# Supporting Institutional Digital Preservation & Asset Management:
# A Summary of the JISC DPAM Programme Synthesis

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## Executive Summary

This article summarises the results of a recently published synthesis study on the JISC-funded Digital Preservation & Asset Management (DPAM) programme. The DPAM programme ran from 2004 until 2006 and aimed to establish a basis for the development of institutional strategies and policies for long term preservation and asset management. Eleven projects were funded by the project across three main themes: Institutional management support & collaboration; Digital asset assessment tools; and institutional repository infrastructure development.

The study found that the programme was a resounding success. Projects delivered a number of highly relevant and re-usable outputs such as demonstrative shared services, survey and assessment tools, costing formulae, case studies, and a number of different training courses. Issues addressed by projects ranged from metadata, repository software and repository frameworks to business planning, life-cycle planning, legal issues and strategy development.

In summarising the DPAM synthesis study, this article provides an overview of each of the funded projects and explores project outputs with regards to a selected number of recurring themes. Further themes are explored in the synthesis study itself and readers are encouraged to refer to the study for more information.

## Introduction

Between 2004 and 2006, the UK Joint Information Systems Committee (JISC) funded a number of projects within its Digital Preservation and Asset Management (DPAM) programme to explore issues supporting digital preservation and asset management in institutions[1]. These projects were intended to establish a basis for further development of institutional strategies and policies for long term preservation and asset management. The programme focussed on preservation and asset management of a limited range of digital object types commonly found in institutions or national services, particularly those addressed in previous JISC-funded feasibility studies. These included e-journals, web resources, e-prints, e-learning objects and materials, and scientific data.

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[1] JISC has supported work in digital preservation for a number of years. Information on previous or concluded initiatives can be found at
http://www.jisc.ac.uk/whatwedo/programmes/programme_preservation/pastinitiatives.aspx. Please note that DPAM was also widely referred to as the 4/04 programme, in keeping with the initial title of the funding circular. The 4/04 circular can be found at
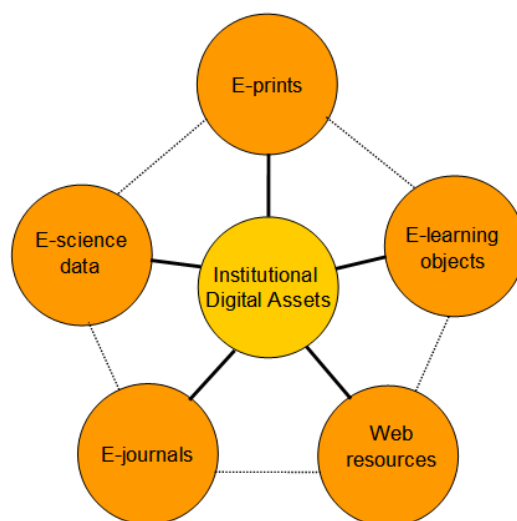http://www.jisc.ac.uk/fundingopportunities/funding_calls/2004/07/funding_circular4_04.aspx.

*Figure 1: Primary asset types covered by DPAM*

Eleven projects were funded within the programme and explored a broad range of issues relevant to digital preservation and asset management. Towards the end of the programme, JISC commissioned the Digital Curation Centre, in its capacity as a centre of excellence in digital preservation and curation, to carry out a programme synthesis study. The study brought together and synthesised all tangible results, outputs and outcomes of the projects funded within the DPAM programme. This article summarises the synthesis findings.

## Methodology

The study ran from November 2006 to June 2007. A questionnaire was developed to elicit as much information as possible from each project manager or representative. One-on-one interviews were carried out with almost every project in the first few months of the study, supplemented by e-mail or telephone contact and desk-based research. Subsequent analysis of project outputs and the interviews resulted in production of a two-part report: part I contained an overall programme and project-level evaluation with subsequent recommendations for JISC; part II contained the synthesis exercise itself.

## Projects

The programme had three funding strands: Institutional management support & collaboration; Digital asset assessment tools, and; Institutional repository infrastructure development.

