Chapter 3: Literature Review

This chapter begins by introducing how knowledge was acquired from a variety of sources before discussing key finds in topics relevant to this research on the transfer of digitisation knowledge from the NLW to the CCA. This chapter fulfills the objective of acquiring theoretical knowledge on digitisation work through researching literature and by extension it fulfills the objective of transferring this knowledge to the CCA. The chapter ends with an overview of useful websites for the MPhil and a summary of the main points gathered from the chapter.

3.1 How the Literature Review was Written and Researched

This literature review is a collection of research findings from both paper and web-based media. The purpose of this literature review is to present an insight into the contemporary situation of digitisation work, as well as to provide a methodology overview.

The central themes to the proposed research study are digitisation, metadata and ceramic-themed material, and therefore the key academic disciplines covered are: art (history), library and museum studies and information studies. In order to include sub-themes, a ‘mind map’ of the key words in the research area was created in order to generate words that would be used for a literature search. This enabled me to see key themes within the topic, and inter-related issues. The terms I identified are shown in Figure 17.
The mind map was further restructured into a more organised flow chart of key words with sub-categories, which aided in methodology (Figure 18). *Digitisation, Metadata, Ceramics and LAMs* were deemed the four most relevant key words while *Collections, Scanning* and *Guides* were made sub-sections. It became clear most of the key words were interrelated in some way or another by research, projects or other activities. The following were deemed relatable with all four main key terms and their sub-sections: the use of *internet* on the terms, the *theory* of the terms, the *users* of the terms and *copyright* issues with the terms.
These keywords formed the basis of the literature search, which began with conducting a search for literature using the computer catalogues of Aberystwyth University (Primo) and the National Library of Wales (Aquabrowser). The keywords identified above were used in searches, pairing them in different combinations such as *digitisation projects, ceramics* and *metadata, archives*. This enabled the researcher to find sources that discussed multiple key variables. As the research topic is studied and practised internationally the researcher was aware of issues such as variant spelling and grammar, particularly with *digitisation* and *digitization*, and so using both spellings became habitual. Often, broad search terms, such as *art, technology*, brought up too many results (most of which were irrelevant) and so other variables were introduced to narrow the search. This search term methodology was also utilised in Google search engine queries and Google was chosen for its wide coverage.
3.2 Sources Used in the Literature Review

From the search terms identified in Figures 17 and 18, the material that was found included printed books, journals and articles as well as online journals and web publications. Following references cited within other sources, such as bibliographies and suggested further reading, lead to the discovery of other sources. These sources provided publications written from different perspectives but, if reviewed together, cover the topic area thoroughly from a technical point of view.

Some sources proved to be too advanced or simply unnecessary for this thesis, such as the mechanics of scanning technology. Despite finding some irrelevant information there were several useful finds and, again, these cited other sources in a snowballing effect. By using the internet it was possible to ‘bookmark’ or ‘favourite’ items for future reference and browsing for sources online also gave a sense of the subject of digitisation work itself. For example, by viewing e-books and other scanned images and documents, the researcher acquired a sense of how digitised material can be used in different ways.

The initial research involved looking at the websites of CCA, NLW, PCW and ICF to gain a familiarity with the organisations involved in the project. This led to visiting websites relevant to digitisation, such as JISC, DCC (Digital Curation Centre) and DPC (Digital Preservation Coalition), as well as websites with digitised collections, such as VADS and the V&A (Victoria & Albert Museum). This was followed by keyword searches within online catalogues of Aberystwyth University (Primo) and the National Library of Wales (Aquabrowser), which offered media in the form of books, journals, articles, films, audio and images. Most books, journals and articles suggested websites and other printed publications that could be of relevance to the reader. Another source included presentations and papers from conferences attended by the researcher.

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1 A list of frequently used websites is provided in section 3.9
Over time, the area of investigation shifted from theory-based information to include more operational tools and methods of practice that could be encountered during a digitisation project. Digitisation guidelines were discovered that became useful and informative and this led to the value of creating digitisation guidelines for this project.

3.3 Digitisation

3.3.1 History of Digitisation

According to Ooghe & Moreels, the growth in analogue production in the early 20th-century forced memory institutions such as LAMs to consider how material should be stored, preserved, controlled and protected (2009). With rapid developments in technology toward the end of the 20th century, digitisation emerged as a new area of study and practice. Hemsley et al say that, in the UK, the use of information and communications technologies in the cultural sector can be traced back to the 1970s and before, particularly “its application for museum collections documentation” (2005: 4). Williams claims that in the 1960s museums began to be recognised and appreciated as repositories of heritage and they were pressured to increase their activities and make full use of resources. Museums were increasingly expected “to be able to locate objects in a moderate amount of time and to maintain adequate records on the methods by which items in their collections were acquired” (2010: 16). However, Williams argues that most initial information systems in museums were inadequate. Referred to as “mainframes,” the early computers used in museums were “very large and costly and required the services of highly trained data-processing operators, programmers, and systems analysts” (ibid).

Rosedale observes that the earliest occurrences of the term “digital library” date to the mid-1980s in the electronics and electrical engineering literature and that “during this period before the popularization of the World Wide Web (1991-1993),
digital library was used in this fairly generic context to refer to the future of electronic library collections” (2002: 137). In the 1980s/1990s people thought that digitisation would save millions of hours of teaching time and increase academic productivity but there are hidden costs and pitfalls to developing and using digital content. However, over this time there has been extensive trial and error, experimentation and testing and much development (Hughes & Green, 2003: 7). CHArt (Computers and the History of Art) was developed in the mid-1980s by “art and design historians who happened also to be computer enthusiasts” (CHArt, 2013). It looked at the application of digital technology to visual culture, particularly in relation to the study of the history of art and the work of LAMs, and ran conferences on the subject.

Hughes & Green note that the “expansion of global computer networks/high-speed internet access led to the proliferation of digital content, delivered to increasing numbers of computer users worldwide” (2003: 4). This led to a growing demand for access that was immediate, easy to use and up-to-date. Bülow & Ahmon echo this, saying: “the dramatic growth in digitization since the late 1990s is a direct response to the rapid development of the internet and corresponding changes in user expectations” (2011: 1). The JSTOR (Journal STORage) shared digital library was created in 1995 to aid academic libraries in digitisation in order to free space on shelves, save costs and provide greater levels of access to content.

The United Kingdom has experienced large digitisation activity in the 21st-century. JISC note “the combination of government, lottery, education and research funding, plus well established programmes of activity, means that this is a relatively mature process” (JISC, 2013b). There has been a considerable investment in digitisation projects in the culture, heritage and education sector dating back to the 1990’s with the eLib (electronic libraries) programme. The eLib programme (1996-1999) covered several projects and was funded by JISC with the aim to “engage the HE [Higher Education] community in developing and shaping the implementation of the electronic library” (Kirriemuir, 1998). One project, the Digitisation in Art and Design (DIAD) aimed to make a record of core journals through digitised content that would
be delivered on the internet or CD-ROM (UKOLN, 1996). Between 2004 and 2006, the UK JISC funded 11 projects within its Digital Preservation and Asset Management (DPAM) programme to explore issues supporting digital preservation and asset management in institutions. These projects intended to establish a basis for further development of institutional strategies and policies for long-term preservation and asset management. JISC, the DPAM programme, and the 11 projects funded within it, acknowledged that digital preservation and effective management of digital assets requires significant work and JISC continues to funds preservation work (Pennock, 2008: 1).

One estimate by JISC suggests £130 million of public money has been spent on the creation of digital content since the mid-1990s (2013b). Significantly, the New Opportunities Fund (NOF-digitise) invested £50 million of this total in programmes that are coming to completion in 2013. The NOF-digitise was launched in 1999 with a budget of £50 million and was an active Lottery Distributor until 2004 (Digitised Communities Online, 2009). The money was split up between 150 national and local bodies with the aim of developing lifelong learning resources in the three areas of: re-skilling the nation; citizenship in a modern state; and cultural enrichment. Among the first projects to receive money were in the subject areas of archaeology and science and nature, with varying formats being digitised (NOF-Digitise, 2009).

The development of digitisation is very much still underway. In 1999 Elkington commented, “photograph collections, printed works and manuscripts are the focus on thousands of imaging projects in libraries throughout the US and the UK” (1999: 245). Despite this however, Youngs notes in 2012 “so far there are no British standards or equivalent for digitisation” (2012: 5).
3.3.2 Definitions of Digitisation

Youngs defines digitisation as “the conversion of analogue materials into a digital format for use in computer based applications” and further adds “conversion or image capture is usually done with a scanner or a digital camera to provide images of the materials” (2012: 4). Hughes & Green offer a similar definition to Youngs, stating: “digitisation is the process by which analogue content is converted into a sequence of 1s and 0s and put into binary code to be readable by a computer” (2003: 4). Both definitions suggest that digital content requires computer hardware for access. This is important as it draws emphasis on the fact that analogue content does not require any intermediary tools for access, except perhaps a magnifying glass or torch in certain cases.

The Digital Preservation Coalition (DPC) provide a list of relevant definitions and concepts on their website and digitisation is defined as:

“The process of creating digital files by scanning or otherwise converting analogue materials. The resulting digital copy, or digital surrogate, would then be classed as digital material and then subject to the same broad challenges involved in preserving access to it, as "born digital" materials” (DPC, 2012c).

This definition by the DPC suggests that once analogue materials have been digitised they essentially receive the same definition as born-digital materials. Digitised material and born-digital material are both in a digital format and are subject to the same behaviour and treatment regardless of their source. Cundiff defines a digital library object as having “a one-to-one correspondence with a typical library item (e.g. a book, a photograph, a sound recording, a map, and so on)” (2004: 53).

Youngs highlights the common misconception that digitisation and digitisation projects are the same, commenting that: “a digitisation project is not just about digitisation; it involves many other issues and activities” (2012: 6). These activities can include the selection and preparation of materials, copyright clearance and

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2 Hughes offers some examples of analogue content, including: paper (variants), papyrus, vellum, birch bark, wood, canvas, negative glass plates, microfilm and sound/moving image (2003: 3).
3 http://www.dpconline.org/advice/preservationhandbook/introduction/definitions-and-concepts
creation of metadata. Youngs further comments on the non-linear nature of a
digitisation project: “the production line aspect of the process is linear, but many
other processes will need to be considered in a holistic way” (ibid: 15). Youngs’ point
is relevant for this research in that it is a digitisation project and not just digitisation
because other processes such as metadata are researched. The Council on Library
and Information Resources (CLIR) emphasise that “a successful project must have
clear definitions of purpose, mission, and audience” (CLIR, 2001: 14) and this justifies
the creation of documents such as a digitisation strategy and a project outline.

When thinking about defining the differences between digital content and analogue
content, one could consider the definitions of different libraries as holders of the
content. In order to define a digital library, one can also look at the definition of a
physical library. In 1931, Indian librarian Shiyali Ramamrita Ranganathan proposed
five laws of library science:

1. Books are for use
2. Every book has its reader
3. Every reader his book
4. Save the time of the reader
5. A library is a growing organism (Jones et al, 2006: 3)

These rules still apply to digital surrogates, such as a collection of digitised ceramics.
The surrogates are still “for use,” every surrogate has its reader or “user,” every user
has his/her surrogate, timesaving is still of importance and, lastly, a collection of
ceramic surrogates continues to grow due to rapidly advancing technology.

