A More Product, Less Process Approach to Digital Access

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Professor, University Library
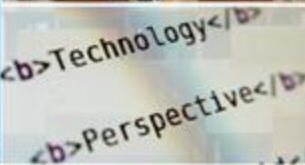
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Society of Ohio Archivists Conference

OCLC Conference Lakeside Center

May 16, 2014

FULBRIGHT COMMISSION

UNIVERSITY LIBRARY
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Born-Digital Elephant

- 50% not enough funding

- 50% no assigned responsibility

- 43% no workflow to acquire/control

  - *Taking Our Pulse: The OCLC Research Survey of Special Collections and Archives*, 2012.

    http://oclc.org/research/activities/hiddencollections.html

University of Illinois Archives

bringing history to life

University of Illinois Archives

- About Us
- Collections
- Services
- Blog/News
- Frequently Asked Questions

Recent Blog Posts

- Personal Reflections on September 11, 2001
- Ellnora Guitar Festival
- Participants Wanted for University Archives Usability Study
- University of Illinois Fun Facts
- Getting the Hat Right: The Untold Origin of Smokey Bear

RSS

- All posts
- All comments

University of Illinois Archives: Bringing History to Life

The University of Illinois Archives is:

- a place to push the boundaries of knowledge outward through primary research
- a group of people who preserve and share the raw materials of history
- over 29,000 cubic feet and three terabytes of records and personal archives
- analog and digital archives covering numerous subject areas

University Hall, circa 1915

If you can't find what you are looking for, please browse the old site.

Edit

Search Holdings

Type and press enter

or browse collections by. . .

Search Website

Type and press enter

Share This Page

- Print
- Like 16
- Tweet 11
- +1 2

Programs

- Student Life and Culture Program | Map/Directions (pdf)
- Sousa Archives and Center for American Music
- ALA Archives | Map/Directions (pdf)

Find Us

Room 19 Library
1408 W. Gregory Drive
Urbana, IL 61801

Contact Us

Email: illiarch@illinois.edu
Phone: (217) 333-0798
Contact Webmaster

Visit Us

M, Tu, Th, Fri: 8:30-5
Wed: 10-5

University of Illinois Archives

- Founded 1963, ~ 26,000 cubic feet, ~5 Terabytes
- University Records, Faculty and Alumni Papers, Student Life and Culture, Sousa Archives and Center for American Music; External Archives on contract
- 8 FTE Faculty and Staff, student support
- Supporting programs in preservation and 'digital content creation' units

Library IT Infrastructure

- Archon
  - Collection Management Software
  - developed in house, open source software
- File Server Storage
- Medusa Project

Fulbright Project Goals

- Method that I (and hopefully others) could use to develop digital preservation capacity, competence, and trust

- Assess tools to appraise, process, preserve, provide access

- Develop policy templates/ recommendations for 'small' archives

- Assemble 'toolkit'

- http://e-records.chrisprom.com

Gartner Hype Cycle:

- http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp
- One way to think about how we (personally and professionally) are engaging with digital preservation

Gartner Hype Cycle/'Leaning Curve'

VISIBILITY

E

TECHNOLOGY
TRIGGER

Broughty Ferry Scotland, August 2009

Gartner 'Learning Curve' part 2

University Library
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Near Tongue, NW Highlands, August 2009

OAIS Reference Model

Projects and and Resources (Sample)

Gartner 'Learning Curve' part 3
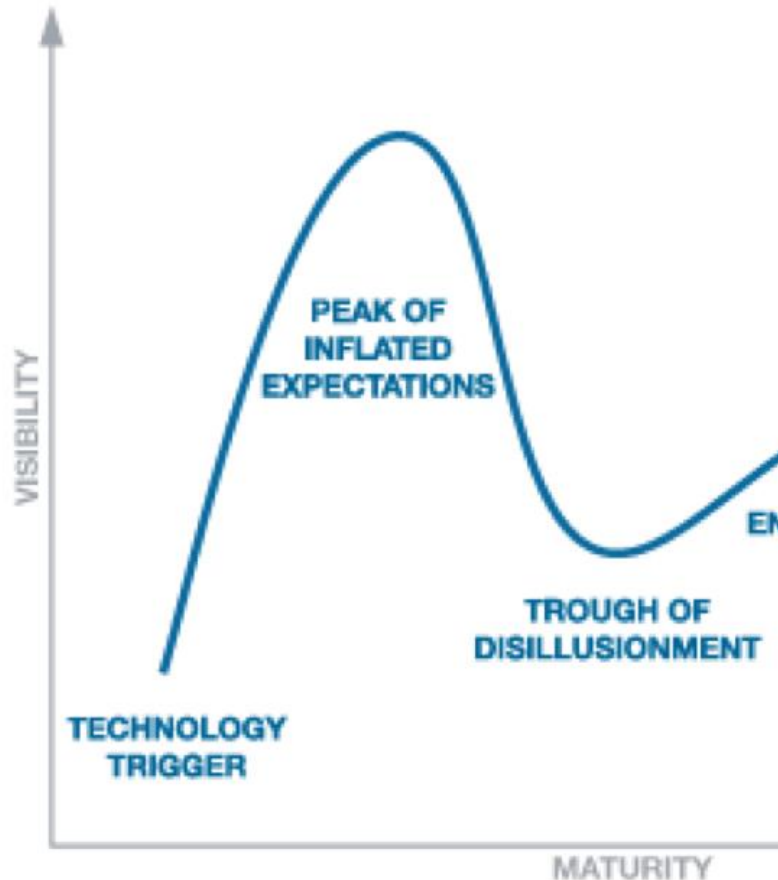
Dec 21, 2009:
    Sunrise: 8:45 AM
    Sunset: 3:35 PM
    Hours of light: 6h 50m 22s