### *Institutional Management Support and Collaboration*

Seven projects were funded to explore issues surrounding institutional management support and collaboration:

- Digital Preservation Training Programme (DPTP).[2] Led by the University of London Computing Centre in conjunction with the UK Digital Preservation Coalition (DPC) and Cornell University in the US, this project developed and delivered week-long residential modular training programmes that explored key issues in digital preservation and examined the need for policies, planning, standards and strategies in digital preservation.

- Life cycle Information for E-literature (LIFE).[3] University College London (UCL) Library Services and the British Library (BL) examined and established individual stages in the

2    DPTP website: http://www.ulcc.ac.uk/dptp/
3    LIFE website: http://www.life.ac.uk/

life cycles of key digital collections at UCL. These stages were costed to show the full financial commitment of collecting digital materials over the long term. A particularly commendable output of this project was the life cycle costing formulae and the unique digital preservation equation to cost digital preservation activity within the life cycle model.

- Managing Digital Assets in Tertiary Education (MANDATE).[4] John Wheatley FE college in Glasgow developed a management toolkit to support the implementation of digital asset management and preservation activities, notably for digital learning support objects and official college records, within an FE context. The toolkit walks users through the main issues to consider in the development of a digital asset management system from both a technological and a 'human' perspective.

- Managing Risk: a Model Business Preservation Strategy for Corporate Digital Assets.[5] This case study project at Kings College London (KCL) explored digital asset management practices across a number of distributed sites at KCL, identified risks arising from these practices, and made recommendations to improve practices across the entire data life cycle.

- METS Awareness Training (MAT).[6] Led by Oxford Digital Library, the MAT project ran a series of training events to raise awareness in the UK Higher Education community of the METS (Metadata Encoding and Transmission) standard for digital object storage within a library environment.

- Personal Archives Accessible in Digital Media (PARADIGM).[7] Research libraries at the University of Oxford and the University of Manchester collaborated on the PARADIGM project to explore and develop best practice guidelines on managing and preserving private digital papers, based on practical investigation with private papers from politicians.

- An Effective Strategic model for the Preservation & disposal of Institutional Digital Assets (ESPIDA).[8] Based at the University of Glasgow, ESPIDA developed a model to help make business cases for funding to enable management of intangible assets, including digital objects.

Training, costs/business models and case studies were particularly prevalent types of output: the Digital Preservation Training Programme, the METS Awareness Training project, MANDATE, PARADIGM, and ESPIDA all delivered or addressed training; ESPIDA and LIFE developed and released highly commended business and costing models, and almost every project released case studies related to their work. Some of these were used as training materials (such as the METS case studies), others documented the use of project outputs (as was the case with ESPIDA, LIFE, and MANDATE).

## *Digital Asset Assessment Tools*

On the basis that it is neither feasible nor desirable to preserve all the digital materials that an institution possesses, funding was made available for projects to explore and develop preservation assessment tools for digital assets. A single project was funded:

- Digital Asset Assessment Tool (DAAT).[9] The University of London Computing Centre together with seven other project partners explored the extensibility and development of

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4    MANDATE web site: http://www.jwheatley.ac.uk/mandate/
5    Information on the Managing Risk project can be found on the JISC web site: http://www.jisc.ac.uk/whatwedo/programmes/programme_preservation/programme_404/project_managingrisk.aspx
6    MAT web site: http://www.odl.ox.ac.uk/projects/projects_mets.htm
7    PARADIGM web site: http://www.paradigm.ac.uk/
8    ESPIDA web site: http://www.gla.ac.uk/espida/
9    DAAT web site: http://www.ulcc.ac.uk/daat

the existing analogue-based Preservation Assessment Survey (PAS) tool from the National Preservation Office (NPO) to assess the preservation requirements of digital materials within a given collection.

A significant output from this project was delivery of a pilot database-driven digital asset assessment tool. A survey and exploration of existing assessment tools was also carried out.

## *Institutional Repository Infrastructure Development*

In recognition of the very clear links between digital asset management, preservation, and repository storage, a further three projects were funded to explore institutional repository infrastructure development, particularly standards and shared repository services:

- •Assessment of UK Data Archive and The National Archives compliance with OAIS/METS.[10] The UK Data Archive at the University of Essex and the UK National Archives explored compliance of two national repositories with two significant (though very different) standards used in preservation: the Open Archival Information System (OAIS) repository reference model and the METS metadata encoding transmission standard.