3.3.3 Why Digitisation is Undertaken

There are many different reasons why an individual, group or institution would
undertake digitisation. Williams observes that growth of a museum collection puts a
strain on routine museum functions because the collection continues to grow while
the museum searches for a cure to its ailments, therefore a backlog of poorly
documented objects and unorganized records accumulates. Traditional paper-based
practices are frequently overwhelmed and so the need for thorough documentation
and efficient record keeping becomes “painfully apparent” (2010: 15). Digitisation can be a cure to this problem as documents are stored on a single piece of hardware. Hemsley et al suggest that utilising digital technology is not an option but a reality for European cultural institutions and that “many archives, libraries and museums have turned into hybrid institutions that take care of both analogue and digital cultural collections” (2005: 18). It would appear, in this sense, that over the past decades, the definition of a cultural institution has changed to include digital material due to its prominent use. Hughes & Green also note that computer-based systems are now considered essential for many operational aspects of “Memory Institutions” such as museums, archives and libraries (2003: 5). Research suggests that digitisation benefits these Memory Institutions; with DigiCULT stating digitisation contributes:

“to the conservation and preservation of heritage and scientific resources; it creates new educational opportunities; it can be used to encourage tourism; and it provides ways of improving access by the citizen to their patrimony” (DigiCULT, 2003).

Ooghe & Moreels argue “digital collections make documents more easily accessible; they allow new links to be created or new interactions with the audience to be maintained” and “end-users are also starting to perceive the digital documents as the primary access-point to collections, regardless of the institutional setting within which their analogue counterparts are housed” (2009). Parry notes that 20 years after the invention of the World Wide Web, museums increasingly recognise their online visitors as equal in importance as those visitors physically on site. Parry highlights four key roles of a museum as being an organisation, an attraction, a communicator and a collector and claims that for each role there is “an abundance of evidence […] to illustrate almost a half-century of development enabled by digital technology” (2010: 1-2).

Cameron argues that technology can “liberate” standardized linear documentation to incorporate “diverse media and create 3-D objects, visualizations, and simulations” and these have major implications for the “types of interpretive evidence gathered, recorded, digitized and created around museum collections” (2010:83). She goes on to say that these data visualization models can be used with
navigation/searching tools to show relationships between objects, subjects and themes using various media forms (images, sound, video, 3-D objects). Taking recent evidence from institutions around the world, Bülow & Ahmon demonstrate how digitisation and new technology has expanded the visions of many institutions. The Smithsonian Institution in the USA imagines “access to all known information... with one touch of the screen” as part of its strategic plan of 2010-2015 (2011:3). In the British Library’s 2008-2011 strategy, five out of the seven strategic priorities aim to either advance the Library’s digital infrastructure or use digitally available content of the Library. The National Archives of Australia states in its corporate plan of 2009-2012 that it will “continue to explore ways in which technological developments can enhance access to our collections” (ibid). In Norway, the Working Group on Digitisation was established in 2004 in order to analyse the need for digitisation of the resources in LAMs and to suggest appropriate action. The Working Group coordinated a national initiative to create access to sources of knowledge and culture managed by ALM. For the initiative the following five points were taken into consideration: (1) the need for digitisation, (2) general principles and criteria for selection, (3) Know-how, infrastructure and long-term preservation, (4) access and further processing of the materials and (5) division of tasks and co-ordination (Working Group on Digitisation, 2006: 13-17)

Elkington suggests that “the decision to embark on an imaging project is instigated by the availability of external funding” (1999: 245). Internal funding is an option if it is available, however with external funding, project managers must consider the wishes of the external funder(s). Elkington further comments that the decision to digitise should be the result of an analysis of four fundamental influences:

- Collection content
- Preservation need
- Access imperatives
- Financial drivers (1999: 247)

In relation to the CCA, these four fundamentals apply as follows. Collection content: the CCA has thousands of items of rare and unique quality and value and the organisation is prominent in the field of ceramics in Wales and the UK. Preservation
need: the CCA has many items in analogue format that have yet to be digitised to ensure longevity of content. Access imperatives: items in the CCA are not made as available as they could be due to limitations that can be overcome through digitisation and Aberystwyth is geographically isolated. Financial drivers: the CCA has potential to receive funding from Arts Council of Wales, Aberystwyth University, and other organisations but it recognises that funding is a major issue.

Hughes & Green comment that digital information has common characteristics and qualities regardless of where it is stored and therefore it can be linked to other materials to create multimedia not dependent upon spatial/temporal barriers or hierarchies. Digital information can be stored and delivered in a variety of ways, can be copied limitless times without degradation of the original and can be compressed for storage (2003: 4). This is not the case for analogue information, which has inconsistent characteristics. For example, a newspaper and a framed oil painting are different in size, weight and material, only the newspaper could be rolled-up and the painting may need to be stored in a cool, dark location. A newspaper or painting would need to be manually searched for within a storage box or room, whilst a digital copy can be searched and browsed for easily on a database and can be linked to other content via the internet. Hughes argues the value of digital collections is particularly difficult to assess, stating: “value is subjective, changes over time and has different meanings that are contingent on external factors” and that the value of digital resources is not evident until research is widely shared, cited and popularised (Hughes, 2012: 6).

According to Note, digital surrogates “allow for deeper study than do their analogue originals, enabling scholars to view details that the photographer may have never seen” (2011: 45). Digital surrogates can be magnified to better see details that are missed by the naked eye and the surrogates can be altered with digital effects. However, as stated previously, this would require relevant computer software and hardware. Youngs also names analysis and research as a reason for undertaking digitisation, as well as for: prestige, access, preservation and conservation, policies (such as government funding) and technology (2012: 6) In relation to the CCA, the
most applicable points from Youngs’ list are access and preservation and
conservation. The CCA is seeking to widen access to its collection by providing
digitised content to users and in doing so the material is preserved. While the CCA is
less concerned with digitisation as a means of analysing materials, it recognises that
2-dimensional photographs of ceramics can limit the sense of scale and shape and
that 3-dimensional scans could better represent ceramic objects.

3.3.4 How Digitisation is Undertaken

Digitisation is still a comparatively new field of study and practice and, as has been
discussed already, there are still issues with uniformity. There are many different
items that can be digitised but not all of them can be or should be digitised in the
same way. There are many factors to consider prior to and during the digitisation
process. Before deciding how to digitise, one must select what is to be digitised.
Hadžić observes that some institutions, such as the National Gallery in London,
create an electronic image of every item in their collection and place in on its
website. Other institutions, such as the Metropolitan Museum of Arts in New York,
collect electronic images based around exhibition themes, or to make educational
modules (2004:74). Ooghe & Moreels argue that an “all-selective” approach to
digitisation, in which everything in a collection is digitised, is impractical and would
only be suitable for “small and precious collections, collections that would lose
coherence unless digitised in their entirety and institutions with sufficient means to
both digitise their entire collection over a short term and to carry the burden of long-
term preservation” (2009). Hughes & Green note that it is not possible or practical to
digitise everything in a collection and that “generally, there will be only one
opportunity [to digitise], as such projects are expensive and require significant
capital investment to start up” (2003: 32). They go on to say the main criteria for
digitisation should be the informational content of original materials, the demand
for materials and the condition of originals (ibid: 37). Youngs offers a list of selection
criteria when choosing material for digitisation:
On selecting objects for digitisation, Elkington comments that “collection managers often select particular materials or collections to be converted based on their understanding of user interest and on their desire to limit use of deteriorated or endangered originals” (1999: 246). Therefore, it is important to balance carefully the requirements of the users against what is best for the preservation of the materials. The decision of what to digitise seems to tie-in with factors such as user demand as well as finances. The usefulness of a digital collection is highlighted by Hadžić, who notes, “some museums count more attendance in cyberspace than on Earth, with the international museum audience estimated to be 1 billion” and that the internet offers institutions “possibilities of distribution of information that are relatively limited in costs and their public is enlarged geographically and on a social level” (2004: 74). Jones et al comment that the web is like a library with all its documents, but that “all libraries ... are based on selections” (Jones et al, 2006: 2). It seems as though it is equally important to consider what should not be included as well as what should be included, in order to ensure content is concise and relevant. Jones et al further comment that there are two main components in the construction of digital libraries: technologies and metadata (ibid: 21). Note comments that because digitisation is a relatively new endeavour, “institutes may too often concentrate on technology before deciding on a project’s purpose,” (2011: 139) however, a project should be driven by the needs of users and not technology.

4 Padfield states that an inability to discover who holds copyright is not a reason to assume it does not exist (2010: 187).
It can be useful to use a formula when assessing materials for digitisation so as to have a regular basis for comparison. In their digitisation project handbook, the North East Document Conservation Centre match the qualities being assessed for digitisation selection with the skills used to assess items prior to acquisition by archives and libraries (Sitts, 2000: 46-47). Examples of how selection could be documented were followed by a list of what should be assessed which was accompanied by definitions of the assessment criteria to ensure clarity of the terms (ibid: 53-58). The Working Group on Digitisation provided a list of criteria for selection of sources of knowledge for digitisation. They claimed digitisation will facilitate access to materials that are (1) frequently used in their analogue format, (2) required or requested by several user groups and (3) especially difficult to access.

Other criteria included:

- The materials are of particular current relevance or national interest or relevant to an integrated range of services offered by the institution.
- The materials are suited to being published and displayed on a computer.
- The materials have the potential for digital processing and/or analysis.
- Digitisation will protect fragile original materials and will not endanger or damage the original (Working Group on Digitisation, 2006: 29).

Digitisation does not necessarily have to occur within the institution. Outsourcing the work to be carried out by digitisation specialists outside the institution is a different option. Bülow & Ahmon suggest this option is best for one-off digitisation projects in institutions that lack training and facilities. However, if long-term digitisation is desired then it is best to purchase equipment and train or hire staff to carry out the work (2011: 21). The CCA aims for long-term digitisation and so initiated this MPhil project in order to acquire the digitisation knowledge for future use.

### Instructive Guides to Digitisation

Written guides are included in the literature review because it became apparent whilst researching that although many published case studies will indicate where mistakes were made, they typically utilise advanced technical language that
potential readers of this thesis may not have. Therefore, this issue was addressed by investigating written guides and particularly those aimed towards beginner and intermediate users in the field of digitisation. It then became apparent whilst researching guides that many of them relay similar information and instruction, each with small differences, such as with terminology. All guides emphasised that there was, as of yet, no single way to digitise material but that institutions should follow similar procedures to one another in a *de facto* standard. Many guides offered the reader a list of abbreviations/glossary of terms, which was useful, particularly for technical terms. Ooghe & Moreels agree there is a lack of uniform terminology for selection for digitisation and “over the years several guidelines have proposed significantly different approaches to the task” but when guidelines are not stated “selection practices appear most often based on ad hoc decisions or on available funds” (2009). The creation of guidelines for digitisation work therefore seems a practical pursuit for the CCA. The following is a selection of material that is useful as a guide to digitisation.

**JISC Digital Media** provide a number of useful articles on the preparation and implementation of digitisation, which are listed freely on their website. Many of the documents are applicable, but only five (5) guides that were considered fundamental by the researcher have been overviewed here.

(1) “**Basic Guidelines for Image Capture and Optimisation**” (JISC Digital Media 2013b) provides a guide to good practice in still image capture to help the user to design a workflow for capture and optimisation. The document highlights the main points that should be considered to ensure the highest quality output from equipment, organised in a useful table. According to JISC pre-image capture activities include: testing and calibrating equipment, software and the environment, testing and establishing operational specifications for image capture, establishing a capture workflow, collecting and preparing original images and clean both these originals and the capture device. Tips for capturing the image include: capture at the highest

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5 Please consult [http://www.jiscdigitalmedia.ac.uk/guides/a-z](http://www.jiscdigitalmedia.ac.uk/guides/a-z) and [http://www.jiscdigitalmedia.ac.uk/digitisation](http://www.jiscdigitalmedia.ac.uk/digitisation)
quality colour settings and resolution necessary for uses, record the metadata, visually check each and every image and save it. The instructions for image optimisation (post-scanning and saving) were: create a working copy and keep the master file just for storage, crop if necessary, optimise colour and density range (shadows and highlights), check for faults, name the file and save progress appropriately and frequently.

