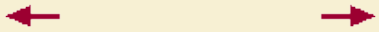
Now you see it, now you won't

Preserving digital cultural material

Suzanne Keene, University College London

"Digital materials, regardless of whether they are created initially in digital form or converted to digital form, are threatened by technology obsolescence and physical deterioration." - *Research Libraries Group*



http://www.suzannekeene.info/conserve/digipres/

Practical challenges

Preservation policies

Preservation Management of Digital Materials
Jones, M. and Beagrie, N. British Library, 2001

The first principle of digital preservation is: Decide at the time when it is created how long the material is to last. This will affect the standards used, the software technology (for example, a more expensive but standard database management system might be necessary), the upgrade path, the staff and technological resources necessary to manage the digital asset for the future.

We don't have to plan to keep everything for ever. Distinguish between assets for:

- **Short-term preservation** – such as visitor information or 'brochure ware'
- **Medium-term preservation** – access for a period of time but not indefinitely - such as web exhibits
- **Long-term preservation** – continued access to digital materials, or at least to the information contained in them, indefinitely - such as database content

What to do?

Set a policy: to designate digital assets for short term, medium term, or long term preservation.

Short term assets need little action.

Medium term assets require day-to-day management and backup to make sure they remain accessible for as long as required.

Long-term assets require careful attention to standards, metadata, their technological basis, to maintaining off-site copies, and to strategic planning for their future technological path.

Practical challenges	Long term realities	Any answers?
Preservation policies Retrieval and identification Technical obsolescence Physical deterioration Authenticity	Intrinsic value Ownership factors Social / political factors Environment factors	International actions ********* About the author

Go to Conserve

Practical challenges

Retrieval and identification

The singing sands on the edge of Mingshashan
Photo: Oliver Wild

Imagine coming across a collection of digital objects - say, the images from a database - in decades to come. Finding any particular object - an image, a piece of text, a sound recording - could be like searching for a grain of sand in a sand dune. Equally, how would one identify any random grain?

Actual cultural objects themselves embody information that can identify them. A painting for example - art historians can tell the date, the subject and the artist from its iconography and through scientific examination of its materials. Digital cultural objects are just collections of digital bits.

- **Metadata** are catalogue information about digital assets. Without the metadata for a digital object we can't find what we want, and we won't know it is there, nor what it is should we come across it by chance.

What to do?

Digital assets have to be catalogued at the time they are created; otherwise we don't even know that they exist. Before embarking on a substantial digitisation project the metadata scheme must be carefully worked out. Normally this will be based on the Dublin Core.

The process of cataloguing the digital cultural objects as they are created may well be the slowest part of the project. This mirrors experience of adding to collections of actual objects, where 'metadata', information about the provenance and significance of the object, is becoming ever more important.

Practical challenges	Long term realities	Any answers?
Preservation policies Retrieval and identification Technical obsolescence Physical deterioration Authenticity	Intrinsic value Ownership factors Social / political factors Environment factors	International actions ********* About the author

Go to Conserve

Practical challenges

Technical obsolescence

IBM pc from 1981.
Image: Rune's Computer Museum

Huge sums of money are being invested in programs of digitisation. Yet rapid technological evolution means rapid obsolescence. It is common experience that we can scarcely read text files more than a few years old, let alone access complex databases. Both software - database management systems - and hardware - the machines on which they run - evolve. The result can be that large scale digital assets become obsolescent along with the machines on which they were born and used.

There are already numerous examples of this, one of the most striking being the BBC's Domesday videodisk. The BBC commemorated the thousandth anniversity of the compilation of the Domesday Book itself by commissioning records of every parish in England from local schools. Only fifteen years after they were made, few disks survive, and the database is having to be completely reformatted and remade.

What to do?

First, distinguish between the means of accessing and presenting the digital assets and the digital assets - the data - themselves. The principles used to ensure interoperability across different organisations' systems are the same as those that will ensure longevity for digital assets - open source software, internationally recognised standard formats for images, text, sound and other media.

On maintaining the data in usable form, there are two main schools of thought. Some people say that it is easier to emulate the software that ran the original files so that it works on new machines:

- **Emulation:** the imitation of obsolete systems on future generations of computers, so that the emulated software can make the digital asset accessible.

Other people say that it is better to convert the digital asset into a new file format that newer software can run:

- **Migration:** the transfer of digital assets from one generation of technology to the next.

Migration preserves the information content of the digital asset but does not necessarily result in an exact digital replica, nor in the original features of display and appearance.

Many people say that the vital thing is to keep using the digital asset. In that way small upgrades or adjustments are made that ensure it remains usable. Any of these solutions, however, raise issues of authenticity.

Practical challenges	Long term realities	Any answers?
Preservation policies Retrieval and identification Technical obsolescence Physical deterioration Authenticity	Intrinsic value Ownership factors Social / political factors Environment factors	International actions ********* About the author

Go to Conserve

Practical challenges

Physical deterioration

Papyrus Harageh 1, late Middle Kingdom.
Image: Petrie Museum, UCL

Actual objects have survived in nearly their original form for a thousand, even several thousand years; digital assets require the constant active attention of highly skilled people, and machines functioning to tolerances of millions of a millimetre.

