A fundamental need advanced to DiSCmap by both intermediaries and end users was the creation of new digital collections *to support ongoing research*. Additionally, the potential for new digital collections *to create a new subject area for research* and to assist innovation in HE teaching and research *using new media* such as the incorporation of multi-media, interactive, web 2.0 technologies was also signalled. This suggests that JISC needs to develop additional strategies to encourage further innovation in this area, and to widen its scope to promote greater collaboration between the university sector and the creative industries. Such initiatives would go some way to meeting the criteria to emerge from DiSCmap that Special Collections be digitised that can have a potential impact on users *beyond the boundaries of HE* and address the imperative of JISC's Strategy 9 - that a digitised HE collection must address *audiences beyond its own community*.

The existing JISC strategy V advances the digitisation of collections which can *Contribute to creating critical mass within a given area or help to create a theme across previously unassociated materials*. DiSCmap uncovered collections that were not only viewed by intermediaries and end users as *a means of furthering collaborative research projects* but were also seen as a means to *support research in multiple disciplines* or able to further *interdisciplinary* research. Many intermediaries (including end users) advanced these criteria alongside their nominated collections, a small number of examples are discussed in sections 4.2.1. (see also Appendix IV). The range of criteria to emerge in relation to "interdisciplinarity" from DiSCmap indicates that this is undoubtedly an area of future high impact for research, with growing demand for digital resources to support the range of emerging interdisciplinary research networks, the needs of which have not yet adequately been articulated. It is recommended that alongside its existing commitment, in Strategy 12, to the creation of *thematic or subject based "nexuses"*, JISC undertake further work to identify the range of needs associated specifically with interdisciplinary research and investigate ways of establishing interdisciplinary links between the collections it selects for future digitisation.

Each of the above findings have implications for the strategic goals announced in JISC's Digitisation Strategy point 6, which expresses aspirations to create digital collections that are *User Focussed*, *Innovative* and *Contextualised*. This is particularly so if considered in light of the increasing sophistication and expectations of end users from both within and beyond HE, as they traverse the traditional "boundaries" of institutions and curatorial environments online to assemble disparate and distributed materials into their own virtual "desktop collections".

Issues related to departmental, institutional and funding bodies' policies on digitisation and adjacent policies were fed into the framework and were used to formulate a series of reports run on our long list of collections. For example:

- Growth areas of research/teaching based on a literature review and including documents produced by relevant bodies such as the DfIUS or AHRC.

- Areas not currently well served by digitisation (i.e. areas identified by end users – see Table 1.)

- The impact of digitised material in terms of digital curation, the extent to which this issue is addressed and how long-term availability and re-use are supported

- Potential impact measured in terms of the degree to which certain subject disciplines might make use of particular digital materials.

- These reports resulted in a set of example "short-lists" demonstrating to JISC the efficacy and usefulness of our framework in aiding selection of materials to digitise, depending on the priorities and needs being considered at any given time and the range of stakeholders concerned.

6. Outcomes

In its widest sense the project contributes towards preliminary evidence on user-driven priorities which could help in the process of allocation of funding for digitisation projects. It also can help to define the purpose, value and impact of digitisation not on institutional basis but on UK HE scale. By development of a framework of user-driven prioritisation criteria, DiSCmap contributes towards the longer-term goal of developing a quantifiable and adjustable system of metrics in the digitisation life cycle especially addressing the selection phase.

The amount of collections nominated to the long list reached beyond the expectations of the project team. This list itself is a valuable outcome which should be enriched further in order to provide a broad and trustworthy basis for the future digitisation decisions.

DiSCmap surveyed over 1000 intermediaries and end users; this report presents in a very condensed form only a small proportion of the total evidence on user demand gathered by the project team. Yet in analysing and representing fully the range of end user priorities, DiSCmap has made a considerable advance in identifying the actual digitisation needs of end users. It has done so with the aim of removing the element of guesswork and assumption hitherto inherent in our understanding of user requirements in this area. The combination of intermediary' and end user' studies provides a richness of view points which highlight the many important different aspects related to the user dimension in digitisation.

7. Conclusions

7.1. How the long list can be used in future and what can be improved

– *The long list as a source of evidence on user demand*

The long list can be used as a source to supply evidence in support of different hypotheses related to user-demand. The descriptive statistics provided in Section 4.1. help to understand what kinds of specific detail on collections can be retrieved from the long list.

– *The need to harvest further details on collections whose records are incomplete*

The long list would profit from its content being better harmonised and the quality of data unified. This would require further contact with intermediaries in charge of collections, especially in the case of collections nominated by the end users. For a detailed list of data supplied by the different sources which were utilised during the work on the long list, see Appendix XI.

– *The need to extend the institutional coverage*

Currently the long list includes collections nominated from 57% of the post-1992 HEIs, 47% of the pre-1960 HEIs and 35% of those "Post-Robbins". The institutions which have not responded to DiSCmap could be targeted in a subsequent action; their list is provided in Appendix XII.