- •PReservation Eprint SERVices (PRESERV).[11] Led by the University of Southampton, the PRESERV project explored a number of web-based preservation services for institutional repositories (IRs) and provided input to the development of preservation functionality within the institutional repository software package EPrints.

- •SHERPA Digital Preservation: Creating a Persistent Preservation Environment for Institutional Repositories (SHERPA DP).[12] The Arts and Humanities Data Service (AHDS) worked closely with the SHERPA project at the University of Nottingham to bring existing repository systems in the SHERPA IR network together with the AHDS preservation repository and create an environment that fully addressed the requirements of digital information objects across their entire life cycle.

The PARADIGM project received additional funding under this strand for its activities in practical testing of repository software and related tools, as well as its use of the OAIS workflow model.

Whilst aspects of each project clearly relate to strand activities already discussed (such as assessment and case studies), a key element of this programme strand was the focus on technical and functional repository infrastructures for long term preservation. Both the UKDA and TNA have archival repositories that cater for long term preservation; the AHDS preservation repository and preservation service had a clear long term preservation objective, and the PRESERV project had an explicit commitment to explore long term digital preservation within the context of institutional repositories.

# Thematic exploration of outputs

The synthesis study brought the outputs of all projects together and clustered them according to recurring elements or themes. The following section summarises the outputs of some of these themes. Further explorations of outputs and themes can be found in the synthesis study.

## *Assessment & Surveys*

Several projects undertook assessment and/or survey activities, either examining existing tools or approaches, or developing tools for use in assessment and surveys.

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10 Information about this project can be found on the JISC website athttp://www.jisc.ac.uk/whatwedo/programmes/programme_preservation/programme_404/project_oais.aspx
11 PRESERV web site: http://preserv.eprints.org/
12 SHERPQA DP web site: http://www.sherpadp.org.uk/index.html

**File format testing tools**: The DAAT project undertook an exploration of existing file format testing tools to explore whether or not they could be incorporated into the DAAT asset assessment tool. It focussed on three currently available tools:

- DROID (Digital Record Object Identification), a software tool developed by The National Archives to perform automated batch identification of file formats.[13]

- JHOVE - JSTOR/Harvard Object Validation Environment, a tool that provides functions to perform format-specific identification, validation, and characterisation of digital objects.[14]

- AIHT at Stanford University: Automated Preservation Assessment of Heterogeneous Digital Collections, and the Empirical Walker tool.[15]

The aim was not to make a general report on whether the tools worked, but whether they had useful qualities which can help identify the preservation needs of digital assets. All three tools had their advantages, but the team found that JHOVE will be particularly useful in a digital preservation context as it can be used continually to check and recheck the validity and integrity of each digital object stored in a repository.

**Digital asset assessment methodology & pilot tool:** The DAAT project released a preservation assessment method and prototype tool.[16] The method is comprised of a manual survey, the results of which are entered into a tool – currently an Access database – and automatically scored. Guidance on using the method and tool are available. The project final report recognises that the survey tool requires significant additional work before it becomes usable in a wide variety of settings.

**Assessment of compliance with OAIS/METS:** The OAIS/METS Assessment project developed a set of questions to help carry out their assessment for OAIS compliance. This question set can be extended and tailored for use as a self-assessment tool for OAIS compliance testing by other institutions. Answers to these questions can help when comparing the functions and workflows in an archive with those recommended by the OAIS standard. The question set covers the functions of the archive, OAIS mandatory responsibilities, functional entities, and the OAIS model.[17]

**Survey of repository preservation policies and approaches:** PRESERV carried out a sample survey to determine exactly what repositories – particularly Institutional Repositories – were doing about digital preservation. The survey found that none of the repositories surveyed had a formal preservation policy to guide decisions on the questions raised in the survey, yet *de facto* policies were being applied to specific areas such as file formats and transformations, for example.[18]

**Survey of digital asset management practices:** As part of its investigation into corporate digital asset management at KCL and in recognition that preservation planning necessarily begins at the start of the digital records life cycle, the Managing Risk project carried out a survey of digital assets and management practices in a number of college units. An overview of the survey results, which are likely indicative of practices at many other similar institutions, is contained in the final report.[19]