(2) “Selection Procedures for Digitisation” (JISC Digital Media 2013d) looks at points to consider when developing a selection criteria for digitisation and it is intended to be of use to resource managers who want to digitise all or part of their collection. JISC points out that some of the points will not be relevant to all projects and collections, but the document has been designed to serve as a useful overview and to stimulate some further thinking and research. The guide gives reasons why and why not to digitise. JISC advises an assessment of the important characteristics of the collection: its size and scope, uniqueness, comprehensiveness, value, intellectual property rights, physical condition (suitability and risk) and availability of metadata. It is also advisable to consider the needs of users: who is the likely user, will digitisation be beneficial to users, what material would users like to see prioritised, will digitisation increase demand for the originals and will there be adequate means of controlling access and use of the digitised collection. Furthermore the guide advises the consideration of wider context issues: the priorities of the institution and its resources, external sources of funding, legal, educational and research contexts, technological changes and awareness of external collections. JISC provides the following ‘decision tree’ diagram (as shown in Figure 19) that clearly sets out rules for selection of material for digitisation.

6 “This should certainly be at least 24bit (8bit per channel), however many scanners now offer the ability to capture at higher colour depths (30-48bit). This will be slower, uses more memory and will increase storage requirements. However the archive image will then have been stored at the best possible quality from the device allowing re-use with confidence” (JISC Digital Media 2003b).
(3) “Setting up a Workspace for Digitising Images” (JISC Digital Media 2013e) considers the appropriate planning of the digitisation environment as well as whether to digitise in-house or outsource the work. Every project will have its own individual requirements which will vary enormously depending on the size and scope of the project, the type of materials being digitised and the method of capture. The guide advises the consideration of what exactly the digitisation space will be used for, what type of material will be captured, what sort of equipment will need to be accommodated, how many staff will be working at one time, as well as health and safety. JISC considers the photograph shown in Figure 20 a suitable example of a correct digitisation workspace.

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7 The issue of outsourcing is also discussed by JISC in more detail in a separate document: “To Outsource or to Digitise In-house? (JISCDigitalMedia 2013f).
(4) “Generic Image Digitisation Workflow” (JISC Digital Media 2013c) reviews the general concepts of 'best practice' within an image digitisation workflow and looks at how these concepts can be mapped onto the workflow to allow the efficient production of all required deliverables. The guide advises to capture at the best quality possible, collect required technical metadata as work progresses, archive original capture files, plan for sustainability, and to “sign-off” completed stages of digitisation. The article provides a clear workflow diagram as shown in Figure 21.
Fig 21. Generic Image Digitisation workflow (JISC Digital Media 2013c)
(5) “An Overview of Scanners” (JISC Digital Media 2013a) details the features of the typical flatbed scanner and what to look out for when choosing one for a digitisation project, including a list of advantages and disadvantages, as seen in Table 6.

<table>
<thead>
<tr>
<th>Scanner advantages</th>
<th>Scanner disadvantages</th>
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<tbody>
<tr>
<td>A scanner is easier to operate and requires less technical knowledge to produce high quality, repeatable results than is required to use a prosumer digital camera. Common photographic problems such as focus, exposure or perspective errors are almost impossible with a scanner. Some libraries are installing simple publically operated ‘push button’ scanners for their users.</td>
<td>Less flexible than a camera, can normally only scan 2D objects. A camera can capture most types of original though additional lenses or other equipment might be required.</td>
</tr>
<tr>
<td>The controlled lighting environment in a scanner eliminates exposure and colour temperature issues.</td>
<td>Scanners are limited to a maximum scan area e.g. A4 or A3.</td>
</tr>
<tr>
<td>Scanners can be set up to scan objects in batches, most flatbeds can scan several negatives, one at a time. Some models are designed to scan multipage documents automatically then pass the data through an Optical Character Recognition application to produce a readable and searchable digital version.</td>
<td>Specialist scanners can be very expensive at over £20,000.</td>
</tr>
<tr>
<td>Most scanners only require a small amount of desk space, cameras however require a formal or ‘make shift’ studio space with controlled lighting.</td>
<td>Scanners are typically deskbound. They are easily damaged in transit and so the original must be brought to the scanner, a camera in contrast can be taken to the original if necessary.</td>
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<tr>
<td>Dedicated book scanners can digitise bound volumes without placing the object under stress.</td>
<td></td>
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</table>

Table 6. Scanner advantages and disadvantages based on a table by JISC Digital Media 2013a
Hughes & Green’s *Digitizing Collections: Strategic Issues for the Information Manager* (2003) provides an informative and realistic guide for the manager of a digitisation project. Amongst many topics, the authors discuss the characteristics of digital and analogue formats, the past, present and future place of digital information within society, the advantages and limitations of digitisation, criteria for digitisation, and cases when digitisation should not be undertaken. Hughes & Green highlight that technological developments within digitisation are market-led and not led by the needs of scholarship and research. Therefore, it is important to consider how technology can be appropriately applied to an academic institution such as the CCA. They also observe the different options available during digitisation in terms of quantity. For example, an institution can digitise either every object in a collection, the ‘greatest hits’ of a collection or objects based around a certain theme. In consideration of the time limitations of this project, as well as its infancy, the quantity of digitised material should be evaluated.

Bülow & Ahmon’s *Preparing Collections for Digitization* (2011) covers all of the tasks that need to be done prior to imaging (e.g. selection, rights clearance, document preparation) as well as those associated with the digitisation process itself (imaging, quality assurance, transcription, metadata creation). From their archives perspective, Bülow and Ahmon strongly advocate the involvement of conservation staff from the outset of digitisation projects (2011: 18). They offer a useful model detailing four phases of digitisation (Figure 22).
Stage One
- Proposal, evaluation, selection
- Resource enhancement
- Copyright clearance
- Partnering (commercial or academic)
- Condition assessment
- Preparation for scanning
- Project Planning

Stage Two
- Imaging
- Quality Assurance
- Transcription
- Structural Metadata
- File Management

Stage Three
- Creation of database
- Delivery (hosting)
- Marketing
- User evaluation

Stage Four
- Long-term sustainability

Fig 22. Four-phase model for digitisation, based on a figure by Bülow & Ahmon, 2011: 11.

Stage one involves a great deal of decision-making as to how a digitisation project should be implemented; including what material will be digitised. Stage two is the more active stage with practical work such as scanning. Stage three is where the digitised material is used in various ways; where the purpose of the digitisation occurs. Stage four happens throughout and beyond the digitisation work because it is concerned with where the digital material is stored and therefore preserved long-term and is subject to developments in new technology (2011: 10-13). Bülow & Ahmon also overview the main details to consider when creating and reviewing a digital image:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Pixels per inch (PPI) – the number of pixels used to represent one inch in the digital image.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dots per inch (DPI) – the number of ink dots printed out over the length of an inch on paper.</td>
</tr>
<tr>
<td>Bit-depth/colour depth</td>
<td>Bit depth – the number of bits used by a computer to represent each individual pixel, e.g. 24-bits means that each pixel is represented using 24-bits (3 bytes).</td>
</tr>
<tr>
<td></td>
<td>Colour depth – a colour’s representation within an indexed colour image (a palette representing the distinct colour in an image).</td>
</tr>
</tbody>
</table>

| Colour management | The computer’s accuracy in its understanding of colours, such as #FF0000 as red. |
Archival masters vs. service copies

- Archival masters – high quality images for storage, usually in a format such as TIFF (Tagged Image File Format) for quality and endurance.
- Service copies – derived from the master for use by users, for example, on a website, usually in a format such as JPEG (Joint Photographic Experts Group) for quick and easy transfer.

Image enhancement

- Where necessary, crop the image or alter the contrast, brightness, angle, etc.

Compression

- Optimizes disk space taken up by a digital file by taking advantage of redundancy found in digital information, however not all file formats offer compression mechanisms.

Table 7. Details to consider when creating and viewing a digital image, adapted from Bülow & Ahmon, 2011: 34-41.

Youngs’s *Managing the Digitisation of Library, Archive and Museum Materials* (2012) is a short but useful introduction to digitisation. Youngs notes the important fact that currently there are no British standards or equivalent for digitisation, however, institutions should work to a *de facto* standard in order to allow resources to be compatible with other learning resources. Youngs stresses that “there is no definitive way of undertaking a digitisation project” and gives a 3 point framework for creating and managing a digital image archive: (1) data capture and creation (digitisation, metadata, storage), (2) Data access and delivery (plan and implement the delivery mechanism to ensure access) and (3) Managing the digital collection (quality control, good practice and standards) (2012: 7). Youngs offers sections on both planning and managing a digital project. The planning section includes discussion of the aims and objectives of a project, the scope, risk analysis, standards and resources. The managing section covers different aspects including the project lifecycle (beginning, middle, end), timing, task analysis (hidden tasks may be identified during the course of the project), staffing and crisis management. Youngs also suggests some pre-digitisation and post-digitisation activities.

The Council on Library and Information Resources (CLIR) published the article “Building and Sustaining Digital Collections: Models for Libraries and Museums” (2001). The article assesses digitisation projects and organisations and provides recommendations, business models and elements of sustainability. CLIR emphasise “a successful project must have clear definitions of purpose, mission, and audience”
The JSTOR project aimed to archive and expand access to scholarly journals but “most libraries see it [JSTOR] as a great delivery system, not an archive” (ibid). According to CLIR, JSTOR considers its core mission as an archive but it “cannot ignore the demand for access” (ibid). JSTOR say:

Our activities, our fee structure, and the way we manage the service and its resources reflect our historical commitment to serve colleges and universities as a trusted digital archive, and our responsibility to publishers as stewards of their content. This underlying philosophy at JSTOR remains the core of our service even as we continue to seek ways to expand access to people beyond academic institutions (JSTOR, 2013).

CLIR’s comments on JSTOR suggest that institutions have a main aim for a digital collection, such as for access or for archiving, and this aim must be carefully considered. However, even though JSTOR defines itself as a trusted archive it does not undervalue access. To conclude, CLIR identified four distinct areas LAMs need to consider when addressing short- and long-term needs: (1) a sound business plan, (2) the elements needed to sustain digital efforts, (3) interinstitutional issues and (4) funding (CLIR, 2001: 20)

Note’s *Managing Image Collections* (2011) discusses the management of the digitisation process from start to finish and instructs users in the definition and assessment of the project requirements and the evaluation of the many digitisation options available. Although the book focuses on the management of photographic material, the instructions are easily applicable and Note provides clear diagrams. When selecting file types, Note suggests using “JPEG\(^8\) for web display, TIFF\(^9\) for storage, and PDF\(^10\) for print reproduction” (Note, 2011: 46). Note provides a useful diagram to demonstrate digital image recommendations (Figure 23).

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\(^8\) “JPEG (Joint Photographic Experts Group)… combines small file sizes with at least respectable quality and… when small file sizes are important, JPEG is hard to beat” (Steinhoff, 2011)

\(^9\) “TIFF (Tagged Image File Format) is a file format that encompasses many internal formats, several compression methods, and color depths” and “scanned TIFF files… contain the maximum image information the scanner can produce” (ibid)

\(^10\) PDF (Portable Document Format) … is a versatile document format that can store text, image, graphics, and… hyperlinks” (ibid).
The United Nations Educational, Scientific and Cultural Organization (2002) published a set of guidelines for digitisation projects for collections and holdings in the public domain. The aim of the guidelines was not to duplicate existing texts but rather to offer a synthesis of available information, drawing upon both published sources and on the operations of specific projects. The guidelines “identify and discuss the key issues involved in the conceptualization, planning and implementation of a digitisation project, with recommendations for "best practice" to be followed at each stage of the process” (UNESCO 2002: 5). The publication considers the particular circumstances of the countries of the developing world.