Storage media for digital assets are physically not very durable. They are composite, made of a number of different materials such as synthetic resins, metals, and carrier media, where different materials have different requirements for their preservation, and may even adversely affect each other.

Actual objects are very forgiving and resiliant. They can survive in fragmentary form, or with quite severe losses, and still be quite understandable. We have the choice of restoring them so that they look whole again, in ways that can be reversed if others subsequently think they would be better unrestored. Will it be possible to restore and also reverse the restoration of a damaged digital file?

What to do?

It will almost certainly be necessary to adopt:

- **Media reformatting** - copying information content from one storage medium to a different storage medium, or
- **File reformatting** - converting from one file format to a different file format.

Both of these imply a thought-out policy for copying from one storage medium to another at intervals, and for reviewing standards and applying updated ones.

Practical challenges

Preservation policies
Retrieval and identification
Technical obsolescence
Physical deterioration
Authenticity

Long term realities

Intrinsic value
Ownership factors
Social / political factors
Environment factors

Any answers?

International actions

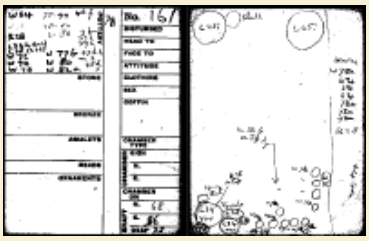
****

About the author

Go to Conserve

Practical challenges

Authenticity



Record of a tomb excavated by Flinders Petrie
Image: Petrie Museum, UCL

If files are being converted or copied, how closely do they need to resemble the original file that was created? Is this important at all? What if someone amends the content? Is there such a concept as an authentic digital asset? This is crucial to the trustworthiness of an electronic record, or the fact that a `born digital' asset is the same as it was when it was first created.

Authenticity means that digital material is what it purports to be. Authentication is the process that would attempt to establish the degree of authenticity.

What to do

It is a usual requirement for museum collections management systems to require the author and subsequent editors of records to be recorded. The security implications of allowing anyone to alter records are obvious. Equally, if a piece of information is recorded it can be important to know who was the originator.

Documentation, as much on paper as electronically, may be the principle means of assuring authenticity, for digital assets just as for real ones. The metadata record for a digital asset should give information about who created it, its original format, etc.

Practical challenges	Long term realities	Any answers?
Preservation policies Retrieval and identification Technical obsolescence Physical deterioration Authenticity	Intrinsic value Ownership factors Social / political factors Environment factors	International actions ********* About the author

Go to Conserve

Long term realities

Intrinsic value

A golden Anglo-Saxon reliquary, 9th cent.
Photo: S.Keene

Michel Benarie and Jonathan Ashley-Smith have analysed the factors that lead to the survival of actual cultural objects. Among them are factors intrinsic to the object. An object that is intrinsically valuable, such as one that is made of precious metal, will be kept safe and looked after; therefore it is more likely to survive than one that is less valuable. Durability is another relevant factor. An object that is strongly made of precious metal may survive well (although it may also be melted down). An object made of precious stone may have a better chance.

Digital cultural objects are neither intrinsically valuable nor durable. Any value arises from current perceptions and uses. There is nothing we can do about this.

Practical challenges

Preservation policies
Retrieval and identification
Technical obsolescence
Physical deterioration
Authenticity

Long term realities

Intrinsic value
Ownership factors
Social / political factors
Environment factors

Any answers?

International actions

****

About the author

Go to Conserve

Long term realities

Ownership factors

The Australian National Museum, Canberra
Photo: ArtServe at the Australian National University

Actual objects have a better chance of surviving if they belong to a powerful, permanent organisation. Fortunately, many digital cultural assets will belong to such an organisation. Universities, libraries and museums are all examples. They tend to be owned or financially supported by governments as a way of fostering and demonstrating a country's 'cultural capital'.

This is fortunate, because as we have seen, digital cultural objects have very exacting needs for organisational continuity and resources. The policies and procedures that need to be set and implemented for constant attendance and monitoring can only realistically be provided by powerful and permanent organisations.

Practical challenges

Preservation policies
Retrieval and identification
Technical obsolescence
Physical deterioration
Authenticity

Long term realities

Intrinsic value
Ownership factors
Social / political factors
Environment factors

Any answers?

International actions

****

About the author

Go to Conserve

Long term realities

Social and political factors

Kronach, Germany, 1945
Source: National Archives and Records Administration
Thanks also to WWII Multimedia Database

Property of all kinds, perhaps especially cultural property, depends crucially on a supportive social and political environment. As we all know, wars and social unrest frequently result in collections and buildings being destroyed. Due to their inherent durability and also their portability many actual cultural objects have survived, and continue to do so.