**Records Survey Tool:** PARADIGM developed a records survey for use in the offices on politicians. The survey is designed to elicit an overview of the paper and electronic records being created, with a view to their subsequent appraisal and preservation. The records survey tool assisted the surveying archivists in identifying materials of historical value by assessing functions

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13  DROID – Digital Record Object Identification http://droid.sourceforge.net/.
14  JHOVE – JSTOR/Harvard Object Validation Environment http://hul.harvard.edu/jhove/.
15  Anderson et al, *The AIHT at Stanford University*, Dec 2005 Dlib Vol 11, no12
    http://www.dlib.org/dlib/december05/choudhury/12choudhury.html.
16  This pilot tool is available from the DAAT project website at http://www.ulcc.ac.uk/daat/project-deliverables.html
17  OAIS/METS assessment final report:
    http://www.jisc.ac.uk/media/documents/programmes/preservation/oaismets.pdf
18  For a discussion of the survey and its results, see Hitchcock et al, *Survey of repository preservation policy and activity* (draft, 2007) at http://preserv.eprints.org/papers/survey/survey-results.html
19  Managing Risk project final report:
    http://www.jisc.ac.uk/media/documents/programmes/preservation/kings_final_report2.pdf

and roles, the nature of the records that document them, the vulnerability of records, and their technical characteristics. It also prompted creators to think about the historical value of their traditional and digital materials, as well as preservation-related issues. Most of the questions may also be applied to the private papers of other individuals.[20]

**Repository contents profiling service:** PRESERV worked with The National Archives to link the widely renowned PRONOM-DROID tool for file format identification to the widely used Registry of Open Access Repositories (ROAR) through an Open Access Initiative (OAI) harvesting service and deliver a web-based assessment tool known as the PRONOM-ROAR format profiling service. As a result, file format profiles can be found for over 200 repositories listed in ROAR. This survey tool to identify file formats stored within a repository is the first step in a more fully fledged technology watch service whereby 'at-risk' formats are subsequently flagged and acted upon.[21]

## *Repositories*

Projects commonly focussed on the 'big three' – Eprints; DSpace and Fedora.

- Eprints is an established, flexible software infrastructure that is used to store and provide open access to a wide range of digital materials in institutions around the world.[22]

- The DSpace digital repository system was designed to capture, store, index, preserve, and provide access to institutional digital research materials.[23]

- Fedora is a general-purpose open source digital object repository management system for managing and delivering digital content. It is used in a range of repository scenarios, from digital asset management and institutional repositories to digital libraries. Fedora is more complex to install and manage than DSpace and Eprints, but is often preferred for more complex activities than commonly undertaken within an institutional repository setting.[24]

SHERPA DP carried out architectural reviews of all three software options. These are available from the SHERPA DP website and were carried out to inform development of the SHERPA DP network for preservation services.[25]

The PARADIGM project workbook contains a detailed description of the project team's experiences in setting up DSpace and Fedora repositories. These are useful 'case study' descriptions that others can follow together with the official user installation guidelines.[26]

The MANDATE toolkit contains information on the issues surrounding selection of a digital asset management system. Its inclusion of proprietary solutions and supporting tools is particularly valuable.[27]

**Preservation Services for Repositories**

*1. Format profiling*

One of the most widely recognised problems in preserving digital information is format obsolescence: as applications change over time to exploit the capabilities of new technology, digital objects created using old formats, or even old versions of formats, can become unreadable and the content and authenticity of a digital object becomes at risk. To begin to avoid the problem of loss through technological obsolescence, repository managers first need to know the formats of the objects in their repositories if they are to be able to plan and act in good time and keep objects

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20 The Records Survey is available at http://www.paradigm.ac.uk/workbook/appendices/records-survey.html
21 More information on PRONOM-ROAR can be found at http://trac.eprints.org/projects/iar/wiki/Profile
22 http://www.eprints.org/.
23 http://www.dspace.org/.
24 http://www.fedora-commons.org/.
25 See http://www.sherpadp.org.uk/sherpadp.html.
26 See the repositories section of the PARADIGM workbook: http://www.paradigm.ac.uk/workbook/repository/index.html.
27 See the software section of the MANDATE toolkit, http://www.jwheatley.ac.uk/mandate/Toolkit/software.htm.

readable, accessible, and authentic.