UNIVERSITY LIBRARY
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

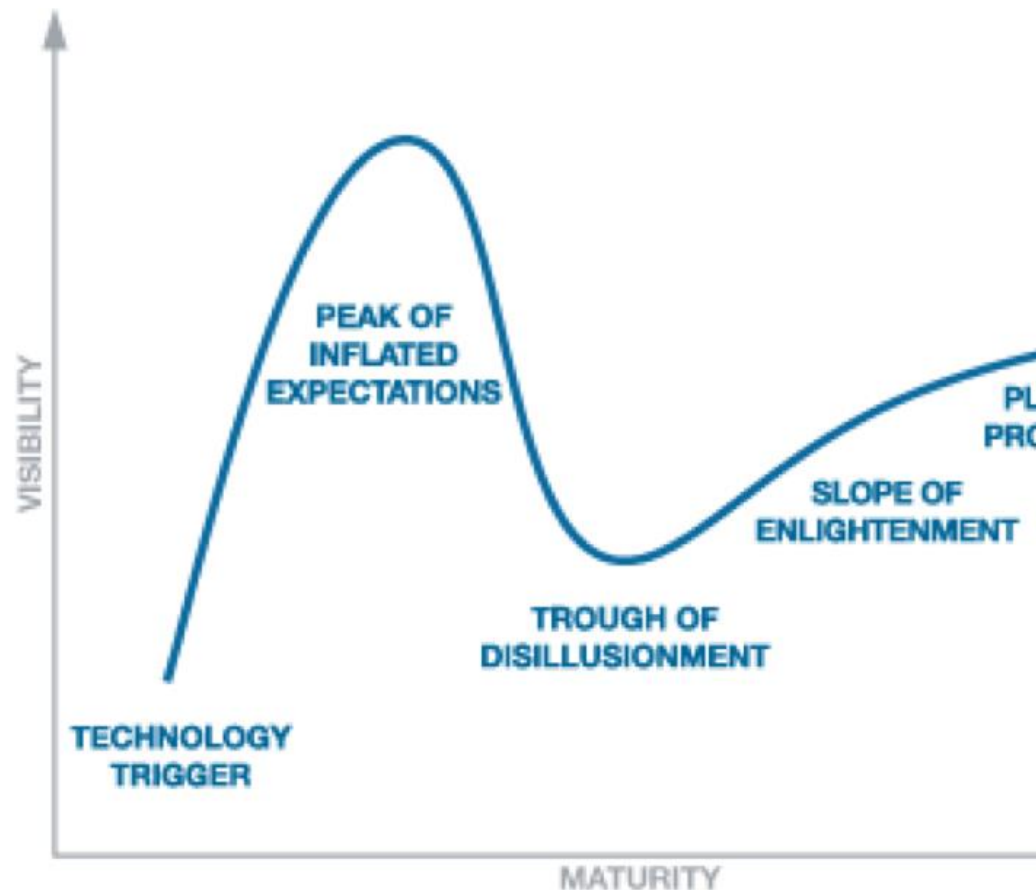Broughty Ferry, 15:33 GMT Dec 23, 2009
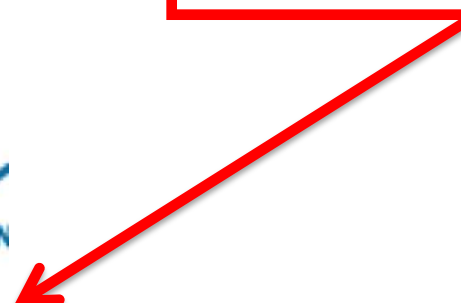
Fundamental Questions

- What do we **really** need to do to:
  - Render objects
  - Retain evidence
  - Show authenticity
- A "More Product, Less Process" approach to access

Gartner 'Learning Curve' Part 4

Enlightenment

- "Thought can lead us only to the us to the knowledge that it cannot give us the ultimate answer. . . . The only way in which the world can ultimately by grasped lies not in thought, but in the act."

  – Erich Fromm, *The Art of Loving*, 78-79.

Do it Yourself Repository

Define a set of local policies and procedures for file ingest, processing and storage.

- Use simple e-records survey forms and submission agreements to identify and accession records. Keep them with your other accession records (in paper or electronic form) and also put a copy inside the nascent a Submission Information Packet consisting of:
  - Submission Agreement
  - Metadata
  - Content

- At a minimum, track fixity information (e.g MD5 checksums), for the original files using one of the ingest tools, in the metadata folder 'archival information packet.' Put fixity info in a tab delimited file produced by something like Jacksum or Karen's Directory Printer. This is part of your PDI (Preservation Description Information). Make sure you use the same format for each set of checksums you produce, so you can easily migrate it later.
- Use a batch program on top of FITS to generate metadata about each file. Store the resulting output it in your metadata folder.
- Decide whether or not you want to undertake preservation actions (such a migration) for particular types of files
- If you do, develop a preservation and access plan; then,
- Implement either proprietary or open source tools for preservation actions (e.g conversion/migration). Do not discard any original files! For each set of records you accession, place the originals into an 'originals' folders in your 'Content" Folder. Place the converted files in a 'Processed' folder. These two folders, linked together, will become the 'content information' of your 'archival information packet.' The processed folder will eventually serve as the content information of the 'dissemination information packet.'
- For each preservation action you undertake on the content information or any part of it (e.g. migration to a new format, renaming, deleting, or reorganizing files), keep track of your actions at an aggreate level in. Describe the actions you undertook in a short narrative statement, and keep this information in text file named "PreservationActions.txt" in the root of the 'Metadata" folder. This record serves as part of your preservation description information (PDI). (Unfortunately, there are no easy to use tools currently available to track file level peservation actions taken outside of systems such as RODA, etc.) You might consider saving log output, if available, from your conversion applications and putting it in the Metadata folder.
- Run a batch FITS process and an MD5 checksum generator against the processed folder, and put the results into your Metadata folder.
- For each 'archival information packet,' use your existing catalog system to track collection-level descriptive metadata. Track AIPS at aggregate level (don't worry about single files) before doing detailed descriptive records for part of the AIP. Detailed description of the collection can be done using standard archival cataloging tools.
- As a "dark archives," of the AIP, store all e-records in one folder, containing the subfolders for 'Metadata' and 'Content', for each set of records you are preserving . The main folder must use a unique identifer that is the