It is a different story for digital cultural material. Although it could be highly portable - an external hard drive or a few CD ROMs - is it likely that this would happen?

Of course, digital materials can be replicated - mirror sites and copies can be deposited around the globe - and this could be a strength. However, many of them depend on the intimate knowledge possessed by their creators and custodians, and they certainly need their detailed documentation. If political stability is a concern then these requirements might be borne in mind.

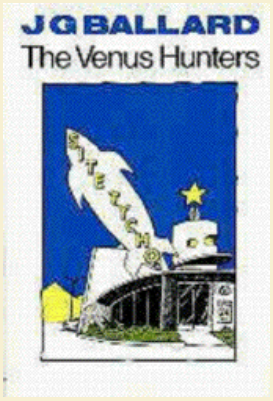
Digital materials also have one more crucial requirement for their use and realisation, strongly politically influenced - a stable electricity supply.

Practical challenges	Long term realities	Any answers?
Preservation policies Retrieval and identification Technical obsolescence Physical deterioration Authenticity	Intrinsic value Ownership factors Social / political factors Environment factors	International actions ********* About the author

Go to Conserve

Long term realities

Environment factors



Why science fiction? A story, *The Time Tombs*, in JG Ballard's *The Venus Hunters*, describes desert tomb robbing a couple of millennia hence. The robbers are not after gold and silver, however. The treasures are tapes that, when the tomb is disturbed, create a virtual reality image of the buried person: virtual equivalents of the well-known portraits from Roman Egypt.

It is plausible that these tapes (and the machines to play them) have survived just as physical objects in Eyptian tombs have done. The sealed tombs would create a completely stable and atmosphere, with minimal humidity, no gaseous pollution, no dust and low oxygen levels. Even virtual objects have to reside in physical media, so these factors apply to them equally.

We are familiar with the amazing preservation of objects from the tombs of ancient Egypt. Such objects include actual documents written on papyrus. Other examples are the quantities of documents found in the Mogao caves in China, which survive from the 9th century AD. There are, of course, many examples of documents surviving from even earlier dates.

In many cases, such survivals happen without conscious intervention from people. If we want to create conditions for long term survival we have to go to extraordinary lengths to create suitable environmental conditions, using air conditioning, sealed cases, and so on. But JG Ballard's story is improbable. It is unlikely that people in future millennia will happen on survivals from the dawn of the Information Age that have not been subject to conscious and active preservation.

But you never know. Even now people are willing to go to considerable lengths to decipher operating systems for long deceased machines - from all of 50 years ago!

Practical challenges

Preservation policies
Retrieval and identification
Technical obsolescence
Physical deterioration
Authenticity

Long term realities

Intrinsic value
Ownership factors
Social / political factors
Environment factors

Any answers?

International actions

****

About the author

Go to Conserve

Any answers?

International actions

Photo: NASA

The issues around preserving digital assets are being recognised worldwide. Below are links to some of the major projects.

UK: The Digital Preservation Coalition
The DPC is a partnership of major information organisations in the UK, including the British Library, the Public Record Office, University Research Libraries, and many other similar organisations.

UK: the CEDARS project
An electronic libraries project that has been broadly investigating issues around digital preservation.

USA: The Digital Library Federation
Good links and information on this topic, from this USA organisation.

USA: the Research Libraries Group (RLG)

Report: Digital preservation needs and requirements in RLG member institutions.

Australia: PADI (Preserving Access to Digital Information)

From the National Library of Australia. Subject gateway with excellent links to this topic

Australia: PANDORA
Preserving and Accessing Networked Documentary Resources of Australia

"The cost of digital image preservation"
The Social and Economic Implications of the Production, Distribution and Usage of Image Data. By Howard Besser & Robert Yamashita. Report funded by the Mellon Foundation, published 1998. School of Information Management & Systems, UC Berkeley.

Practical challenges	Long term realities	Any answers?
Preservation policies Retrieval and identification Technical obsolescence Physical deterioration Authenticity	Intrinsic value Ownership factors Social / political factors Environment factors	International actions ********* About the author

Go to Conserve

Suzanne Keene

As well as working as a consultant in museum collections care and digitisation, I jointly run the Masters programme in Museum Studies at University College London. Iéve worked in senior museum management for a number of years, most recently as Head of Collections Management in the Science Museum and Head of Conservation in the Museum of London. In both museums, I developed and introduced many new ways of managing and planning for collections care and digitisation. Before that, I worked in archaeological research organisations.

I write a lot of articles, and I have authored two popular books, *Managing Conservation in Museums*, and *Digital Collections: Museums and the Information Age*. My main research areas are the usefulness of large scale collections, and the new field of the effects of information and communications technology on cultural organisations.

Do visit my website:

www.suzannekeene.info

Practical challenges

Preservation policies
Retrieval and identification
Technical obsolescence
Physical deterioration
Authenticity

Long term realities

Intrinsic value
Ownership factors
Social / political factors
Environment factors

Any answers?

International actions

****

About the author

Go to Conserve