Sitts published a *Handbook for digital projects* (2000) in collaboration with the Northeast Documentation Center. The handbook interprets digital technology from the perspective of the unique needs of institutions and explores how institutions can justify digital imaging projects. It also stresses that project managers take as much
time as is needed at the outset of a project to clearly define its goals and outcomes. Experts in the field comment on: rationale for digitisation and preservation, considerations for project management, selection for materials for scanning, copyright issues, guidelines from case studies.

Kenney’s *Moving Theory into Practice: Digital Imaging for Libraries and Archives* (2000) is a self-help reference for libraries and archives that choose to convert cultural resources into digital form. It focuses more on how digitisation occurs, rather than why it occurs, looking at the technical aspects of the process and considering case studies. Kenney reviews benchmarking, quality control, metadata and Photoshop software. Despite not focusing greatly on art or ceramics it is useful guide for non-experts.

Parry’s *A Review of Digitisation Projects in Local Authority Libraries and Archives* (1998) is a useful guide to digitisation and an overview of various projects. It is somewhat out-dated but the points Parry raises are still applicable to digitisation today. Parry overviews archives, museums and galleries, looking at their positions within local authorities, digitisation projects, information technology priorities, networks, standards and future co-operation. Parry believes the main elements of a digitisation project are: selection of material; copyright issues; selection and installation of hardware and software; data capture; cataloguing and indexing; and document and file management. Parry covers issues with standards, action plans, funding, and selection of material; the criteria for the latter included: improving access, networking potential, conservation, institutional considerations, local/national importance, education, user needs and copyright (1998: 44-46). According to Parry, prominent funding came from internal local authority funding and bids to the Heritage Lottery Fund (ibid: 55), which are still common funders in 2013, however funding was not listed as one of Parry’s main elements of a digitisation project and this may contradict 2013 due to the recent economic downturn.
Beagrie and Greenstein’s strategic framework (1998) is a practical guideline suitable for implementation; however, it is not specific to museums, galleries or archives. The guide not only provides the framework (with the three main stages of creation, management/preservation and use) but also offers a section on how to use the framework, which includes useful hints such as doing a walkthrough of each stage. The framework looks at case studies from different cultural institutions, including the Victoria & Albert Museum.

3.3.5 The Impact of Digitisation

Whether an institution, a group or an individual undertakes digitisation there are many implications to the task. One issue faced by many organisations seeking digitisation is finance. Digitisation involves time, effort and technology, as well as expertise, which can all be costly. However, there are ways to tackle financial problems, such as collaboration with other organisations to split costs, time or effort. Youngs comments that “collaborative projects allow complementary, or split collections ... to be digitised at the same time and brought together as a new, virtual collection” (2012: 4). Bülow & Ahmon point out that digitisation “will have an impact on the resources of an institution” (2011: 17). However, they claim that digitisation “has the potential to benefit both the development of a collection as well as its use” and that “a well executed digitization project will result in detailed cataloguing information and metadata about a collection, while enhancing possibilities for its use in ways previously not conceived” (2011: 6). They explain that digitisation preserves a collection by maintaining its value through reduced access to the original and allowing it to be stored more cost-effectively (in terms of storage location and environment). At the same time, digitisation allows information to be made accessibly online on a broader basis and in doing so supports the use of the collection (2011: 13-14).

Parry observes that the presence and push of digital provisions in contemporary museums shapes and drives new workflows, new directories, new strategic aims,
new funding streams and government priorities (2010:1). Therefore, digital work impacts not only the ‘face’ of the museum (the collection displays, user facilities and events) but also the ‘behind-the-scenes’ workings of a museum. LAMs face many logistical and financial issues as a result of undertaking and maintaining digitisation work. Ooghe & Moreels suggest that careful selection of materials can prevent digitisers “from ending up with a cumbersome mass of data that is practically and financially impossible to maintain or access” (2009). Elkington comments on correct decision-making in order to ensure the longevity of a digitisation project. Elkington writes, “the images and data created will need to be in a form that is sustainable and migratable over the long-term” (1999: 250) and suggests that standard file formats and compression strategies ensure this happens. Elkington also highlights the importance of running costs, potential income, operational commitment and market longevity to ensure a digitisation project is long-term.

Chenhall and Vance group museum activities into three major categories: (1) initial activities, (2) ongoing activities, and (3) terminal activities. All of these activities are involved in the digital work of a museum. Initial activities, when an artefact is acquired, involve the object being “accessioned, identified, registered, and, possibly, restored” (2010: 43). The information gained from this stage is documented in digital format and metadata. Initial activities also includes the digitisation or photography of objects. The ongoing activities are “the essential business of the museum” such as storing, exhibiting, loaning, or restoring objects (ibid). In some ways this could be considered the ‘current status’ of each object and its accompanying digital record needs to be updated accurately. Information continually needs to be updated, for example, if an artist passes away or if the object is on loan. The recorded status of an object also applies to terminal activities, when the departure of the object, in whatever manner, needs to be documented. If an object is given to another museum, the digital records could be transferred for continual use.

Tanner notes many implications of digitised resources for learning, teaching and research. Digitised resources can provide easier access to scholarly publications, enable new areas of research, make use of unused collections, encourage economic
competitiveness, offer efficiency savings, connect communities and encourage community engagement (2013: 105-117). Tanner concludes by offering five modes of value for digitised resources (Table 8).

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option value</td>
<td>People value the possibility of enjoying the digitised resources and the resultant research outputs created through the endeavors of academic and higher education (HE) now or sometime in the future.</td>
</tr>
<tr>
<td>Prestige value</td>
<td>People derive utility from knowing that a digitised resource, HE institution or its research is cherished by persons living inside and outside their community.</td>
</tr>
<tr>
<td>Education value</td>
<td>People are aware that digitised resources contribute to their own or to other people’s sense of culture, education, knowledge and heritage and therefore value it.</td>
</tr>
<tr>
<td>Existence value</td>
<td>People benefit from knowing that a digital resource exists but do not personally use it.</td>
</tr>
<tr>
<td>Bequest value</td>
<td>People derive satisfaction from the fact that their descendants and other members of the community will in the future be able to enjoy a digitised resource if they choose to.</td>
</tr>
</tbody>
</table>

Table 8. Five modes of value for digitised resources, adapted from Tanner, 2012: 119.

Oliver highlights the implications of digitisation on archival functions and services: “appraisal, archival description and access services are the three core areas that are impacted” (2012: 57). Appraisal is the selection of specific archival materials from an overall quantity that are carefully chosen based on their value. In light of this, it may be that only certain materials are digitised and not all will stand the test of time. For archival description, Oliver says there should be “greater awareness and readiness to use tools that will facilitate the addition of user-generated content,” such as popularised family history “to enhance existing archival description” (ibid: 58).

Access services have been impacted by the broader community of users caused by digitisation. Oliver concludes that digitisation presents enormous opportunities for archives, particularly in terms of enhancing information retrieval, but the investment required is immense.
The Working Group on Digitisation highlighted some needy recipients of digitisation work as: the general public; genealogists and local historians; researchers; students; school pupils; tourism; publishers and the media; public administration; and the institutions themselves who digitise (Working Group on Digitisation, 2006: 25-26).

Jones et al argue that an institutional repository should be able to meet the following criteria, many of which apply to a digital collection. The criteria state it should be institutionally defined, scholarly, cumulative and perpetual, open and interoperable, searchable with constraints, and able to digitally capture and preserve many events of campus life (2006: 53).

Figure 24 shows the useful 4-layer model offered by DigiCULT in regards to unlocking the value of cultural heritage resources, specifically in bringing knowledge to the attention of the broader public. LAMs must ‘provide access’ to databases that contain descriptions of their holdings, such as digital catalogues, as the first requirement for further functionality. LAMs must ‘provide objects’ to the users in the form of descriptions and digital surrogates of the objects. Expert knowledge that resides in LAMs must be used to ‘provide expert knowledge & creativity’ in order to integrate this into the services offered and DigiCULT comment: “this process leads to information environments that explain and narrate, offer recommendations, and create meaningful relationships with user[s]” (2002: 185). Finally, ‘provide user personalisation & community’ enables users to actively participate in the creation of context and to manipulate and interact with resources in order to develop a sense of ownership. From DigiCULT’s model it is clear that digital holds more value than analogue, however, it is unclear in what sense the term ‘value’ is used. In an economic/financial sense, value would suggest here that digital is more beneficial to the profit of a cultural heritage institution. In an intellectual/social sense, value would suggest here that digital is more rewarding to users and visitors.
Hemsley et al believe that the only future forecasts on digitisation that may be regarded as ‘safe’ are generally held to be limited to the two following types: (1) demographics – barring ‘doomsday developments’ and (2) the continuation of change in technology, tastes, markets, etc. but without being able to predict the precise changes (2005: 297). Despite the advent of large-scale digitisation initiatives in the last decade, Bülow and Ahmon consider that most cultural heritage organisations would not currently be in a position to consider digitising any more than a relatively small proportion of their content (2011: 47).
3.4 Metadata

Ooghe & Moreels claim “Digital documents serve no purpose unless metadata are linked to them, but creating these is usually time and labour intensive” (2009). Most commonly, selection for digitisation is based on the sufficiency of metadata, however, items with minimal metadata may be selected for digitisation due to their uniqueness or as a stimulus for metadata-creation (ibid). Note defines metadata as “structured data about data,” and “information that facilitates the management and use of other information,” with its function being to “provide users with a standardized means for intellectual access to holdings” (2011: 117). There are three types of metadata: Administrative, Descriptive and Preservation (Deegan & Tanner, 2002: 160-120) to detail with different types of information on an object (Table 9).

<table>
<thead>
<tr>
<th>Type of metadata</th>
<th>What it Does</th>
<th>Example</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>Describes the features of an object(s) used to manage the object(s)</td>
<td>Who printed the book and when; where it is kept and if it is in good condition. If the book has had conservation treatments or been loaned.</td>
<td>Used to manage an object throughout its life. Includes all data needed for managing preservation (Deegan &amp; Tanner, 2002, p. 120)</td>
</tr>
<tr>
<td>Descriptive</td>
<td>Describes the appearance of the object(s)</td>
<td>Describes what the book is about, what it looks like, the paper it is printed upon and when etc.</td>
<td>Object descriptions help humans identify an object. Also aids attributing meaning to an object (Deegan &amp; Tanner, 2002, p. 116)</td>
</tr>
<tr>
<td>Structural</td>
<td>Describes the internal structure/arrangement of the object(s)</td>
<td>Describes the arrangement of the item or the set of items e.g. the order of the pages of a book or which page an illustration is in that book</td>
<td>Structure is part of the meaning of an object. Especially important for digital objects as structure doesn’t have an enduring physical form. Structure is part of the meaning (Deegan &amp; Tanner, 2002, p. 117)</td>
</tr>
</tbody>
</table>

Table 9. The three different types of metadata, based on Deegan & Tanner, 2002: 160-120.