Where Are We Now?
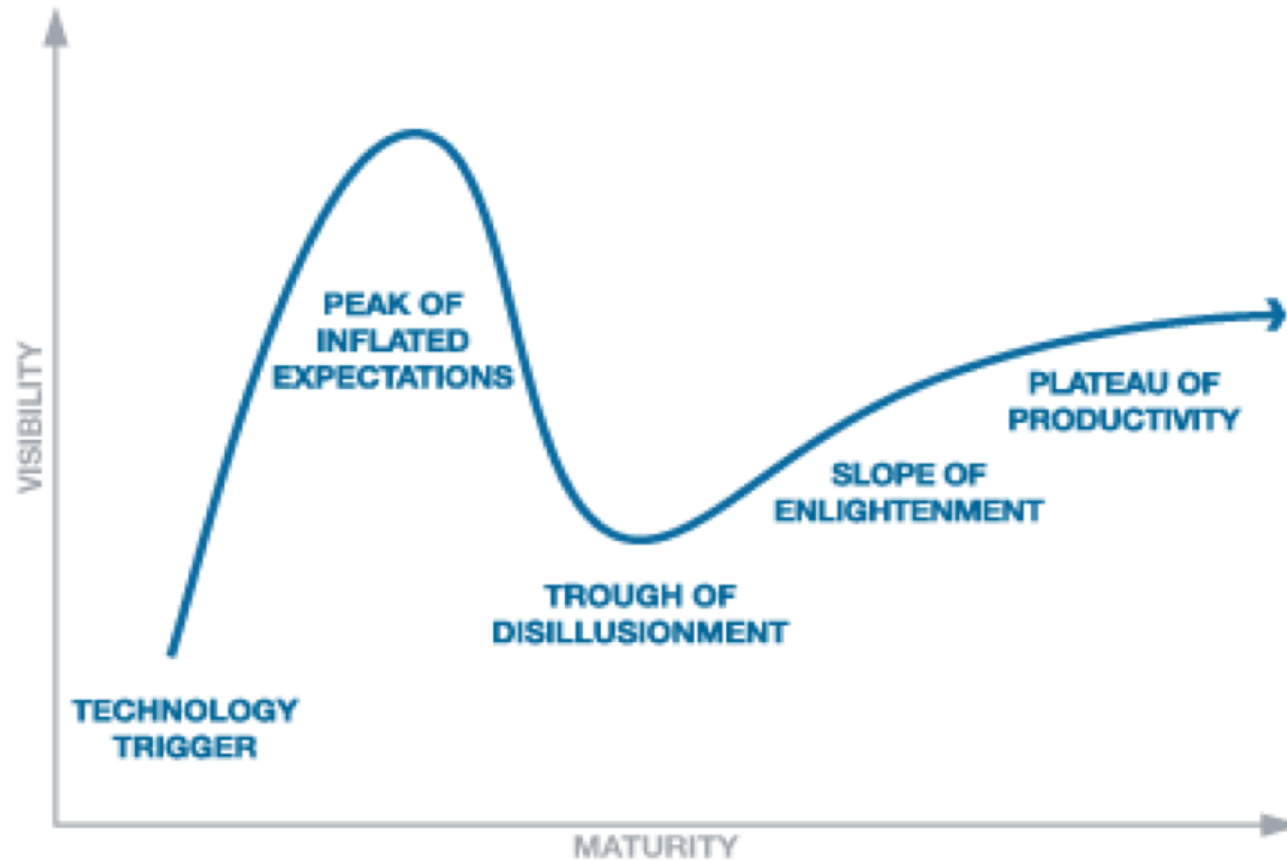
Resources

- *Making Digital Curation a Systematic Institutional Function*
  - *http://www.ijdc.net/index.php/ijdc/article/view/169*
- *Archival Information Packet Structure,*
  - *http://e-records.chrisprom.com/archival-information-packet-structure/*
- OCLC Research*, Demystifying Born-Digital Reports*
  - *http://oclc.org/research/publications/library/2012/2012-06r.html*
- *G Daines, Processing Digital Records and Manuscripts,* Society of American Archivists Press, Trends in Archives Practice Series

Trends in Archives Practice

TRENDS IN
ARCHIVES
PRACTICE

ARCHIVAL
ARRANGEMENT
AND DESCRIPTION

Edited with an Introduction by
Christopher J. Prom & Thomas J. Frusciano

MODULE 1
STANDARDS
FOR ARCHIVAL
DESCRIPTION
Sibyl Schaefer &
Janet M. Bunde

MODULE 2
PROCESSING
DIGITAL
RECORDS AND
MANUSCRIPTS
J. Gordon Daines III

MODULE 3
DESIGNING
DESCRIPTIVE
AND ACCESS
SYSTEMS
Daniel A. Santamaria

Upcoming:
- *Digital Preservation Essentials*
- *Rights in the Digital Era*
- *Teaching with Primary Sources*
- *Becoming a Trusted Digital Repository*

Essentials of Practical E-Records

- Bit level control, with good description and technical metadata.
- Practice first, then policy
- Use what you have
- Focus on collection-level control
- Use professional standards wisely
- Build skill, confidence and trust over time
- Add services over time