PRESERV worked with The National Archives to link the widely renowned PRONOM-DROID tool for file format identification to the widely used Registry of Open Access Repositories (ROAR) through an OAI harvesting service. This has already been described in the section above – 'Repository contents profiling service'. File format profiles can now be found for over 200 repositories listed in ROAR. This service – that identifies the file formats stored within a repository – is the first step in a more fully fledged technology watch service whereby 'at-risk' formats are subsequently flagged and acted upon and has been termed the PRONOM-ROAR format profiling service.

*2. Preservation Service Provider*

The SHERPA DP project developed a practical and cost effective shared preservation service demonstrator system for performing preservation activities for a distributed network of institutional repositories. This was a reusable service framework that allowed the integration of a disparate collection of software tools and standards within a two tier system of content providers (participating IRs) and service provider (AHDS archive). The project adopted Fedora as the basis for the preservation repository and built a technical infrastructure necessary to harvest metadata, transfer data, and perform relevant preservation activities. Appropriate software tools and standards were selected, including JHOVE and DROID as software tools to validate data objects, METS as a packaging standard, and PREMIS as a basis on which to create preservation metadata.[28]

**Standards for Repositories**

*1. Open Archival Information System (OAIS) Reference Model*

The OAIS model establishes a common or standardised framework of terms and concepts that describes the necessary functions and elements of an archive intended to provide permanent or indefinite long term preservation of digital information.[29] Standard terminology allows existing and future archives to be more meaningfully compared and contrasted. It also provides a basis for further standardisation within an archival context and it should promote greater vendor awareness of, and support for, archival requirements. The OAIS reference model became an ISO standard in 2003.

The PARADIGM workbook includes some useful examples of OAIS in practice, as well as information on certification mechanisms.[30] A compliance checklist was developed by the OAIS/METS Assessment project.[31] The OAIS model formed the basis of the SHERPA DP aggregated preservation service provider model, whereby services provided by institutional repositories are mapped to the OAIS reference model, and notable omissions are identified and allocated to the preservation service. Finally, the DPTP training course included a module on the OAIS to provide trainees with a better understanding of the OAIS model and its applicability.[32]

*2. PREMIS*

PREMIS is a de facto standard metadata schema for preservation metadata.[33] The PREMIS data dictionary specifies core metadata for verifying and tracking the provenance, authenticity and integrity of preserved digital assets, and it has been widely seized upon by the preservation

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28 The SHERPA DP demonstrator is still being worked upon in an extension of the SHERPA DP project: SHERPA DP 2. Further information is available from the SHERPA DP website, op cit.

29 The OAIS model was first developed by the CCSDS. The 2002 version of the document is available from the CCSDS at http://public.ccsds.org/publications/archive/650x0b1.pdf.

30 See the OAIS section of the PARADIGM workbook at http://www.paradigm.ac.uk/workbook/introduction/oais.html

31 Op cit.

32 See http://www.ulcc.ac.uk/dptp/modules/oais.html for information about the contents of the OAIS functions module.

33 PREMIS was developed by an OCLC/RLG working group and is being maintained via a Library of Congress site: http://www.loc.gov/standards/premis.

community.

PRESERV found that PREMIS appeared to provide an excellent basis on which assess the preservation metadata requirements of IRs, and that it was possible to map the PREMIS elements to an extended model incorporating both preservation services and registries.[34] The PARADIGM workbook explored the use of PREMIS metadata within METS (see below) files and the workbook contains a particularly useful section outlining the strengths and weaknesses of PREMIS.[35]

*3. METS*

The METS schema is a de facto standard for encoding descriptive, administrative, and structural metadata regarding objects within a digital library, expressed using an XML Schema. The METS standard has been proposed as a suitable vehicle to support transfer and dissemination of objects for preservation by an external service provider, particularly in the case of complex objects (i.e. those comprising more than one file).[36]

