Digital Data and Archaeology: Management, Preservation and Publishing

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Digital Data and the Archaeological Record

Outline
- Digital Data and Archaeology
- Why is Digital Data Fragile
- Case studies of bad practice
- Importance of data management and preservation

Archaeology
- Archaeology is destructive
- Comprehensive records of field work are imperative

http://archaeologydataservice.ac.uk
Archaeological Data

- Published data is limited
- Majority of data recorded in grey literature
- Data is not easily searchable
- Assess to data is difficult
- Move from large data rich publications to slim syntheses

Advancement of Digital Data

- The use of computers in archaeological fieldwork recording and research has become routine

Digital Data

- Born Digital: Data created in digital format
- Digitised Data: Hardcopy converted to digital format
**Digital Data and the Archaeological Record**

### Software
- Lots of formats
- Become out of date rapidly

![Software Pie Chart](https://example.com/software_chart.png)

<table>
<thead>
<tr>
<th>Software</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Studio Max</td>
<td>4%</td>
</tr>
<tr>
<td>AutoCAD</td>
<td>4%</td>
</tr>
<tr>
<td>ArcGIS</td>
<td>4%</td>
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<tr>
<td>CADD</td>
<td>4%</td>
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<tr>
<td>ENVI / IDL</td>
<td>4%</td>
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<tr>
<td>ERDAS Imagine</td>
<td>4%</td>
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<tr>
<td>Golden Software Surfer</td>
<td>4%</td>
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<tr>
<td>Hexagon</td>
<td>4%</td>
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<tr>
<td>MicroStation</td>
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<tr>
<td>Polyworks</td>
<td>4%</td>
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<tr>
<td>rapidform</td>
<td>4%</td>
</tr>
<tr>
<td>Terrasight</td>
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<tr>
<td>TERRA3D</td>
<td>4%</td>
</tr>
<tr>
<td>Custom software</td>
<td>4%</td>
</tr>
<tr>
<td>MySQL</td>
<td>4%</td>
</tr>
</tbody>
</table>

### Digital Data
- Easier to create
- Easier to update
- Easier to access

### But Fragile!
- Digital data is encoded
- Digital data requires software and technology to present content

### Why is Digital Data Fragile?

![Digital Data Fragility](https://example.com/fragility.png)

*https://youtu.be/8dhp_20j0Ys*
Why is Digital Data Fragile?

- Deterioration of the storage medium
  - Degradation — Bit rot!
  - Can be easily damaged
  - Can be easily overwritten

Case Study: NASA — again!

One giant blunder for mankind: how NASA lost moon pictures

Copied over the Moon Landing tapes
Why is Digital Data Fragile?

- Deterioration of the storage medium
- Obsolescence of the software

Case Study: NASA

- NASA sent two Viking Landers to Mars in 1975
- Data recorded on magnetic tape
- Climate controlled environment

In the 1990s they could not decode the formats used
Had to track down old printouts and retype everything

Photos: Courtesy NASA/JPL-Caltech
Why is Digital Data Fragile?

- Deterioration of the storage medium
- Obsolescence of the software
- Obsolescence of the storage medium

Media Types

- Experience rapid change

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Technology

- Hardware experiences rapid change

Case Study: BBC Domesday Project

- 1986
- photographs, maps, etc
- 30cm laserdiscs
- BBC Microcomputers

In 2006 the laserdiscs were obsolete as was the hardware

Rescue projects launched by The National Archives and Leeds University

http://www.bbc.co.uk/history/domesday/story
Why is Digital Data Fragile?

- Deterioration of the storage medium
- Obsolescence of the software
- Obsolescence of the storage medium
- Obsolescence of the hardware
- Failure to document data adequately

Case Study: Newham Museum Archaeological Service

Archive:
- approx. 150 excavations
- 6432 individual files
- 1500 excavation reports
- 700 database files
- 1200 geophysics files
- 200 separate projects

Problems:
- No data structure
- No file naming standards
- No metadata
- No data documentation at all
Case Study: Silbury Hill

http://archaeologydataservice.ac.uk/blog/2013/08/jenny-ryders-day-of-archaeology-at-the-ads-a-silbury-hill-update/

Case Study: Newham Museum Archaeological Service

Lessons Learnt:
• Regular software migration needed
• Robust data documentation down to file level needed
• Need to plan for re-use
• Forward planning is much cheaper
• Data management strategy required

"Digital information lasts forever - or five years, whichever comes first."

(Jeff Rothenberg, RAND Corp., 1997)
Archaeological Data

2,000 years in the making
3 days to record
Backed up in 10 seconds
Lost forever?

How can we prevent this?

Protecting Digital Data

- Recognise data is as fragile as the archaeological record we excavate
- Stop archiving data as objects rather than computerised information
- Recognise the challenges of digital data
- Professionally archive digital material
- Create Data Management Plans

GOOD DATA MANAGEMENT IS ESSENTIAL