"Archival Information Packet"
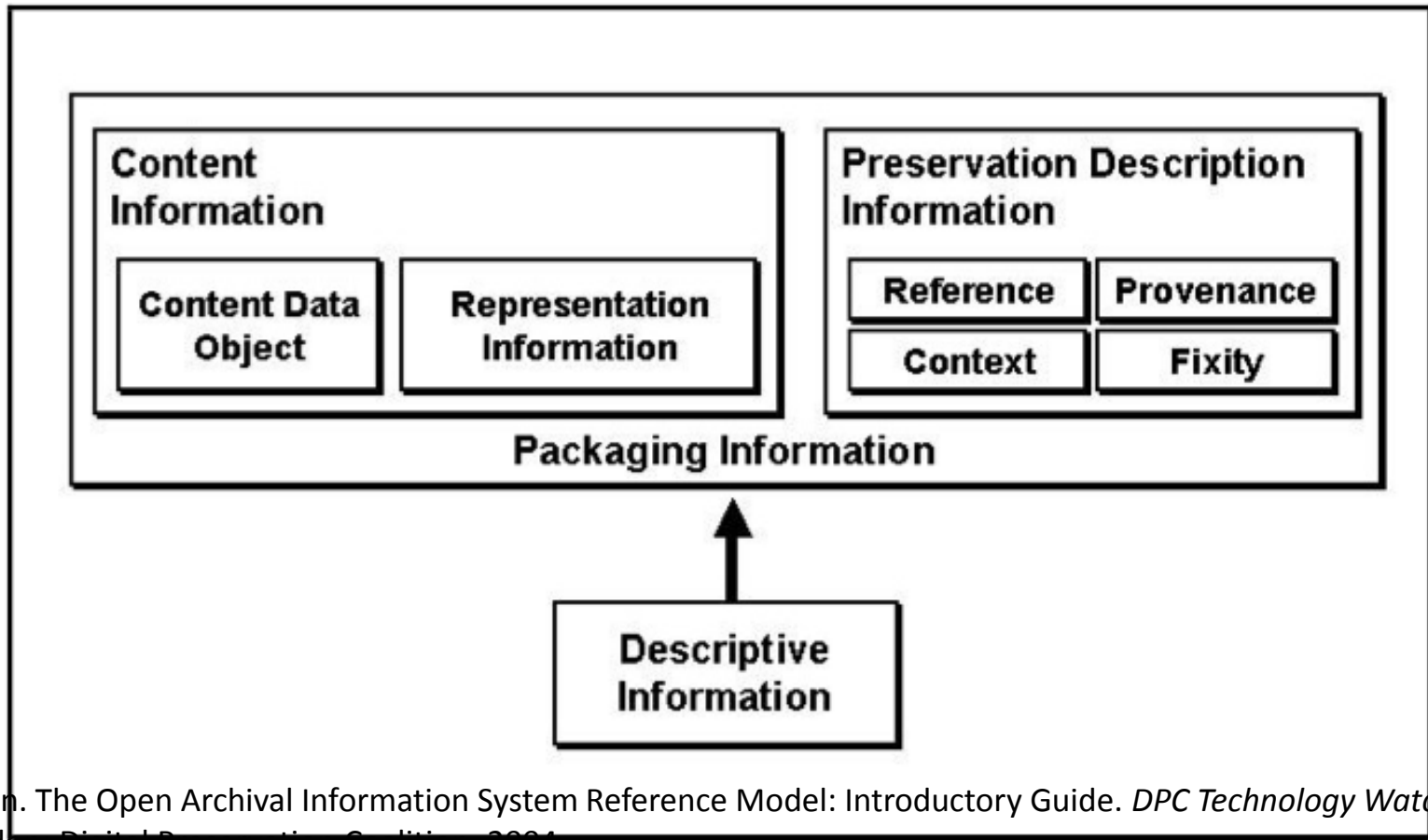
Lavoie, Brian. The Open Archival Information System Reference Model: Introductory Guide. *DPC Technology Watch Report* 04-01. London: Digital Preservation Coalition, 2004.

Archival Information Packet

Is a logical unit

Descriptive Metadata
- Catalog Record in Archival Content Management System USE DACS!
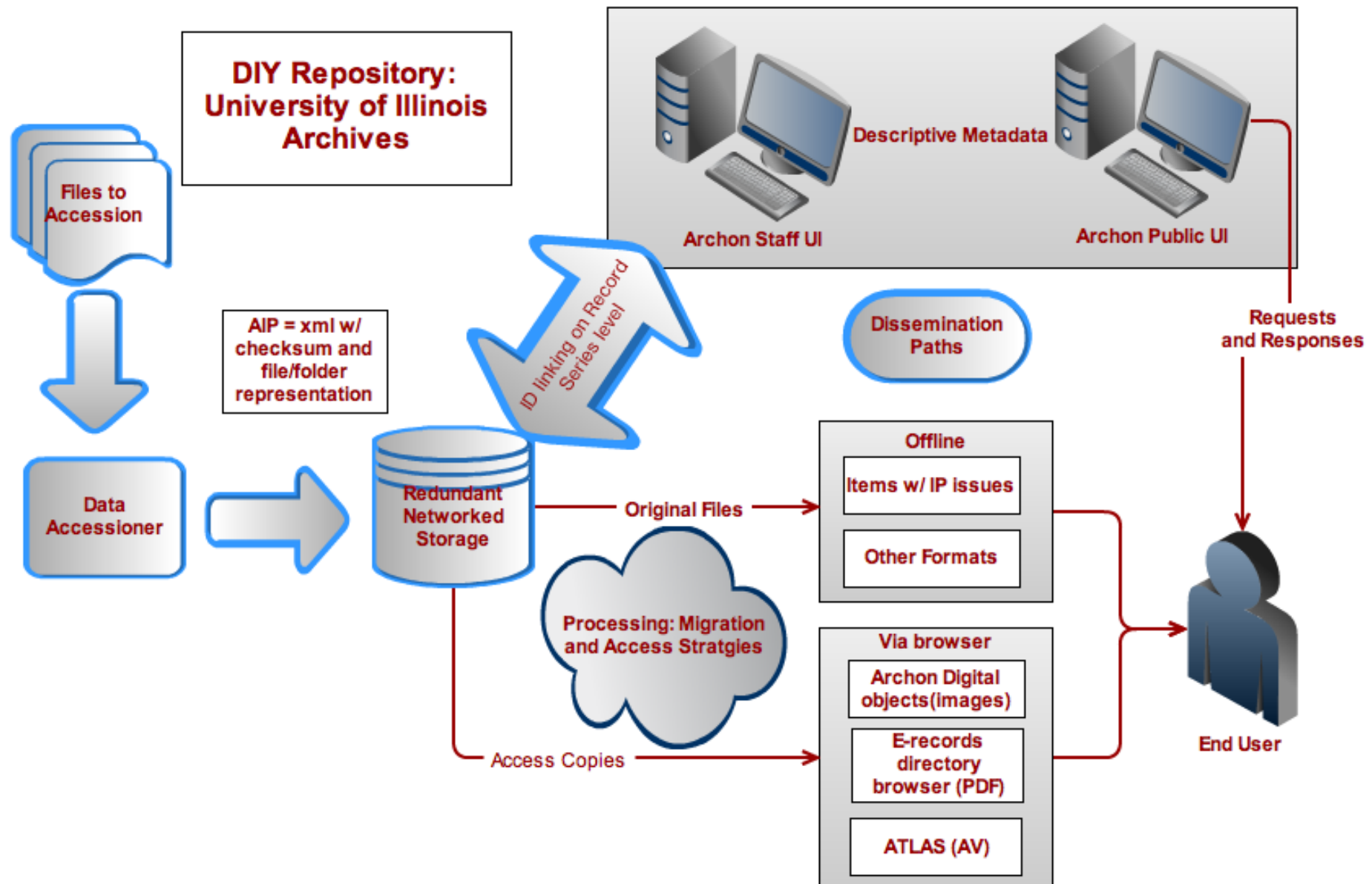
Content Data (Files)
- Preservation (bitstream)
- "Online" copy
- "Nearline" copy