Once metadata is gathered on a computer it needs to be arranged in order for it to be understood by users and this is done using a metadata schema. Eden claims “metadata schema and standards are now a part of the information landscape” but
that there is a “proliferation of metadata standards” (2004: 6). This suggests that although metadata is extremely important it lacks standardisation – a similar issue to digitisation. Eden highlights MARC (MAchine-Readable Cataloguing), Dublin Core (DC), Text Encoding Initiative (TEI) and Instructional Management System (IMS) as some of the main metadata schema. The results of a 2006 survey showed that the most widely used metadata standards in digitisation projects were Dublin Core (92%)\(^{11}\), MARC (84%), XML (eXtensive Markup Language) (75%), and EAD (Encoded Archival Description) (69%) (Mugridge, 2006: 15). To take one example, MARC involves the use of coding to allow a computer system to read and manipulate the description and headings in a catalogue. This enables printing of catalogue data, the production of other products (shelf lists, book and spine labels), and the standardization of a machine-readable format for bibliographic records on an international scale (2007: 35). Carini & Shepherd claim one of the main problems with MARC in the archival environment is that, “while it serves the needs for collection level description fairly readily, it does not lend itself to the more detailed parts of the description as easily” (2004: 19). They conclude that standardized descriptions improve usability of archival descriptions by new groups of users who may be inexperienced in archival research.

The use of metadata schema based on an XML format is an “indisputable advantage” because converting one schema to another is relatively simple and “a technologically savvy non-programmer” could do it (ibid: 26). Andressen agrees: “XML offers a more general standard for describing data for transport” (2004: 45). The use of XML also creates an environment where it easy to change the look and feel of hundreds of finding aids. These are important considerations for the CCA, which lacks expert knowledge and skills in the area. Another metadata schema in XML format is METS (Metadata and Encoding Transmission Standard). Cundiff defines METS as:

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\(^{11}\)Jones et al note that the first generation of institutional repositories used the Qualified Dublin Core metadata schema to describe the content of their objects: “Dublin Core is still widely used, mainly because it is specified by the OAI-PMH [Open Archives Initiative - Protocol for Metadata Harvesting] as a ‘lowest common denominator’ format” (Jones, 2006: 22).
An XML schema designed for the purpose of creating XML document instances that express the hierarchical structure of digital library objects, the names and locations of the files that comprise those digital objects, and the associated descriptive and administrative metadata (2004: 53).

METS is flexible, easy to manage and, as it is in XML format, there is a wide range of software, often free, that can be used to create, store, display, transform, navigate, query, or publish METS objects (ibid: 63).

Orna & Pettitt highlight the importance of consistency in terminology for metadata, noting “descriptive terms tend to be applied inconsistently, with the same object being described in different terms by different recorders” (1980: 58). They further provide a list reasons why vocabulary control is needed, which includes: to avoid missing relevant information, group similar terms together to provide the same results, information is found under precise terms to avoid irrelevant information and similar terms and topics to the search term are suggested. They also offer a useful diagram (Figure 25) to explain the method of ensuring all relevant search terms are used and the user finds what they are looking for. The diagram explains how incorrect spelling in search queries can still produce correct results.

<table>
<thead>
<tr>
<th>List the variants</th>
<th>Desk bed</th>
<th>Dess bed</th>
<th>Folding bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decide on the standard term</td>
<td>Desk bed</td>
<td>entry term</td>
<td>Dess bed</td>
</tr>
<tr>
<td>Record the decision, with instructions</td>
<td>Desk bed</td>
<td>Use</td>
<td>Folding bed</td>
</tr>
<tr>
<td></td>
<td>Dess bed</td>
<td>Use</td>
<td>Folding bed</td>
</tr>
<tr>
<td></td>
<td>Folding bed</td>
<td>UF*</td>
<td>Desk bed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dess bed</td>
</tr>
</tbody>
</table>

* UF = “use for”

Fig 25. Instructive diagram of correcting search terms, based on a diagram by Orna & Pettitt, 1980:61
The CDWA (Categories for the Description of Works of Art) is a metadata standard designed for researchers of art history as well as staff who manage works of art (Kao & Tsai, 2009: 26). CDWA includes around 540 categories and subcategories but a small subset of categories are considered core in that they represent the minimum information necessary to identify and describe a work (CDWA, 2013). Kao & Tsai observe that, even though elements designed in the CDWA standard are able to satisfy the archive management requirements of museums, differences in Chinese and Western developments and in the characteristics of their collections have caused differences in categories and definitions of elements when using metadata (2009: 30).

In a collection of writings on issues to do with electronic records management, Cumming (2005: 36) states that:

The application of appropriate metadata can help to maintain records and preserve their structure, content, accessibility and meaning but, at a higher level, implementation of metadata can also help testify to the authenticity of records....Because of their inherent vulnerabilities and the threats that they face, it is critical that records are able to be demonstrably valid and accountable chronicles of the business they document. Applying metadata can help testify to the authenticity of records by documenting their effective maintenance and management.

Wood-fisher argues that, in Cumming’s statement, the word “record” can be replaced with “digital file” to equally apply to issues faced in digitisation projects. Wood-fisher suggests “while authenticity is not a regulatory requirement in this particular instance, demonstrable, effective documentation processes can only help with finding solutions when problems do occur” (2012: 56).
### 3.5 Cataloguing

Once metadata has been created it can be organised into some type of catalogue to help users locate items. According to Mortimer, cataloguing “is the preparation of bibliographic information for catalog records” and consists of descriptive cataloguing, subject cataloguing and classification (2007: 10). Descriptive cataloguing describes an item and identifies and formats access points, subject cataloguing determines the subject headings for an item in words and/or phrases and classification determines the classification number for an item, which represents the subject of the work in a number and/or letters (ibid). Catalogues are particularly valuable when users are researching new areas and are unaware of the best sources because a simple keyword search can locate all accounts of a word (Reid, 2000, p. 144). Chenhall & Vance argue “the only reason for creating any sort of artefact record is to provide various individuals with information they will probably need to carry out certain defined activities,” primarily information that assists in the ongoing activities of a museum (2010: 44).

Having a set of rules for cataloguing provides consistency within a single library, as well as between libraries, reduces time involved in cataloguing, provides ease of use for library users and ensure that the purpose of the catalog is achieved (Mortimer, 2007: 11). However, Carini & Shepherd argue cataloguing systems limit the number of fields and characters which can lead to difficulty in fully representing the collection using note fields, while still having enough fields for added entries and subject headings (Carini & Shepherd, 2004: 19).

Mortimer provides a useful diagram highlighting the cataloguing process, as shown in Figure 26. The diagram considers the different situations where cataloguing information is found and not found and provides solutions for both.
Fig 26. The cataloguing process (Mortimer, 2007)
Klijn and De Lusenet argue “a good description is the key to every collection; it makes a photograph visible, for the researcher, the cataloguer or the occasional visitor” (Klijn and De Lusenet, 2004: 7). They add that a catalogue provides a photograph with context, because a photograph and its information belong together, and that catalogues add extra meaning that cannot be seen in the image alone. This can help users understand and interpret what they see and the catalogue helps with searchability (ibid). According to Carini & Shepherd cataloguing is just one aspect of archival description, which is the process of capturing, exchanging and providing access to information about records (Carini & Shepherd). They describe a ‘finding aid’ as “any tool that assists with discovering and using archives and manuscript materials,” such as repository guides or descriptive catalogue cards. This is similar to Mortimer’s ‘access points.’

**3.6 Archiving**

In *What are Archives?* (2008) Craven declares that the issue of electronic records is the most enduring challenge for archives and she draws a fundamental distinction between paper records and electronic records: “With paper records, the *paper* (or parchment or vellum) must be preserved, for this is the authentic record; with electronic records, it is the *information* which must be preserved, for that is the authentic record” (2008: 21). Craven does not define whether “electronic records” refers to born digital material, digitised analogue material, or both. In contrast to Craven, Kilbride argues that digital preservation is not just about data, access or risk but it is about people and opportunities (2013). Whilst paper is subject to more decay, electronic records do require a certain level of preservation in the form of storage, hardware and software.

Johnson highlights 3 problem areas for a large archival digitisation project as: navigation, context and search behaviour (2008: 145-146). On the topic of navigation, Johnson says research shows that “users continue to find digital archives difficult to navigate and search” (2008: 145) while Craven argues that new search
engines, digitised records and automatic indexing question the relevancy of cataloguing and finding aids (2008: 21). On the topic of context, Johnson uses an example from a digitisation study project in which it was observed that there was “a lack of understanding that the digital object represented a ‘real’ object that could be accessed locally” and as a result “users did not associate the digital object with a ‘real’ object [and therefore] contextualization of the object within a wider perspective was poor” (2008: 146). This suggests that some users consider a digital object as original or different and detached from the analogue original. On the topic of search behaviour, Stevenson comments on the issue of users searching a library catalogue online at home as opposed to visiting the library itself, saying: “users of archives are increasingly physically remote” and “perceptions of access are now shifting due to the increasing numbers of electronic resources available online, but it is still the case that personal visits to repositories and physical contact with the archives themselves are seen as the main goal in terms of user statistics, and therefore in terms of the success of the record office” (2008: 91). Johnson rather controversially comments “users lack the support of archivists in formulating queries, identifying archival sources and interpreting and contextualizing the search results” (2008: 153). Johnson does not specify what form of “support” she is referring to.

A 2005 study by the Arts and Humanities Research Council found that archives, museums and libraries are the most trusted information sources; however, the sources most easily accessible are least trusted, such as the Internet, newspapers and television, despite being most used (Usherwood, 2005). Craven rather interestingly discusses the psychology of archival use. She claims that “paper records have a set of ‘signs’ which we absorb automatically” and that “just as typefaces tell us things about the meaning of the words they convey, the outward form of paper records tells us about the significance and authority of the content within. A book bound in red leather says ‘I’m important’” (2008: 22). In this case, it would seem as
though electronic records need cataloguing metadata for survival and use.\textsuperscript{12} As for electronic records, Craven claims they have no such signs of importance: “moreover, in the digital context, characterized by the automatic transfer from an electronic records management system (ERMS) to an archive’s digital storage and online presentation system, rearrangement and description by an archivist is unlikely” (ibid).

Johnson offers a useful set of questions for the manager of a digital archive project to consult. In regards to the user, the managers must ask themselves who uses digital archives and for what purposes and what are the motivational factors. As for the information-seeking and retrieval process, managers must question how users currently seek and retrieve information within a dynamic digital environment. Managers must consider how to model the interaction between the user and the digital archive to capture the “multidimensional context that exists in each interaction” (Johnson, 2008: 147). In regards to translation of information, managers must look at how to support the user in translating information to meet his or her own specific information needs. Finally, managers must consider the wider perspective: how do the findings from the work fit into the wider theoretical debate within the subject field? These are all issues that should be considered prior to and during the management of a project.

Oliver argues that archival records have enduring value as evidence of accountability as well as intrinsic informational value for the present and the future. Oliver suggests the three main influences on digitisation activities in archives are: “the changing usage and user profile of archives; reformatting as a preservation strategy; and the ability to crowdsourse and harness ‘user power’” (2012: 49). Oliver points to the popularisation of family history as a purpose and requirement for digitising archives, however, issues can arise in that materials are removed from context in digital form and, almost ironically, there can be increased demand for the originals.

\textsuperscript{12}Craven expands: “the archivist’s intervention here – putting the documents in order, describing them and producing finding aids – simply reinforces this notion of importance, and gives the user an indication of what to look at and where to start. Signs of conservation are similarly significant: ‘ooh, this has been repaired: it must be valuable!’” (Craven, 2008: 22).
3.7 Oral History

The Ceramic Archive & Collection (CCA) has a large collection of oral history material in a variety of formats, some of which is in the process of being digitised. Material includes lectures and interviews with artists as well as paper materials of interview transcriptions. Leavy comments that oral history is “a method of qualitative interview that emphasizes participants’ perspectives, and generally involves multiple open-ended interview sessions with each participant” and that it is “an effective method for gaining in-depth knowledge from participants, from their perspective” (ibid: 3-5). Therefore, material gained from interviews is a valuable source of information.