The OAIS/METS Assessment project project explored the strengths and weaknesses of METS in an archival environment and found that METS documents (i.e. instances of METS in practice) are compatible with the OAIS model but saw no clear benefit in implementing METS in the test repositories at this moment in time, particularly for born-digital materials.[37] The PARADIGM workbook section on administrative and preservation metadata contains a detailed introduction to METS and its use within a digital archive setting. The project developed specific guidance for users implementing METS in a digital archive setting, including advice on dealing with problems ingesting METS files into Fedora.[38] In terms of software development, PRESERV released a METS export plug-in derived from work done by the Repository Bridge project, which had previously implemented a METS export for EPrints v2. PRESERV updated this for the new plug-in architecture and data model in EPrints v3.[39]

*4. MPEG-DIDL*

Similarly to METS, the de facto standard MPEG-DIDL (Digital Item Declaration Language) has also been proposed as a suitable vehicle to support transfer and dissemination of complex objects for preservation by an external service provider. PRESERV developed an MPEG DIDL plug-in to package data for delivery to an external service that has since been integrated into Eprints v3.[40]

## *Costs & Business models*

A number of projects addressed issues relating specifically to costs and business modelling, namely LIFE, ESPIDA, and SHERPA DP.

**Cost model:** The LIFE project developed a life cycle based, scalable methodology to calculate the long term costs and future preservation requirements of digital assets. Though the model has been developed in a digital library setting, there is no reason to believe that elements of the model are not transferable to other contexts. The preservation aspect of the model is particularly valuable as most other work on preservation costing has approached the subject in isolation, rather than how it is integrated into overall life cycle management.[41]

**Business model for a preservation service:** SHERPA DP built on the outputs of the LIFE project

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34  See Hitchcock et al, *Preservation Metadata for Institutional Repositories: applying PREMIS* (draft, 2007) http://preserv.eprints.org/papers/presmeta/presmeta-paper.html.
35  See the preservation metadata section of the PARADIGM handbook, http://www.paradigm.ac.uk/workbook/metadata/preservation-metadata.html.
36  See the METS web site from the Library of Congress, http://www.loc.gov/standards/mets/.
37  See OAIS/METS Assessment project final report, op cit.
38  See the PARADIGM workbook preservation metadata section, op cit.
39  Repository Bridge project – http://www.inf.aber.ac.uk/bridge/; METS plug-in – http://wiki.eprints.org/w/Preservation_Support#Complex-Object_Export:_METS_and_DIDL_plugins.
40  See reference to METS plug-in, ibid.
41  The LIFE project methodology is contained in the project final report: http://eprints.ucl.ac.uk/1854/. A summary report is available from http://eprints.ucl.ac.uk/1855/.

to develop a cost and business model for the SHERPA DP preservation service. The model illustrates how the LIFE model may be applied to Service Providers offering a service to institutional repositories, or indeed anyone who wish to assess the cost of preservation on a year-by-year basis. Costs are calculated on a three-tier basis – set-up costs; service costs; and exit costs. Service costs are the focus of investigation, with the cost of storage, preservation and limited technical support being provided as examples of the method in which different levels of service will incur varying costs.[42]

**Business case model for intangible assets:** The business case model developed by ESPIDA can be used in making business cases for proposals that bring benefit in more intangible spheres than immediate financial benefits. While it was designed initially to be used within the area of digital resource management, it has potential for far wider application, including decision making, performance measurement, and change management.[43]

## *Training*

**Comprehensive preservation training:** The DPTP developed a modular training programme with content targeted at all levels of staff from service or project managers to technical and operational staff. DPTP's broader aim was to equip staff with the skills, tools and confidence to be able to embark on a pragmatic and cost-effective digital preservation programme appropriate to their own institutional needs. The programme was delivered on three occasions. Since the end of the project, ULCC have taken ownership of the programme and offer updated versions of the course.[44]

**METS training:** The METS Awareness Training project aimed to raise awareness in the UK higher education community of the METS (Metadata Encoding and Transmission) standard. MAT Training materials are a mixture of graphic presentations and documentary case studies.[45]

**Business case training:** The ESPIDA project developed a training exercise to facilitate understanding and implementation of the model. It is envisaged that the training exercise could be used as a first step in understanding the approach before full implementation within organisations or groups wishing to use it.[46]

**Digital Asset Management Systems (DAMS) training:** The MANDATE toolkit contains a section on training, highlighting the importance of training for managers approaching digital asset management and including those with responsibility for flexible learning, library services and quality, and technical managers.[47]

## *Case studies*

Case studies are incredibly valuable. In some circumstances, they provide a basis on which to test and refine a given theory or approach. In others, they can be used to illustrate to the wider community how an approach was implemented in a given context. This can give rise to several practical issues that may otherwise not be obvious to new implementers. Indeed, case studies can often accomplish both of these outcomes, acting simultaneously as test cases AND as learning tools for others.