Technical Metadata
- Fixity information
- File types
- Characterization Info.
- Structural metadata

Administrative Metadata
- Donor Correspondence
- Deeds of gift
- Other relevant info.

DIY Repository: University of Illinois Archives

Files to Accession

Data Accessioner

AIP = xml w/ checksum and file/folder representation

ID linking on Record Series level

Redundant Networked Storage

Descriptive Metadata

Archon Staff UI

Archon Public UI

Dissemination Paths

Requests and Responses

Original Files

Offline

Items w/ IP issues

Other Formats

Processing: Migration and Access Stratgies

Access Copies

Via browser

Archon Digital objects(images)

E-records directory browser (PDF)

ATLAS (AV)

End User

Medusa

Principle One

- Aggregate Description Works!
- DACS Principle 1: Levels of Description Correspond to Levels of Arrangement

Stanley Smith Papers

University of Illinois Archives | Holdings Database

🔍 Search

Browse by:

| Campus Unit | Name | Subject | Series Title | Image/E-Record Title |

Search PDF lists

Digital Archives > Electronic records and digital surrogates from the Stanley Smith Papers

Electronic records and digital surrogates from the Stanley Smith Papers | University of Illinois Archives

Available:	http://archives.library.illinois.edu/e-records/index.php?dir=University%20Archives/1505050/
Title:	Electronic records and digital surrogates from the Stanley Smith Papers
Description:	Born-digital and digital surrogates from Stanley Smith Papers contain presentations, images, web tutorials, audio and video concerning chemistry curriculum and instruction. Digital materials involve topics as web-based instruction, Falconsoft, PLATO, course materials and Chemistry Department equipment and facilities.

Streaming access to video material containing PLATO screenshots and chemistry experiment demonstrations, is available at: http://archives.library.illinois.edu/e-records/av/?destinationID=jMtFE0wHyUaAdrFh5Yj8RQ&categoryID=OXbw7qoaKkCpX5mEy7uJOw

Complementary material available upon request; includes computer programs, additional presentations, pictures, maps, audio and video files, concerning chemistry curriculum, instruction and research, Falconsoft, PLATO, course materials, Chemistry Department Faculty and the renovation of Noyes Hall.

Administrative access to preservation, nearline, and access files are available to archives staff at https://medusa.library.illinois.edu/collections/346

Phys. Desc:	Formats include .JPEG, .PNG, .GIF, .BMP, .PDF, .HTML, .AVI, .MOV, .PPT, .DOC, and .XLS file extensions.

Complementary materials have undergone minimal processing, and may require the use of specialized software for display and access. Include 22.9 gigabytes of files

ID:	7952e790-9e58-0131-4a3e-0050569601ca-e
Repository:	University of Illinois Archives
Found in:	Stanley Smith Papers, 1957-2006
Creators:	Smith, Stanley
Subjects:	Chemistry Department
	Computer Software
	PLATO (Programmed Logic for Automatic Teaching Operations)

Simplified Archival Information Packet

Unique ID, link to Descriptive Record

Checksums, File Characterization Data

Files as accessioned

Deeds of Gift, transfer correspondence, etc; can be attached to descriptive record in some archival CMS applications