Oral histories have advantages in that they contain distinctive information and they complement traditional materials already held in LAMs (Weatherford Stevens & Latham, 2009: 213). Tanner argues oral histories are “an especially powerful means of connecting personal stories with digitised content to create a wider contextual framework” and therefore “we can better understand or engage with a subject than if they remain uncollected” (Tanner, 2012: 117). However, Tanner notes that the oral history resources of the United Kingdom are a vast and untapped resource because only a small quantity has been digitised.

Leavy highlights ontological\textsuperscript{13} and epistemological\textsuperscript{14} as the two main sets of philosophical assumptions in relation to oral history and these guide methodological decision making. Ontologically, oral history is based on a conception of research as a process, not an event, while epistemologically; oral history positions the researcher and participant in a collaborative relationship (Leavy, 2011: 7-8). The difference

\textsuperscript{13} An ontological position is based on assumptions about the nature of the social world and what can be known about it. Ontological reflects answers to questions such as “what is the nature of social reality?” and “how can social reality be studied?” (Leavy, 2011: 6).

\textsuperscript{14} An epistemological position is based on assumptions about the nature of the relationship between the researcher and research participants and assumptions about how research should proceed. Epistemological reflects answers to questions such as “how can we learn what we think we can know?”, “who is a knowing party in the research process” and “what is the relationship between researcher and participants?” (Leavy, 2011: 6).
between process and event is that an event is more end-focused and conclusive.

Leavy’s suggestion that oral history is a collaborative relationship somewhat contradicts her statement that participants are privileged parties with valuable knowledge to share; as this suggests an imbalance of power. It would seem the balance of power is constantly tested in interviews with the interviewer’s success or failure in acquiring information and the participant’s willingness to reveal information.

Leavy argues that “because of the open-ended and unstructured nature of oral history interviews, the participants have a lot of leeway to determine the content of the interview sessions” (2011: 19). The level of participant control is determined by the interviewer’s control through preparation, organisation and conversational strictness. Memory and truth are two major issues in oral history interviews as well as they can impact the quality of the content. Different interview strategies and research methods have pros and cons and so certain questions should be considered prior to selecting a method. Some of these questions include:

- What kind of data are you interested in?
- Do you have a specific topic about which you want to ascertain data?
- How much background information are you interested in?
- Do you have a specific list of questions you seek to gain responses to?
- What size sample of participants are you seeking?
- Do you need to seek similar data from all of the research participants?
- Do you want to compare the responses of different participants? (Leavy, 2011: 14-15)

These questions are useful to keep in mind when preparing for an interview in order to ensure control and organisation of the interview.

The digitisation of different materials, whether sound or image, seems to be unified in the creation of separate files for preservation and access. A project to digitize Jacksonville State University’s Houston Cole Library’s oral history collection used .wav as preservation files and .mp3 as access files in a similar way to using tiff and .jpeg for images. The .wav format was good for storage, editing and manipulation of audio but it was large in size, while .mp3 was small in size and therefore “better suited to the end users’ needs,” (Weatherford Stevens & Latham, 2009: 217) even
though there was some degradation in sound quality due to compression (ibid). The files were uploaded to the web server with a main index page and secondary pages for each interview and these were linked to fields in the bibliographic and holdings records in the library’s catalogue.

3.8 Ceramics and Digitisation

This MPhil project was concerned with digitisation work on the CCA’s collection of materials on the International Ceramics Festival (ICF), specifically the festival programmes and demonstration videos. However, as the CCA has a large collection of ceramic objects, it was deemed relevant to research digitisation work in ceramics.

In her book Ceramics, Frances Hannah makes reference to the use of technology in the preservation of ceramics. Hannah advises the use of equipment, which, as of 2013, is considered commonplace and common sense, such as a hand-held magnifier and a local light source, to “highlight the irregularities and textures of the surface” (1986: 42). Although Hannah does not refer to digitisation or scanning, she does refer to photography as a means of documentation: “photography used in conjunction with the microscope can be an extremely useful method of documenting unusual and interesting features” (1986: 43-44). Hannah discusses the use of “energetic” x-ray technology, claiming it can “penetrate materials normally opaque to visible and ultraviolet radiation to produce a two-dimensional representation of the internal three-dimensional structure.” However, the sense of 3D depth is lost on a 2D reproduction, which Hannah claims can be somewhat overcome by taking views from different angles and comparing the various images (1986: 45). Hannah’s observations can be read as a predecessor to, and history of, the digitisation of ceramics. Hannah highlights a key issue in the digitisation of ceramics: that 3D objects are not ideally represented with 2D digitisation. Therefore,

15 Hannah’s book was published in 1986 and both photographic and preservation technology has significantly progressed since then, however, it is still interesting as a background to the use of technology on ceramics.

16 “X-rays, which are of an even shorter wavelength than ultraviolet radiation, can be used to present an image of an object on a sensitized photographic plate” (Hannah, 1986: 45).
3D scanning appears to be the best form of digitisation for ceramic objects. Hemsley et al explain that a “High Resolution Laser Scanner simultaneously digitises the 3D shape and colour of traditional museum objects and provides a maximum depth resolution of 10 microns” (2005: 29).

The E-Curator project at University College London used 3D colour scans for remote object identification and assessment (Hughes, 2012: 129). It created a prototype application for 3D laser scanning of museum artefacts, which was tested by curators, conservators and museum and heritage researchers. Hughes says a tool such as this that aids in the analysis of temporal and spatial data allows the representation of content in many formats (ibid). The Digital Michelangelo Project,17 which officially began in January of 1997 and ended in 2000, utilizes laser scanning technology to digitise sculptures and architectures from the Renaissance in Italy (Lu and Pan, 2010: 134), most famously, Michelangelo’s sculpture of David (c.1501-1504) and other works. Zhou et al note a 3D laser scanner was used to “digitalise [sic] Michelangelo’s works, including a 7.5 meter high of the David sculpture, which contains 2 billion points, with accuracy of 50 micrometer” (2012: 7).

Creating abstractly and teaching simply insects: a collection in multiple dimensions (2012) by Chamberlain was a project-based thesis that involved the use of a 3D scanner to scan insects. Chamberlain commented that for one of the largest insects in the world, “it seemed appropriate to make it even larger for a fun way to connect to the kids. To do this, I used a 3-D scanner to create a digital copy so I could use a rapid-prototype printer to make a replica” (2012: 6). On the practicality of the project, Chamberlain noted:

One of the main objectives for me was to create the best possible representation of the [28,000] specimens while keeping efficiency in mind. To put this into perspective, if it took one minute per insect, the process to document all 28,000 would take 466 hours. This means that to repeat some processes, such as 3-dimensional scanning, is just not feasible (2012: 3).

17 “The Digital Michelangelo Project was performed by Stanford University, the University of Washington, and the Cyberware Corporation” (Lu and Pan, 2010: 134).
The project was a collaboration with the University of Iowa Museum of Natural History’s 100-year-old insect collection which, upon becoming available to the public, Chamberlain commented: “the photographs can be used in the future to inform potential funding sources. It is a cycle: the potential funding sources make it possible to improve the collection, reach more people” (2012: 16).

3D digitisation is not always a possibility, largely due to its cost, and in this case 2D digitisation can suffice as a suitable alternative. *Ceramics Digitisation Procedures Guideline* (2008) by Kao & Tsai is a highly instructive guide to the 2D digitisation of ceramics. The guide overviews the preliminary operations of digitisation work, such as planning the workflow and selecting objects, and describes the process of ceramics imaging from artifact and equipment preparation to photographing and file storage. Kao & Tsai instruct in the use of a still-life photography case for image capturing (Figure 27). The guide explains how to establish metadata and related tasks, including ceramics metadata fields using CDWA and DC. The rest of the guide discusses equipment selection and costs, outsourcing, protection of content and benefits and prospects of digitisation. The authors conclude that every step of the digitisation process is closely linked with other steps and often lessons were learned through trial-and-error (2008: 50).

![Image](image-url)

Fig 27. The use of a still-life photography case for image capturing (Kao & Tsai, 2008: 21).
The Crafts Study Centre Digitisation Project (2000-2003) was collaboration between the Surrey Institute of Art and Design, University College, the Crafts Study Centre and VADS. It was funded by JISC to digitise 4,000 images of the collection and archive and to produce six learning and teaching modules (Vacher, 2003). The resource was delivered through the JISC-funded Visual Arts Data Service's (VADS) collections repository so it could benefit from “interoperability with other collections hosted by VADS and the work VADS is doing to promote the use of its collections for learning and teaching” (JISC, 2013c). One challenge acknowledged on the project was a lack of standardisation due to different people using different systems for cataloguing. Another challenge encountered was that the “specialist” nature of the collection could sometimes be compromised by the richness of the descriptive vocabulary in an attempt for standardisation. The importance of documenting all the processes and steps of the project was emphasised (Vacher, 2003).

Yin et al claim that after entering the 21st century, “the research and development of computer hardware, communication engineering and sensor technology have put forward more and new requirements on the quantity, quality, variety, conformation and functions of functional ceramics” (2010: 345). Zhou et al observe that “the digitalization of cultural heritage is the process of digitalizing the movable or unmovable cultural heritage using contemporary remote-sensing and virtual technologies to achieve 2D or 3D digital archiving, for the merits of protection, reparation, restoration, and archaeological research” (2012: 2).

3.9 Relevant websites

The following is a list of websites for organisations that are of use and interest to digitisation and ceramics. The organisations are variously interested in the management, running and collaboration on digitisation projects and so they were deemed relevant for researching digitisation work. Many of the organisations provide services, suggestions, guidelines and tools that will be of continuous use and interest beyond this project for long-term digitisation in the CCA.
The V&A (Victoria & Albert museum) Channel

Web address: www.vam.ac.uk/channel

The V&A Channel is the home for the films from the Victoria & Albert Museum, and is a gateway to the museum’s leading programmes and collections. Cultureshock Media created the channel in 2009, and continues to manage and produce its content (Cultureshock Media, 2013). Users can search for video material by entering a keyword search query or by browsing the 3 main themes of ‘People,’ ‘Things,’ and ‘Happenings’ (such as the latest news from the museum). Aside from video material, users can go to the ‘Magazine’ section to view digital copies of back and current issues of V&A Magazine. A keyword search for “ceramics” (Figure 28) produced 9 results in all 3 themes and results could be organised by date and popularity. When a video from the ‘things’ theme is selected the user is linked to the ‘things’ area of the website where the video is located. When watching videos (Figure 29), users are able to play/pause, maximize to full screen, dim the rest of website, adjust volume and embed the video elsewhere. Most videos are approximately 5-10 minutes long, shot in high definition, and have subtitles. Each video page has a title and short descriptive information about the video.