Case studies covered:

- Digital asset management in an FE setting (MANDATE project)
- Digital asset management in an HE setting (Managing Risk project)

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42 Further information on the model is contained in the project final report, available from http://www.sherpadp.org.uk/documents/sherpadp_finalreport.pdf.
43 The ESPIDA handbook details the overall approach, see http://www.gla.ac.uk/espida/documentation.shtml.
44 DPTP training course, see DPTP web site op cit.
45 Training materials are available from the MAT project web site, op cit.
46 ESPIDA handbook, op cit.
47 MANDATE toolkit: http://www.jwheatley.ac.uk/mandate/Toolkit/index.htm.

- Costing of digital library collections (LIFE project)
- Metadata implementation in digital libraries (METS Awareness training)
- Archival collection development (PARADIGM project)
- Developing a business case to support intangible assets (ESPIDA project)

The MANDATE project is an excellent example of how case studies can function both as test scenarios against which to develop and refine an approach, and also practical examples of implementation from which others can glean valuable learning experiences. Each chapter of the MANDATE toolkit is supplemented by a case study description of implementation experiences at John Wheatley college that demonstrates how the toolkit was applied and shows how and why decisions were taken in support of any given activity.[48]

The LIFE project used case studies as a mechanism for implementing and testing their model, and for identifying actual costs for different types of digital objects in different scenarios. The case studies focussed on VDEPs (voluntarily deposited electronic publications), web archiving activities, and e-journals at UCL Library services. Although preservation activities were not undertaken in any of the case studies, the studies were fundamental in shaping the specific and required elements of the preservation aspect of the model.[49]

The PARADIGM project carried out three case study/pilot projects to test and refine their knowledge of collection development for digital materials. This enabled them to make important recommendations on approaching and developing collection development policies and strategies. The primary case study involved identifying, capturing, and transferring records from contemporary politicians and led to a series of recommendations on how this valuable type of historical resource could be targeted for preservation. The study was supported by two complimentary pilot projects, one examining how political web resources could be targeted, the other exploring the issues in accessioning digital deposits from physical storage media. The project ultimately recommended that more case studies are needed, particularly those that test different approaches or which address different domains.[50]

### *Conclusion*

JISC, the DPAM programme, and all of the projects funded within it, recognised that digital preservation and effective management of digital assets requires significant work. Their activities have made valuable progress towards equipping us with the knowledge to safeguard our digital assets for the future. Yet there is still some way to go, and JISC is continuing to fund preservation research within the context of the Repositories and Preservation programme (2006 – 2009).[51] The work carried out as part of the DPAM programme is contributing in no small way to this, and, it is hoped, to digital preservation and asset management activities in other, external organisations.

To learn more about the other activities undertaken within the programme and themes explored within the synthesis, including life-cycles and digital asset types, please refer to the references and the synthesis report itself.[52]

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48  MANDATE toolkit, op cit.

49  LIFE project case studies are contained in the final report, op cit.

50  More information about the PARADIGM case studies is contained in the project final report, see http://www.paradigm.ac.uk/projectdocs/jiscreports/index.html.

51  See http://www.jisc.ac.uk/whatwedo/programmes/programme_rep_pres.aspx.

52  The synthesis report is available from the JISC website - http://www.jisc.ac.uk/media/documents/programmes/preservation/404publicreport_2008.pdf ; the DCC website - http://www.dcc.ac.uk/docs/publications/404publicreport-2008.pdf ; and the UKOLN web site – http://www.ukoln.ac.uk/ukoln/staff/m.pennock/publications/docs/404publicreport-2008.pdf.