Files after processing

- ▼ 📁 1505050
  - ▼ 📁 pdi
    - ▶ 📁 manifests
    - ▶ 📁 docs
  - ▼ 📁 access
    - ▶ 📁 online
    - ▶ 📁 nearlline
  - ▶ 📁 preservation
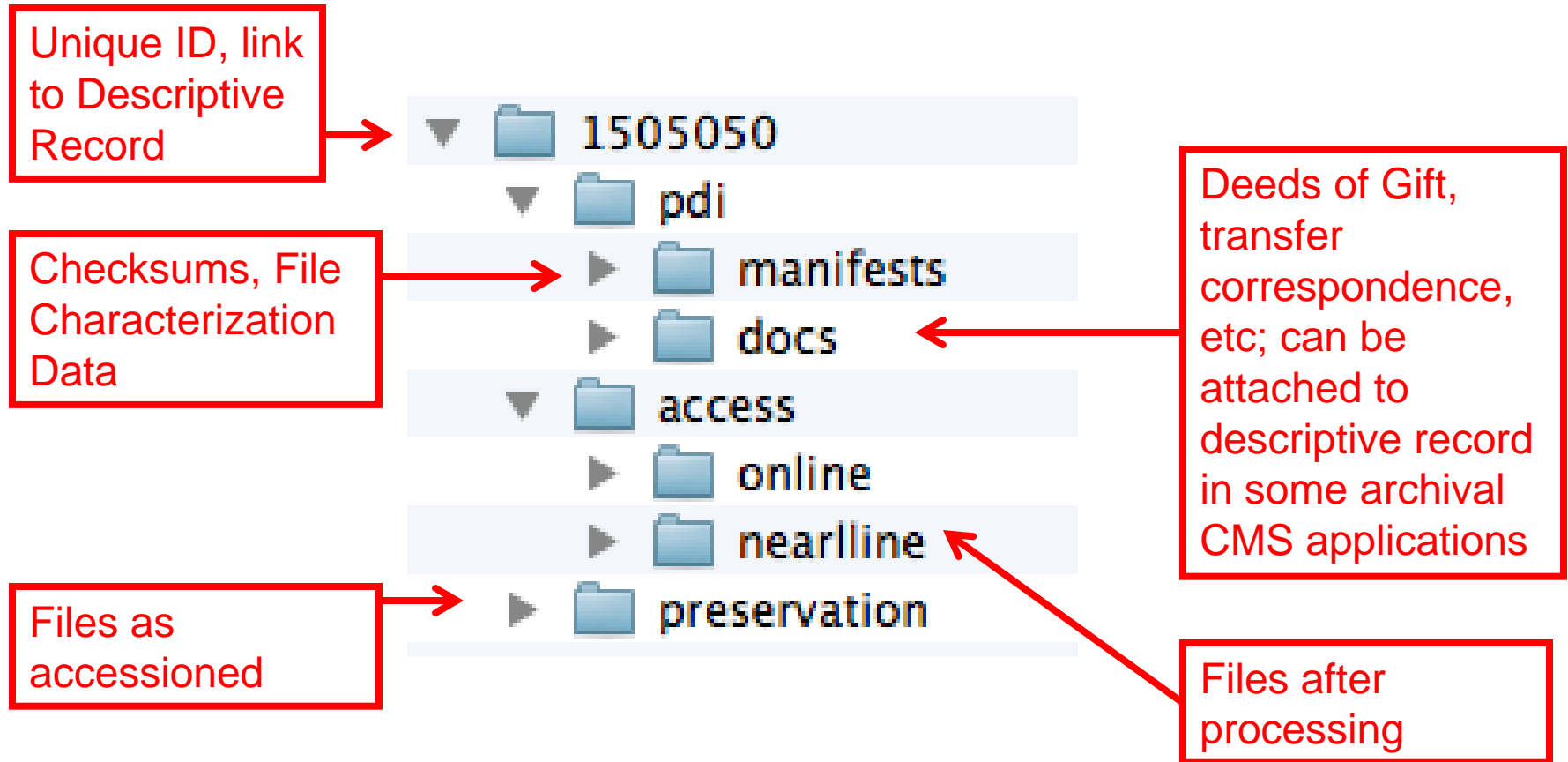
Principle Two

- Use low barrier technologies (that preserve original order and context)

University Archives
University of Illinois at Urbana-Champaign

University Archives → Electronic Records Browser → University Archives → 1505050 →

Stanley Smith Papers, 1957-2006 (Series 15/5/50)

Browse Stan Smith's course materials and course webpages. Smith spent much of his career developing computer-based educational materials for general and organic chemistry. He migrated much of his software to a web-based format in the late 1990s and early 2000s. For more information, please see Smith's catalogue record in Archon.

PLEASE NOTE: These folders contain a number of web pages, some of which work and some of which do not. Most were designed to be used on a PC with an older version of Microsoft Internet Explorer. 'Index' pages have been noted when known. Please feel free to browse through his files, but know that many of the file formats are older or out-of-date and are to be used at your own risk.

File	Description	Size	Modified
📁 BCCE		[dir]	2012-Mar-03
📁 BrownBag		[dir]	2012-Mar-03
📁 ch106Brass		[dir]	2012-Mar-03
📁 Ch231Ex1sample		[dir]	2012-Mar-03
📁 Chem 234 PP F02		[dir]	2012-Mar-03
📁 chem234exams		[dir]	2012-Mar-03
📁 Chem234old		[dir]	2012-Mar-03
📁 Chem234syll02		[dir]	2012-Mar-03
📁 chem337		[dir]	2012-Mar-03
📁 chem337syllabus		[dir]	2012-Mar-03
📁 chemaze		[dir]	2012-Mar-03
📁 nRogers		[dir]	2012-Mar-03
📁 Organic		[dir]	2012-Mar-03
📁 Rogers		[dir]	2012-Mar-03
📁 Word Documents		[dir]	2012-Mar-03
📁 WWWroot		[dir]	2012-Mar-03
📄 smithcv.doc		116.5 KB	2005-Oct-20
1 Files - 16 Folders		Total size: 116.5 KB	

Powered by AutoIndex PHP Script

AutoIndex Script

University of Illinois Archives | Holdings Database

Search

Search PDF lists

Browse by: | Campus Unit | Name | Subject | Series Title | Image/E-Record Title

Electronic Records of the Center on Democracy in a Multiracial Society, 2002-2011 | University of Illinois Archives

Available: http://archives.library.illinois.edu/e-records/index.php?dir=University%20Archives/2401001/

Title: Electronic Records of the Center on Democracy in a Multiracial Society, 2002-2011

Date: 2012

Description: Electronic Records of the Center on Democracy in a Multiracial Society include grant submissions, newsletters, brochures, budgets, minutes, reports, presentations, publications, and photographs concerning racial diversity on campus, student voting, hate crimes, civic diversity, health disparities, and racial discrimination. The files include a copy of the CDMS proudction website and office files organized into the following folders: Access-for-Students; Current-GRANTS; EWI; files; and web.

A snapshot version of the CDMS website is available at the URL listed above.

A .zip file containing files that cannot be placed online due to copyright or other reasons is available from the University Archives upon request. The files in the zip packet include a copy of the CDMS proudction website and office files organized into the following folders: Access-for-Students; Current-GRANTS; EWI; files; and website.

A preservation copy of all files, available only to archives and digital preservation staff members, is stored in the Library's Digital Repository: https://medusa.library.illinois.edu/collections/225.