Fig 28. Screenshot: a search for “ceramics” on the V&A Channel, 2013
When viewing digital copies of V&A Magazine in the ‘Magazine’ section, users can view the current issues, the recent issues and the back issues up to 2006. Upon selecting an issue, users are provided with a title, such as ‘V&A Magazine: Autumn/Winter 2013,’ a short description of the issue and a small thumbnail image of the front cover (Figure 30). Below this, users can view the digital issue with similar tools to the videos. Users are able to zoom in and out, scroll between pages, maximize to full screen, dim the rest of the website and share the item elsewhere on the internet (Figure 31). However, a keyword search for “ceramics” within the ‘Magazine’ section redirects the user to the 9 video results discovered previously. This suggests users are unable to search solely within specific themes and the website has a single search facility that broadly searches all the themes. This can make it harder for users to find what they are looking for, however, as there were only 9 results for “ceramics” this was not a challenge and perhaps it highlights a need for more content on ceramics.
Fig 30. Screenshot: accessing the V&A Magazine Autumn/Winter 2013 on the V&A Channel, 2013

Richard Barnhart takes us on an erudite trip through the history of Chinese painting, beginning with the Tang dynasty and closing with the Qing dynasty.

Martin Herbert enters the ever-shifting world of Elmgreen & Dragset, and provides an overview of their career to date, the latest development of which has dawned at the V&A.

Murtaza Vali introduces the artists and designers on the shortlist for the year’s £35,000 Jameel Prize. Their work goes on show at the V&A following the announcement of the winner on 16 December.

Hannah Betts visits the V&A’s recently acquired Vivien Leigh archive, and pieces together a remarkable life lived between screen, stage and anywhere else Ms. Leigh chose to go...

The cover was photographed by Thierry Bal in Tomorrow by Elmgreen & Dragset. A limited edition Chinese painting cover is also available.

SUBSCRIBE TO V&A MAGAZINE →

Fig 31. Screenshot: viewing the V&A Magazine on the V&A Channel, 2013
In a 2011 website review for Guardian newspaper the V&A channel was described as a “strong addition” to the V&A website but it is not as integrated with other sections of the website as well as it could be (Joseph, 2011). However, perhaps a new addition to the website as of 2013, users are encouraged to ‘discover more at the V&A’ and are provided with relevant links on the V&A website (Figure 32).

JISC (Joint Information Systems Committee)

Web address: http://www.jisc.ac.uk/

In 1984, the Joint Academic Network (JANET) was set-up to provide universities and research councils in the UK with access to a national research network for the first time with a 9.6 kilobit data transfer rate. In 1990, it was identified that there was a need for colleges and universities to communicate with each other and so a national mailing list service was created. In 1991 the Information Systems Committee was formed which took over the management and development of a fragmented computer network service. JISC was subsequently created in 1993 to “provide vision and leadership to universities, to stimulate innovation and fund research into technology developments for the benefit of all universities and colleges” (JISC, 1993).

18 The main V&A website received marks of 22/25 for content, 23/25 for usability, 24/25 for branding and 21/25 for monetization, giving it a total score of 90/100 (Joseph, 2011).
2013b) and to take on responsibility for managing the UK’s network infrastructure for universities through JANET. The same year, the Follett Report\(^\text{19}\) was published which recognised the need to support the library community into the digital age including technical requirements and study space for teaching and research in universities (Follett, 1993). In 1994 the JISC eLib (electronic library) programme was developed to change the “culture of academic libraries,” develop the “librarian of the future” and lay the cornerstones of JISC’s work in content development and resource discovery (ibid).

![JISC logo](image)

We are the UK’s expert on digital technologies for education and research

Fig 33. Screenshot of the JISC website homepage, 2013

JISC publishes all of its material on its web pages, which allows the users to choose the articles they are most interested in and download those. To JISC the benefit is that they can update their web pages regularly to reflect the most current view on a topic. JISC provides users with links to its associated websites where they can view electronic journals and books, maps, learning and teaching resources, films and images and resource discovery links. For example, JISC Journal Articles

(jiscjournalarchives.ac.uk) enables users to search over 4 million journal articles by bringing together a selection of archives of key providers into a single place. JISC Digital Media (www.jiscdigitalmedia.ac.uk) is a particularly useful website that provides online resources and expert advice guidelines on finding, creating, managing, delivery and using digital media. Users can enter keyword search queries (Figure 34) or browse information by topic, such as digitisation (Figure 35).

Fig 34. Screenshot of search for “digitisation” on JISC Digital Media, 2013.

Fig 35. Screenshot of digitisation section on JISC Digital Media, 2013
DPC (Digital Preservation Coalition)

Web address: http://www.dpconline.org/

The Digital Preservation Coalition was established in December 2001 to foster joint action to address the “urgent challenges of securing the preservation of digital resources in the UK” and to work with others internationally to secure a global digital memory and knowledge base (DPC, 2012a). It was launched officially in February 2002. It is a not-for-profit membership organisation. The DPC describes itself as: “An advocate and catalyst for digital preservation, enabling our members to deliver resilient long-term access to content and services, and helping them derive enduring value from digital collections” (DPC, 2012b).

Fig 36. Screenshot of DPC homepage, 2013.
The DPC have a set of core values for the publications they provide in order to ensure respectability and reliability. The material on the DPC is downloadable and is uploaded as a continuous series of updates rather than a discrete database. For example, the DPC annual reports are uploaded yearly and new papers and conference reports are uploaded as soon as possible. While the DPC focuses more on digital preservation than digitisation itself, the two topics are closely related with overlapping information. An example of access to the DPC’s Digital Preservation handbook is shown in Figure 37.

Fig 37. Screenshot - accessing the DPC’s Digital Preservation handbook, 2013
VADS (Visual Arts Data Service)

Web address: http://www.vads.ac.uk/

Created by the University for the Creative Arts (London), VADS describes itself as “the online resource for visual artists” (VADs, 2008a). It offers a number of digitised collections from academic and cultural institutions across Britain. Users can easily browse, search or use an advanced search tool. VADS accepts digital resources created by, and of relevance to, visual arts education. A visit to the VADS “resources” page shows a series of learning and teaching resources based around the VADS image collections, written by subject specialist authors and lecturers. One such resource featured well-known potter/ceramicist Bernard Leach (Figure 38). The resource linked to biographical information on Leach with digitised images as well as a “full catalogue record” of metadata information on the Leach article (Figure 39).

Fig 38. Screenshot viewing “the life and work of Bernard Leach” on VADS, 2013.
Most recently, in 2013, VADS has worked on a project entitled “Zandra Rhodes Digital Study Collection” (ZRDSC). The project piloted a digitised collection of design work belonging to fashion designer Zandra Rhodes as well as an accompanying Open Education Resource (OER), which VADs hosted on its website. The project was a collaborative venture between the University for the Creative Arts (UCA) and the Zandra Rhodes Studio and was funded by JISC as part of their Content

programme between November 2011 and January 2013. On the study blog, the project described itself as follows:

The Digital Study Collection will provide unique open online access to images of 500 of the designer’s most iconic and landmark costumes... From this substantial collection of intriguing and innovative fashion designs, 25 key works will be chosen to build an OER with the aim of embedding it in learning and teaching. These 25 captivating digital images will be enriched by primary and secondary source material in digital format (Zandra Rhodes Digital Study Collection, 2013).

On the VADS page, the user has the option to “view all garments” or specific items (fashion collections, objects, techniques, textile designs, fabrics) from the ZRDSC, which are displayed in a format similar to that of online clothes shopping. Figure 40 shows an example of this, an image result for “Chinese Constructivist” textile design. Users operate thumbnail images to viewer larger images that can be manipulated with tools such as zooming and each object has its own record of metadata.

![Core Record](image)

**Fig 40. Screenshot of ZRDSC on VADS © Rhodes, 2013.**
Users can also view digitised sketchbooks (Figure 41) belonging to Zandra Rhodes however these are hosted on a separate website to VADS but still part of the UCA website family (http://uca.onlineculture.co.uk/zandra_rhodes/). One engaging feature of the digital material on this website is that when users move between the digitised pages the pages are animated to turn in the fashion of a physical book.

Fig 41. Screenshot of Zandra Rhodes digitised sketchbooks © Rhodes, 2013

**DCC (Digital Curation Centre)**

*Web address: http://www.dcc.ac.uk/*

Funded by JISC, the DCC claims to be a “world-leading centre of expertise in digital information curation with a focus on building capacity, capability and skills for research data management across the UK’s higher education research community” (DCC, 2013b). It provides access to a range of resources including how-to guides, case studies, training programmes and online services. Material can be read both directly on the website and via download. The DCC are committed to making all information and resources on the website accessible to all users.
The DCC explains that digital curation “involves maintaining, preserving and adding value to digital research data throughout its lifecycle” and that “active management of research data reduces threats to their long-term research value and mitigates the risk of digital obsolescence” (DCC, 2013c). Whilst this project is not primarily concerned with digital curation, ongoing work to digital material is still a relevant issue and concern. A keyword search result for “digitisation” on the DCC website offers numerous results, including a useful paper entitled “What is Digital Curation?” by Abbott (2008). In relation to digital curation it discusses the short-term benefits (persistent access, improved quality of data, authenticity checks, improved speed of and range of access, etc.), the long-term value (preserving/protecting data, encouraging re-use of data, the use of tools and services to migrate data, metadata and other representation information into new formats, etc.) and the issues to be considered (costly process in terms of time investment and expertise, an ongoing process not a one-off action, best practice changes as new tools and standards are developed, etc.) (2008).
Another interesting keyword search result for “digitisation” provides an overview of the Storage and Archive Management (SAM) analysis tools created by PrestoSpace free of charge (released in 2006). PrestoSpace was a project that ran from 2004 to 2008 to propose tools and strategies for an integrated approach to the preservation of audiovisual materials. SAM consists of three browser-based tools which aid in planning for audio-visual digitisation projects. A storage calculator (Figure 43) allows the user to input the types and volume of media in their collection and then calculates how much bit storage will be necessary. A cost calculator allows the user to input the types of media and an estimate of how much of the media is in a deteriorated state and then calculates the cost of the digitisation project. A preservation calculator uses the cost estimate to create a month-by-month project plan.

![Storage assessment calculator](https://www.prestospace.co.uk/images/uploads/storage-assessment.png)

Fig 43. Storage assessment calculator © PrestoSpace and System Simulation Ltd

21 The completion of the PrestoSpace project led to the PrestoPRIME project (2009-2012) which developed the tools that are now made available online by the associated organisation PrestoCentre (https://www.prestocentre.org/library/tools/storage-planning-tool-0)
DigiCULT (Digital CULTure)

Web address: http://www.digicult.info/pages/index.php

DigiCULT was a project set up to establish a regular technology watch for cultural and scientific heritage in Europe for a 30-month period (2002-2004). It aimed to benefit the Cultural Heritage sector “through monitoring and assessing existing and emerging technologies that provide opportunities to optimise the development, access to, and preservation of Europe’s rich cultural and scientific heritage, within the emerging digital cultural economy” (DigiCULT, 2005) The project discussed and analysed current and future trends in several technology domains that were identified as key areas during the DigiCULT study. In 2002 Salzburg Research collaborated with the University of Glasgow on the DigiCULT project. The DigiCULT Report (2002) provided recommendations for policy making in both the cultural institutions themselves and the public authorities directly responsible for funding those institutions. The 4 key recommendations for archives, libraries and museums were identified as follows: (1) raise the competence in cultural heritage institutions, (2) cooperation at all levels is key to marketing to new target groups, (3) strive to better exploit your own strengths and core competencies and (4) become methodical.

One issue discussed in the report was how small institutions can manage to participate in the emerging information society. One curator of a small institution commented:

I feel the lack of employee expertise in technological areas is one of the most pressing problems for adoption of new technologies... In a small institution, where no staff are hired specifically to perform these functions, the responsibility falls on individuals to develop policies and programs often with scant knowledge of development in other cultural institutions. - Geoff Barker, University of Sydney, Macleay Museum, (The DigiCULT Report, 2002: 15).