Another dimension of the long list extension would be to seek more collections nominated from beyond the HE sector. Currently the long list includes collections nominated by The National Archives, The British Library, the National Library of Wales and multiple other institutions.

7.2. Conclusions about end users

– *The view of end users on Special Collections differs from the view of the intermediaries*

The necessity to embrace a user-driven framework for the digitisation of Special Collections must be qualified with one additional important caveat.

The project uncovered a key area where there exists a difference in perspective relating to the understanding of Special Collections between the two survey groups. Intermediaries (with due professional care) were, for the most part, highly specific in their provision of descriptive detail on the Special Collections which they nominated as priority cases for digitisation. End users (understandably) often had a tendency to be vaguer in description and instead suggested, in places, discrete "sub-collections" for digitisation or alternatively "super-collections" such as manuscripts of the British Library or the BBC Archives. This means that the granularity of collections is viewed in a different way by both intermediaries and end users.

One significant conclusion to be drawn from this distinction is that, when providing a digital resource to end users, intermediaries should seek to accommodate both these understandings of its relevant context; not only should the digitised resource enable end users to identify the context of a given object in the sense of the collection to which it physically belongs, but also

it should provide the possibility of identifying its relationship to relevant "sub-collections" or "super-collections" with the capacity to link to key semantic groupings, such as, for example "19th century newspapers" or "incunables".

– *The needs across domains are different, this needs further study*

DiSCmap did not have the specific task to discover differences between subject domains, but the distribution of subjects across the nominated collections not surprisingly revealed higher interest in arts and humanities material in digitised form. This seems to sound like an echo of the Loughborough study (see JISC 2008b), but one possible approach would be to make further subject-specific studies on the user needs, similar to the Digital Islam project study.[20]

7.3. User demands in digitised resources for research and teaching

– *Intermediaries' and end users' views on the impact of digitised resources in research and teaching differ*

Our study showed that end users expect that digitised materials will be of greater benefit to research. The number of collections nominated by end users for research purposes outnumbered almost 3 times the collections nominated for teaching. Intermediaries, on the other hand, tended to evaluate higher the expected impact on teaching of collections nominated for digitisation. It could be recommended in future digitisation calls to request specific information in what teaching courses or in what specific research the collection nominated for digitisation is expected to be used. The established and clear connection with the future community of users of the digitised collection may help to justify proposals for digitisation.

– *What happens after a collection is being digitised?*

DiSCmap did not prompt, in its surveys, any specific *uses* of digitised collections. End users, however, did suggest a number of criteria which reveals a growing level of expectancy that digitised resources should help to improve collaboration, further interdisciplinarity, connect distributed collections and aim to increase the amount of available digital materials across chronological timelines/subjects. However, VLEs and VREs were not widely mentioned, indicating that the use made of digitised resources through such online environments for teaching and research must be further expanded. We believe that if future digitisation projects include scenarios for typical uses and training of the identified users for the discovery and everyday work with digital resources, this will help not only to increase the amount of digitised materials, but will also influence their quantity of access and quality of use.

7.4. Ideas for the future

Fig. 19 summarizes the possible directions of further development of DiSCmap as follows:

1. *Expanded collections:* here we include the harmonisation of existing collections, the inclusion of collections from institutions from the HE sector which have not responded to DiSCmap, as well as the further addition of collections beyond the HE sector.

2. *Improved support to users:* here we include two aspects, actions which will *improve the information literacy* which covers aspects of resource discovery and

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[20] Review of User Requirements for Digitised Resources in Islamic Studies, JISC, University of Exeter, May 2008, Online at:
http://www.jisc.ac.uk/media/documents/programmes/digitisation/islamic_studies_report_pdf.pdf

use, and actions which will help to transform the current "gate keepers" amongst intermediaries into facilitators in resource provision. The first aspect addresses end users, while the second one addresses intermediaries.

3. *New services:* the amount of collections nominated to DiSCmap and the view which the project built on the flexible approach towards prioritisation of collections, can be combined in a *decision making tool* which would select collections from the long list which match specific criteria. This could be a valuable tool for decision making in future digitisation programmes.

4. *More detailed user studies:* this would seek to deepen the knowledge about user demands in *specific subject domains*, as well as the differences of needs in digital resources for teaching and research.

Some practical actions in line with the directions for continuing the work done by DiSCmap can be seen in the outer circle on Fig. 19; some of them contribute to two different directions. For example the inclusion of *more HE, general and foreign collection* contributes to the expansion of the long list, but also can improve the user support with the possibility to provide a greater amount of data.