Phys. Desc: 66 gigabytes

ID: 0600da80-902c-0131-1105-0050569601ca-4

Principle Three

- Do the least amount of work necessary to provide 'good enough' access.
- (people are very clever)

Plato Notes File

http://www.computerhistory.org/revolution/the-web/20/377/2154

```
---------- note 40 kids
   04/27     14.59      jones        psych




Can someone tell me what all the very young looking
children are doing in cerl, using up the terminals?
Are they authorized to be here? A lot of seem to have
author sign-ons, and the rest seem to spend most of
the time asking people how to get to the games...
They can be very annoying at times...

---------- response 1
 04/27   15.29      parrot              iu

Oh, boy...
You don't know it (maybe), but you have just stumbled
into the most common problem of PLATO. These little
folks (usually referred to as vultures,little mamzers,etc.)
have to be periodically chased off the system in order
to allow authors to work. If you get real trouble
with one, call the operator using "alert" or at
333-2375.
↓P.S. I am not at CERL, but the problem is universal.

---------- response 2
 04/27   15.53      michael             english

Quite a few of them have legitimate signons in order to
learn to program and/or just become exposed to a different
sort of learning environment. If you don't like their
presence or the pedagogical rationale, I suggest you take
it up with the projects who are funding such activities.
```

Available:	http://archives.library.illinois.edu/e-records/index.php?dir=University%20Archives /0713010/
Title:	Digital surrogates of PLATO System Notes Files, 1972-76
Description:	Digital surrogates of PLATO Notes Files, contain digitized notes exchanged between developers and users of University of Illinois PLATO system during evolutionary implementation of the world's first wide-area computer network devoted to education. Digitized notes include lesson notes with developers' instructions, as well as users' experiences and questions related with the system use. PDF files contain scanned copies of the original material and .TXT files contain transcriptions of the original digitized material to facilitate its access.
	Administrative access to preservation, nearline, and access files are available to archives staff at https://medusa.library.illinois.edu/collections/234
Phys. Desc:	Contains 162 kilobytes of files in PDF and .TXT formats
ID:	53271800-965c-0131-1105-0050569601ca-e
Repository:	University of Illinois Archives
Found in:	PLATO Notes Files, 1972-76
Subjects:	Computer-Based Education Research Laboratory (CERL) Computer Based Communications Computers PLATO (Programmed Logic for Automatic Teaching Operations)
Rights:	These records are in the public domain.

University Archives
University of Illinois at Urbana-Champaign

University Archives → Electronic Records Browser → University Archives → 0713010 → text →

File	Description	Size	Modified
0713010_LessonNotes01_1972-10-30_TO_1972-11-15.TXT		40.5 KB	2011-Dec-01
0713010_LessonNotes02_1972-11-15_TO_1972-12-02.TXT		36.3 KB	2011-Dec-01
0713010_LessonNotes03_1972-12-02_TO_1972-12-12.TXT		37.4 KB	2011-Dec-01
0713010_LessonNotes04_1972-12-13_TO_1973-01-02.TXT		42.1 KB	2011-Dec-01
0713010_LessonNotes05_1973-01-02_TO_1973-01-21.TXT		58.4 KB	2011-Dec-01
0713010_LessonNotes06_1973-01-20_TO_1973-02-06.TXT		77.5 KB	2011-Dec-01
0713010_LessonNotes06_addendum_1973-01-21_TO_1973-01-25.TXT		26.8 KB	2011-Dec-01
0713010_LessonNotes07_1973-02-06_TO_1973-03-01.TXT		64.7 KB	2011-Dec-01
0713010_LessonNotes08_1973-03-01_TO_1973-03-16.TXT		75.4 KB	2011-Dec-01
0713010_LessonNotes09_1973-03-16_TO_1973-03-28.TXT		66.1 KB	2011-Dec-01
0713010_LessonNotes10_1973-03-29_TO_1973-04-04.TXT		73.7 KB	2011-Dec-01
0713010_LessonNotes11_1973-04-05_TO_1973-04-11.TXT		72.4 KB	2011-Dec-01
0713010_LessonNotes12_1973-04-12_TO_1973-04-25.TXT		79.7 KB	2011-Dec-01
0713010_LessonNotes13_1973-04-25_TO_1973-05-09.TXT		73.5 KB	2011-Dec-01
0713010_LessonNotes14_1973-05-10_TO_1973-05-19.TXT		82.1 KB	2011-Dec-01
0713010_LessonNotes15_1973-05-19_TO_1973-05-31.TXT		82.8 KB	2011-Dec-01
0713010_LessonNotes16_1973-06-01_TO_1973-06-15.TXT		82.6 KB	2011-Dec-01

UNIVERSITY LIBRARY
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Principle Four

- Look outside the archives/library field of view.

Faculty, Staff and Student Portraits

University of Illinois Archives | Holdings Database

[   ] 🔍 Search

Search PDF lists

Browse by: | Campus Unit | Name | Subject | Series Title | Image/E-Record Title

Public Information > Photographic Services > Faculty, Staff and Student ...

Faculty, Staff and Student Portraits, 1933- | University of Illinois Archives

✉ Email us about these records | 🖨 Printer-friendly

Title: Faculty, Staff and Student Portraits, 1933- ✏

Series Number: 39/2/26

Acquired: 3/67

Volume: 25.6 cubic feet

⊞ **Arrangement**

⊞ **Creator(s)**

⊞ **Biographical Note**

⊞ **Subjects** (links to similar materials)

⊞ **Special Formats** (links to similar genres)

Description: Includes 5" x 7" and smaller print and negative portraits of faculty, nonacademic staff, families, visitors and students.

⊞ **On-line Images / Records**

University of Illinois Archives Photo Galleries

Archive

⇨ Gallery and News

RSS

⇨ Album RSS
⇨ Gallery

Principle Five

- Preserve evidence about functions and activities (opens up possibility for multiple uses and interpretations.)

Carl Woese Papers

Anthropology of Science

- Bruno Latour and Steve Woolgard. *Laboratory Life: The Construction of Scientific Facts. 2nd Edition, 1986.*

- *Key question: How are facts produced on constructed in the specific microsocial context of a research lab*

- *Emphasis on interaction between people and activities they pursue*

Latour and Woolgard Key Concepts

- Science is a process of **construction**: begins with the slow craftwork of inscribing data;

- Under particular **circumstances**,

- While combating **noise**;

- Using an **agonistic** process within a field;

- Where researchers invest and build **credibility:**

- leading to the **reification** (materialization) of certain statements as 'facts' or 'discoveries';

OriginalFiles (19,490.7 MB)

Library (7,625.9 MB)

Mail (6,488.7 MB)

Mailboxes (2,732.3 MB)

Woese (1,062.4 MB)

CRW- Scientific Corr...