This is of particular relevance to the CCA as a small institution that needs to be aware of its limitations in terms of financing projects and staff time and training. The DigiCULT report noted that models, guidelines and best practices for digitisation

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22 The Salzburg Research website (http://www.salzburgresearch.at) shares a number of online publications in the areas of digitisation and the applications of information technology.
needed to consider scalability in order to be appropriate for small institutions with less resources (2002: 39). It was noted that an “estimated 95% of all cultural heritage institutions in Europe are not in the position to participate in any kind of digital cultural heritage venture” due to a lack of financial resources, and a shortage of staff, skills and technology (ibid: 47). DigiCULT experts suggested setting up regional information centres that would help small organisations develop basic skills. This concept reflects the work of the PCW, which has its own “ambassador centres” for digitisation around Wales that hold a number of scanners and laptops for digitisation work. The PCW staff travel around Wales holding sessions on digitisation and specifically seek out smaller groups to work with. DigiCULT also suggested that small institutions should get on-board with larger projects and initiatives and they could “piggy-back” with experienced cultural organisations in common projects to foster knowledge transfer (ibid: 50-51). An example of this would be this MPhil project in which knowledge is acquired from the NLW and applied to the CCA. The suggestion that the state could finance only selected initiatives (ibid:123) reflects the application process of the Arts Council of Wales, which funds the CCA.

**Association of Research Libraries (ARL)**

*Web address: [http://www.arl.org/](http://www.arl.org/)*

ARL is a US-based group that provides several relevant resources via its website, such as reports, briefs and presentations in the field of library studies. There is some material available in relation to digitisation, along with ‘SPEC-kits’ which contain the up-to-date information on the latest issues of concern to libraries and librarians. The *Managing Digitisation Activities* SPEC-kit (2006) investigates the digitisation efforts of libraries, the organisational structures used to manage digital initiatives, management of staff, the allocation and origins of funding, outsourcing and the assessment of digital activities (Mugridge, 2006). There are numerous digitisation statistics which are useful for decision-making, such as organisational charts, mission statements, policies and procedures, and selection criteria. Another SPEC-kit, *Managing Born-Digital Special Collections and Archival Materials* (2012), explores the tools, workflow and policies that archive and special collections staff use to manage, process and provide access to born-digital materials (Nelson et al, 2012).
The SPEC-kit *Digital Image Collections and Services* (2013) examines how research libraries and their parent institutions have responded to the transition from analog to digital images. It includes examples of digital image collection websites, finding aids, image use training materials, copyright and use rights policies, selection policies, descriptions of digital image service points, and digital collection promotional materials (Kandiuk, Lupton & Davidson, 2013).

**MINERVA EC (MInesterial Network for Valorising Activities in digitisation, eContentplus)**

*Web address: [http://www.minervaeurope.org/about/minervaec.htm](http://www.minervaeurope.org/about/minervaec.htm)*

A 2005 report by the Commission of the European Communities, “i2010 – A European Information Society for growth and employment,” promoted an open and competitive digital economy, emphasised ICT as a driver of inclusion and quality of life and aimed towards an integrated approach to information society and audio-visual media policies in the EU. MINERVA was a “Thematic Network in the area of cultural, scientific information and scholarly content” that brought together stakeholders and experts from all over Europe to support the 2005 report by the Commission of the European Communities (MINERVA, 2012). MINERVA aimed to improve accessibility to and visibility of European digital culture resources and contribute to increase the interoperability between existing networks. The project supported both public and private organisations that create/collect/own digital content, as well as universities, schools and private citizens. MINERVA had many partners throughout Europe, with the Museums, Libraries and Archive Council (MLA) its main partner in the UK. Other organisations involved in the UK include: CYMAL, British Library, British Museum, JISC, National Council on Archives, National Library of Scotland, UKOLN and the Victoria and Albert Museum. The MINERVA website provides access to many useful resources, including, digitisation guidelines, IPR (Intellectual Property Rights) guidelines, good practices in digitisation, technical
guidelines for digital cultural content creation programmes, quality principles for websites and the European and National rules on web applications.\textsuperscript{23}

**AHDS (Arts and Humanities Data Service)**

*Web address: [http://www.ahds.ac.uk/creating/index.htm](http://www.ahds.ac.uk/creating/index.htm)*

The AHDS was a national service in the UK funded by JISC and the AHRC (Arts and Humanities Research Council) that ended in 2008. It aimed to promote, preserve and collect the electronic resources that resulted from research and teaching in the arts and humanities. Information continues to be made available through online catalogues. The management of the AHDS is spread out geographically between various universities around Britain. The AHDS was involved in numerous projects, including: the DAAT (Digital Asset Assessment Tool), which aimed to develop a digital preservation assessment tool for use within the UK Higher Education/Further Education and research, learning and teaching communities, the NeMLA (Northeast Modern Language Association), which aimed to produce a range of supplier training courses within the digitisation sector, and the Digital Images Archiving Study which investigated the way digital image files were preserved and determined archiving methodologies and future research possibility (for both ‘born digital’ and digitised images).

The AHDS offers some useful publications relevant to the topic of digitisation such as guides to good practice, case studies and depositing guidelines. On the AHDS website there is a useful page called “Acronym Buster” (Figure 44) which explains the acronyms of institutions, organisations, projects and services. However, it does not explain technical acronyms and instead links the user to a different website ([whatis.techtarget.com/](http://whatis.techtarget.com/)).

\textsuperscript{23} British are rules available at [http://www.minervaeurope.org/eu_nat_webapplications/unitedkingdom.html](http://www.minervaeurope.org/eu_nat_webapplications/unitedkingdom.html)
A search within the Visual Arts field for “Guides to Good Practice” produces two documents. One document entitled “Creating Digital Resources for the Visual Arts” (2000) was produced by VADS and TASI (Technical Advisory Service for Images, now JISCDigitalMedia). It highlights examples of practice in the creation of digital information in the visual arts domain and makes recommendations for best practice in data creation, collection, description, delivery and preservation. The second document, entitled “Creating and Using Virtual Reality: a Guide for the Arts and Humanities,” (2002) was also made by VADS in collaboration with the ADHS. It concentrates on an accessible desktop virtual reality which may be distributed and viewed online and is concerned with the variety of virtual reality models that may be produced and how to ensure that these can be delivered successfully to users and preserved for future reuse.

Ariadne

Web address: [http://www.ariadne.ac.uk](http://www.ariadne.ac.uk)

Ariadne is an online magazine for professionals within the field of information studies in Higher Education based in the UK and worldwide. Ariadne was formed in 1996 as part of the eLib Programme and was provided by JISC and the Innovation Support Centre until July 2013 when it was taken over by the University of Bath Library. It originally reported on developments within the UK Electronic Libraries.
Programme (eLib) although it now also reports on JISC-funded programmes and services as well as other developments within the UK and abroad. A keyword search for ceramics produces many results, including a 2013 article by Garrett et al which describes the exploration of the importance and nature of research data in the visual arts and the requirements for their appropriate curation and preservation. Garret et al use the 2011-2013 KAPTUR project funded by JISC and led by VADS as an example. KAPTUR sought to investigate the nature of the visual arts research data and develop and apply a model of best practice. One challenge observed was the lack of a comprehensive technical solution, which addresses the needs and behaviour of visual arts researchers and research teams, and meets the requirements of curators, institutions, funders and the wider community (Garrett et al, 2013).

Fig 45. Screenshot – Garret et al article on Ariadne, 2013.
3.10 Reflections on the Literature Review

Practical problems were encountered in carrying out this literature review. Firstly, it was challenging to find sources that usefully considered more than one of the areas that needed to be covered. For example, books and articles exist on the subjects of ceramics (Rawson 1971, Hannah 1986, De Waal 2003) and digitisation (Hughes 2003, Sitts 2000, Youngs 2012) but there appeared to be very little which made links between the areas. Many search results for ceramics, digitisation were a scientific analysis of ceramic materials (Carr, 1993). Also, sources about digitisation tended to be published more recently than sources about ceramics; however, ceramics had more longevity in research.

Secondly, when writing the literature review for this project, the line between methodology and subject could be blurred due to the nature of the MPhil. For example, VADS (the Visual Arts Data Service) was reviewed as both an exemplar database of sources for this project and as a public resource of digital images. Likewise, JISC (Joint Information Systems Committee) provided much useful knowledge on how and why digitisation occurs but it was also researched as a funder of digitisation projects.

As Hart suggests, “all reviews, irrespective of the topic, are written from a particular perspective or standpoint of the reviewer” and that, consequently, “the particularity of the reviewer implies a particular reader.” (Hart, 1998: 25). Comparing or synthesizing arguments can be difficult when, for example, two authors could approach the same topic but from different subject origins, such as digitisation in museums and digitisation within hospitals.

Another difficulty is that because technology continues to advance so rapidly, books and journals written before a certain date are somewhat obsolete, apart from being useful in historical analysis. Therefore the researcher tried to find sources published since the early 2000s to ensure up-to-date information was acquired.
These limitations identified a gap in the specific subject of digitisation of ceramic materials, which was taken as a justification for this research project.

3.11 Chapter Summary

Digitisation is still a progressing field. Historically speaking digitisation is comparatively new to other fields of study but it is advancing quickly due to the rapid developments in technology from which it was born. Since the 21st-century digitisation has become a primary focus particularly for LAMs that want to preserve collections and provide access to the collections. This has resulted in the establishment of numerous digitisation organisations and projects. However, due to broad variety and unpredictability of analogue materials, there is still no one-way to digitise and perhaps there never will be just one-way.

There are many reasons why digitisation is undertaken. Some of the main reasons include: to save physical space, to preserve items, for educational benefit, for analysis of items, to encourage tourism, to deepen and broaden access to items and to increase income.

As for the actual process of digitisation, there are many different aspects to consider before, during and after the work. Selection of materials is crucial as it ties-in with issues such as funding, staff training, accessibility of equipment, user requirements and availability of information. Instructive guides to digitisation are useful documents for assisting beginners through all stages of digitisation work as well as for reference for regular digitisation workers to maintain uniformity. However, there are a number of different guides available and so research must be done to ensure digitisation is continually done with accuracy.

Digitisation can have a large impact on an organisation and this must be considered prior to deciding to undertake digitisation work. Finance is a major issue, particularly in the economic climate of 2013, because digitisation demands money for
equipment, training, time and continuing maintenance. However, institutional collaboration, outsourcing and funding programmes can solve this issue. Digitisation has an impact on the way different users interact with a collection but this can potentially generate income for an institution.

Metadata and cataloguing are important components that support digital material. Metadata aids users in understanding digital material. There are several different types and schemas of metadata, such as DC, MARC and XML, but when one is appropriately chosen it must be adhered to for consistency. Catalogues work with metadata to aid users in discovering digital material and, again, consistency and clarity are important.

Archiving has been changed a great deal by the advent of digitisation. Analogue materials in archives can be digitised to increase access and save physical space and the analogue materials are subsequently better preserved. However, archives must evaluate how they interact with users as a result of digitisation. Oral history can be valuable and unique material when it is carefully planned and strictly conducted. The digitisation process of audio and video material is somewhat similar to that of images, but an issue with oral history is attracting users.

Ceramics have been exposed to different technologies for study, analysis and preservation. Until the development of 3D scanning, the digitisation of ceramics was limited to 2D reproduction, which was not perfect in representing the nature of the 3D objects, however, 2D reproduction can suffice as a practical and cheap alternative.

A number of different websites were included that were considered to be of continuous use during and beyond this MPhil project. Some of the websites were inspirational examples of how different digital material can be offered to users in collaboration with metadata. Other websites provide useful guides to digitisation and reviews of digitisation projects, as well as offer digitisation services and consultation.