One unconventional development of the work started with DiSCmap would be to build a *meta-finding aid for collections*. Currently, there are different portals, repositories and registries of collections (see Appendix IX), but there is no unified way to search across these collections. This was mentioned by the Loughborough study (JISC 2005) but four years later it has not changed. If the further expansion of the long list can integrate data from these existing resources, besides the use of the long list as evidence in digitisation prioritisation, it could be developed as a meta-finding aid on information on collections. This is not simple to achieve having in mind the granularity and metadata issues which were identified in the comparison of the DiSCmap long list with SCONE (see Appendix VII) but integrating data from existing portals and registries such as Archive Hub, AIM25, SCONE, Michael UK might be a reasonable way to extend significantly the long list of collections. A scoping study on the data models of these facilities might help to identify a reasonable approach of integrating data from them into the long list.
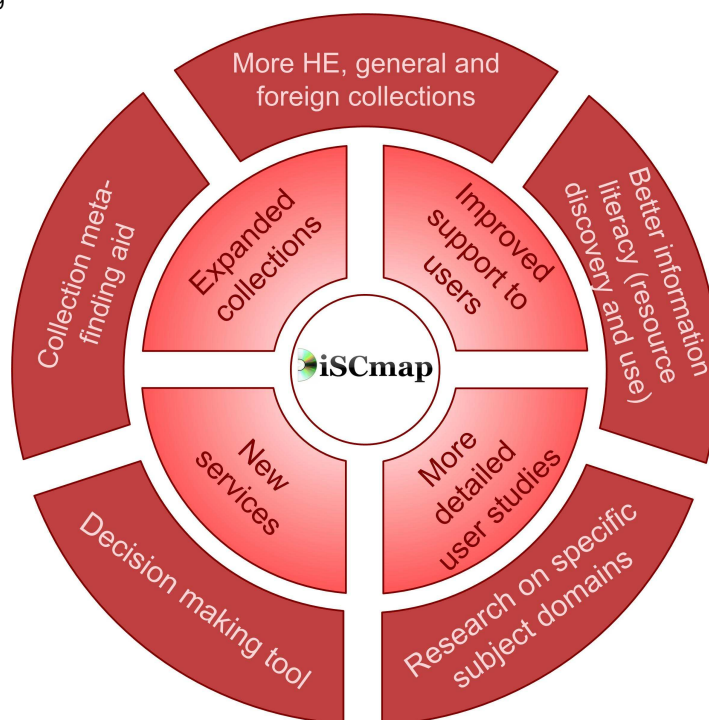
Figure 19. Possible future directions of development of the work done in DiSCmap

8. Recommendations

As a summary of the project work, the following recommendations are made:

1. **The long list of collections should be harmonized and sustained into the future.**
    The long list as it currently stands illustrates the feasibility of applying a user-driven framework as a component of prioritising digitisation. The list was created from five different data sources and would be even more useful if the data were harmonized and further expanded. The maintenance of the list through a web service is one possible approach to develop the current static list into a sustainable dynamic resource.

2. **The user-driven framework developed by DiSCmap can be seen as a tool to support a flexible approach to the prioritising digitisation of Special Collections.**
    Rather than applying the framework to the "long list" in order to generate one single "short list" of prioritised collections, a flexible use of the framework is proposed. This would allow for the testing of multiple different hypotheses and could be supported by a specialised decision making tool which allowed for the selection of priority criteria and their application to the "long list" of collections.

3. **A comprehensive collection description and finding utility is needed in the UK.**
    The availability of multiple collection description services, portals, and inventories (such as Archive Hub, AIM25, Michael UK, SCONE) aids resource discovery, but in ad hoc fashion. These services are either not scalable or lack essential functionality and, therefore, what is now needed is an ad modum, cross-sector, UK-wide collection description resource and finding aid. An example of such aggregated service from Canada is AlouetteCanadaDiscovery Portal.[21]

4. **Granularity issues of collection description facilities need to be revisited.**
    The above services describe collections at different levels of granularity and structure relationships between collections in hierarchical or derivational ways. It is recommended that a standard approach to collection description be adapted where the relationships between a collection and its super- and sub-collections are clearly presented. This would improve resource discovery. In addition, facilities to allow the creation of virtual collections, mash-ups or contextual groupings should be introduced. The appropriate model for doing this needs to be identified.

5. **Metadata issues on collection level need to be addressed better**.
    It is commonly accepted that the key to resource discovery resides in the availability of high quality metadata. However, our research reveals that even elements such as the collection title are not unified across different electronic resources. A common collection description and discovery facility could address this issue in a systematic fashion.

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[21] http://search.alouettecanada.ca/search.

6. **A stronger connection should be established with the actual use of digitised resources in the wider context of research/learning/entertainment.**
The lack of clarity as to how the digitization of collections might transform their use for teaching and research has contributed to the large amount of digitised materials currently fulfilling mainly a preservation function. Wider involvement with communities of end users prior to digitisation and a greater transparency as regards possible uses, such as within an institutional VLE or more specialized VREs would help increase the quantity of access and quality of use of the digital resource. The identification and promotion of good practices on collaboration between VLEs/VREs and digitisation projects might boost future use of digitised content in research and teaching.

7. **Information literacy related to resources presenting collections can be further enhanced.**
More work needs to be done in improving the skills of the end users in resource discovery and subsequent use of digitized collections.

8. **Further work can be done on the impact of "to-be" digitised resources (qualitative and quantitative methods).**
The project revealed a number of quantitative and qualitative measurements which represent facets of user demands. More detailed research into these to discover better ways to evaluate the impact of a resource nominated for digitisation would be beneficial.

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