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Bob...

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Goldenfeld...

Carl ...

Evolution (...

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D...

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D... | O... | D... | L...

L...

P...

Arc...

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Woese (986.1 MB)

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Messages (915.6 MB)

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Caches (718.9 MB)

com.apple.Safari (610.9 MB)

P.

Mail Downloads (340.7 MB)

Documents (4,828.5 MB)

Parallels (4,677.4 MB)

Ubuntu Linux.pvm (4,677.4 MB)

Ubuntu Linux-0.hdd (3,517.8 MB)

*.hds (3,517.8 MB)

Path: Z:\Desktop\OriginalFiles\Documents\Parallels\Ubuntu Linux.pvm\Ubuntu Linux-0.hdd*.hds
Allocated: 3,517.8 MB
Files: 1

[Files] (1,159.7 MB)

*.mem (1,152.0 MB)

Pictures (1,408.8 MB)

iPhoto Library (1,398.5 MB)

Masters (1,077.3 MB)

2007 (497.1 MB)

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Mailboxes (2,125.5 MB)

Woese (971.2 ...

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POP-carl@life.uiuc.edu (1,056.8 MB)

M.

*.emlx (915.6 MB)

Moved Files from old Mac (...

WOESE IMAGES (92.0 MB)

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PUBLICATIONS (38...

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LITERATURE (356.9 MB)

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CLASS (305...

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CRW (69.5 MB)

Music ...

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MSS (...

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P.

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Digital Files: Woese Topic Model

List of Topics

1. darwin science history natural nature social theory man scientific society
2. nature law page laws world mind force power natural man
3. der die und propensities animals von zu den plants da
4. evolution translation proteins rna protein amino cell acid trna code
5. nature space event time sense events awareness relations objects character
6. darwin letter page book work charles plants dear sir hooker
7. bodies fire water chymists salt body elements make principles parts
8. darwin charles evolution selection erasmus theory butler lamarck work wallace
9. molecular evolutionary microbiology biology gene evolution process problem world synthes
10. years time life good history father thought year day make
11. species natural plants animals long forms life nature varieties change
12. evolution evolutionary genes life gene genetic origin species selection organisms
13. uiuc nigel university pm illinois cell date research dear goldenfeld
14. science theory physical knowledge time scientific matter general material facts
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16. theory natural life darwin selection species descen
17. motions time power stimulus part ideas action grea
18. sequence rrna phylogenetic bacterial sequences d
19. bacteria cell bacterial archaebacteria procaryote ph
20. biology evolution century molecular world scientific

DOC :woesetextbase_LettoDan.txt

```
    Am I saying anything here!

Sat Jun  9 10:40:23 EDT 2007

    Let me try something out on you while it is still new -- less than an hour old.
It feels sort of like rewording and it will definitely be labeled "Darwinian" by the church.  But it's not.
]If you do combinatorics on the words of the language enough (especially if you do so having set up an
undertow pulling against the old system) then something new may emerge. ]

Let multicellularity and all it's baggage and implication be moot for now.

There may be variation and (then) selection (Darwin's formula and formulation).  But there may alternatively
be selection and (then) stabilizing) variation (Lamarck's view).

Let variation be seen as adaptation (think bacterial adaptation).
The point here is that populations as a whole can adapt (to energy sources, for example)
within a single generation, and without mutation.
[?? REF to developmental genes like Hox?? Read Raff's discussion of development]

The adaptation is a specific response to particular environment, circumstances,
on the part of a POPULATION.  The combinatorics can be such that without "specific"environmental
circumstances to increase probabilities, the chance of consequent evolutionary events would be vanishingly
small.
[More than one cellular subsystem could be involved --> increasing the combinatorics]
```

Top topics in this doc (% words in doc assigned to this topic)

- (44%) evolution evolutionary genes life gene genetic origin species selection organisms ...
- (13%) evolution translation proteins rna protein amino cell acid trna code ...
- (9%) species natural plants animals long forms life nature varieties change ...
- (7%) science theory physical knowledge time scientific matter general material facts ...
- (6%) bacteria cell bacterial archaebacteria procaryote phylogenetic organisms molecular microbiology rna ...

[Index]

TOPIC : darwin science history natural nature

top-ranked docs in this topic (#words in doc assig

2.	(46011)	woesetextbase_Darwinsdism
3.	(45817)	woesetextbase_DarwinsMeta
4.	(1519)	woesetextbase_WSJ1.txt
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6.	(1102)	woesetextbase_DarwinsMetaphorRobertM.Young2.txt
7.	(1045)	woesetextbase_DarwinsPlaceInHistory.txt
8.	(1020)	woesetextbase_DarwinsPlaceInHistory2.txt
9.	(994)	woesetextbase_Dysonposter.txt
10.	(836)	woesetextbase_615CRWeditJSintrochp1and2.txt
11.	(811)	woesetextbase_615CRWeditJSintrochp1and2copy.txt
12.	(733)	woesetextbase_WSJwhysandwherefores.txt
13.	(723)	woesetextbase_WSJ4.txt
14.	(703)	woesetextbase_AsaGrayDarwinianatext.txt
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16.	(613)	woesetextbase_SLevinballotsupport.txt
17.	(612)	woesetextbase_SLevinreply.txt
18.	(605)	woesetextbase_Debbietranscript.txt
19.	(586)	woesetextbase_AdamsLifeofHenryAdams.txt
20.	(568)	woesetextbase_AdamsLifeofHenryAdams1.txt
21.	(498)	woesetextbase_WoesereferecLewinappointment.txt

??????

Principles Six and Seven

- Learn how computers really work, then document it.

- "Access drives preservation" --Brewster Kahle

UIHISTORIES PROJECT

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Principle Eight

- Optimize For Use
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    - Archon/moving to ArchivesSpace
  - Usability Study

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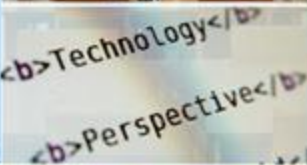
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