

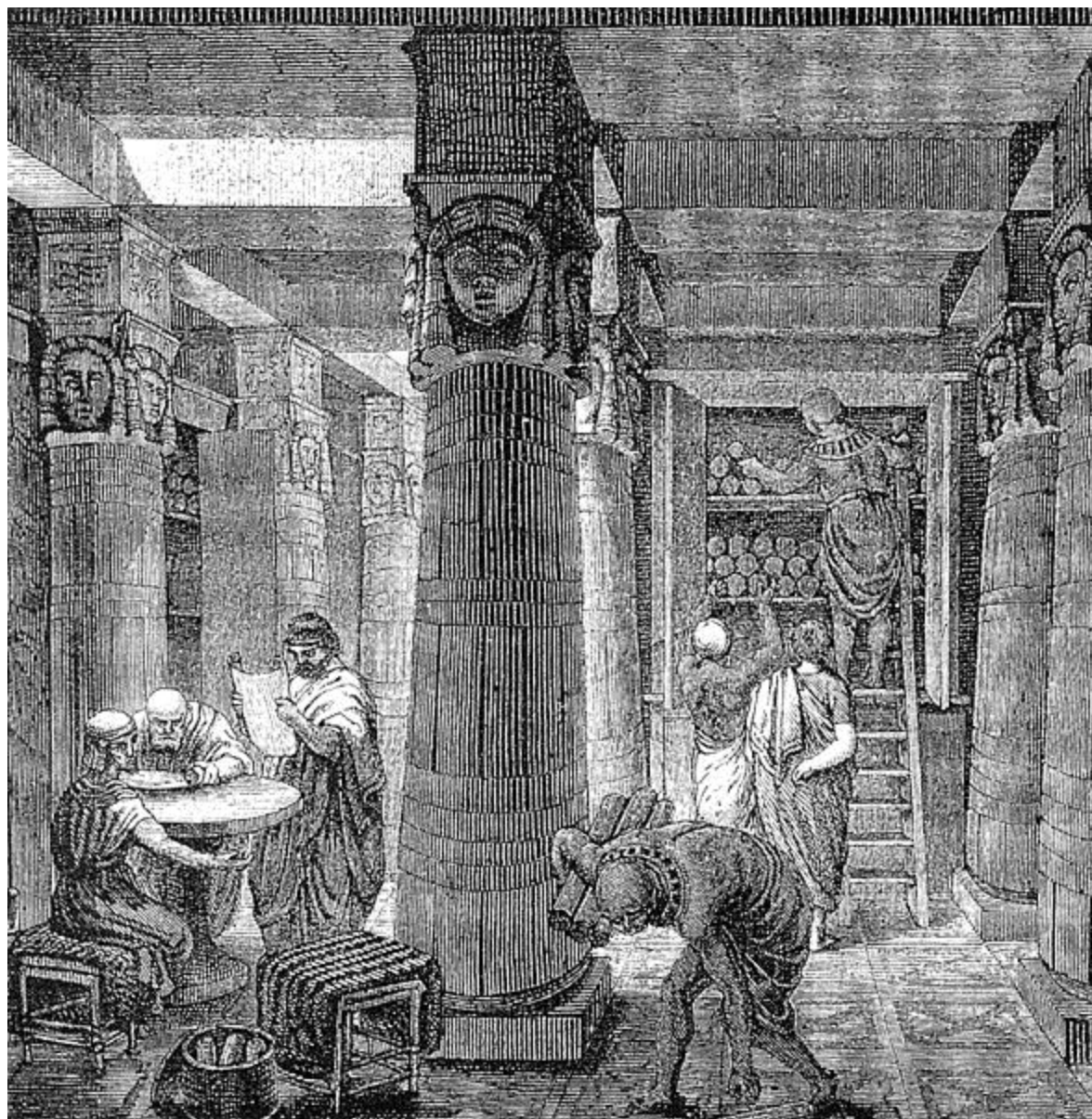
Digital Preservation - Challenges

G Santhosh Kumar
Cochin University

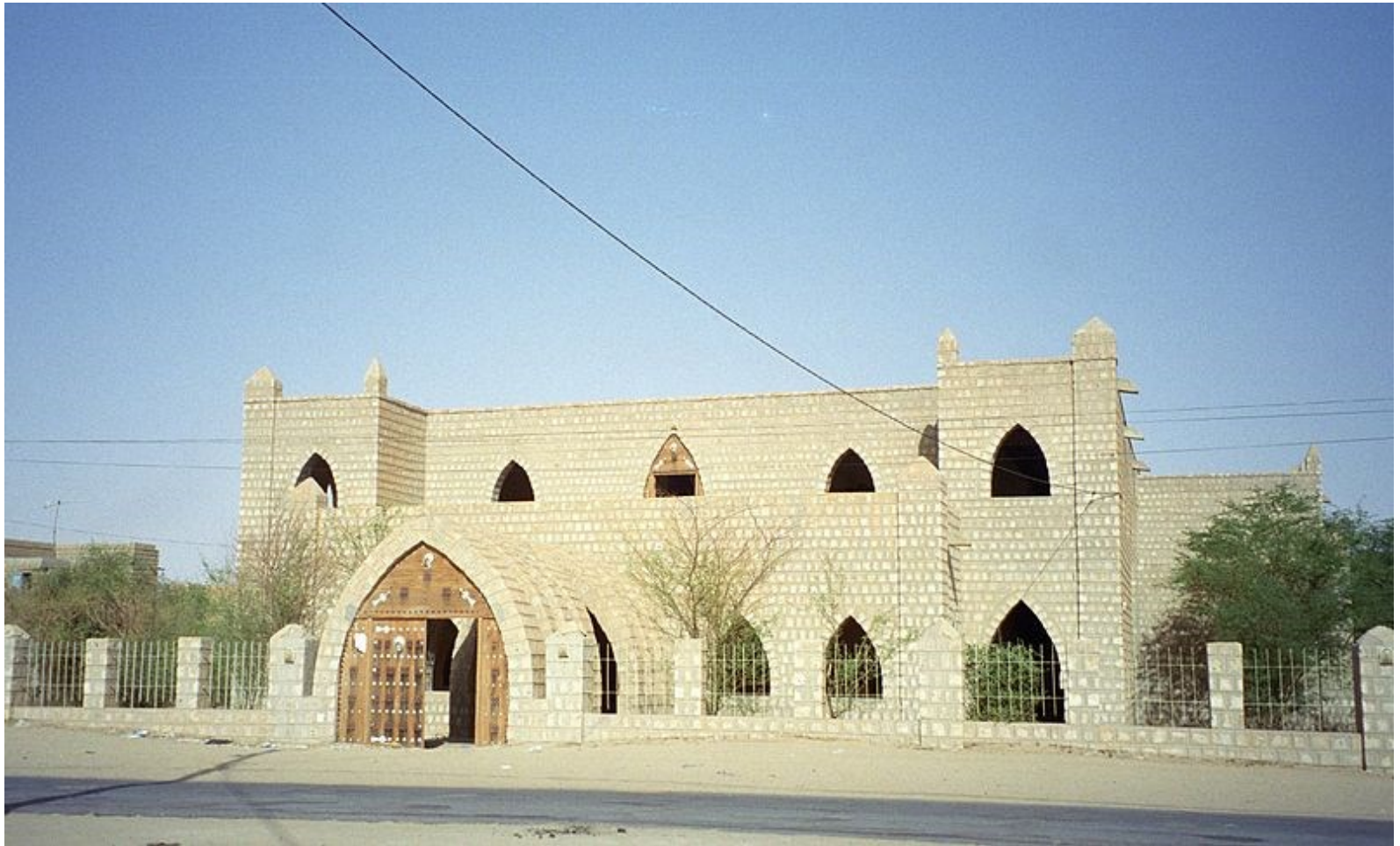
biblioclasm



1193 AD



Library of Alexandria, 30BC



Ahmed Baba Institute
2013 AD

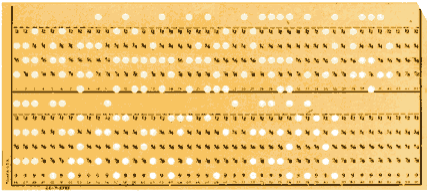


http://en.wikipedia.org/wiki/List_of_destroyed_libraries



Digital **Obsolescence**

A situation where a digital resource is no longer readable because the physical media, the reader required to read the media, the hardware, or the software that runs on it, is no longer available.



Punch cards



Punch tapes



Selectron tubes

Evolution and obsolescence of storage media



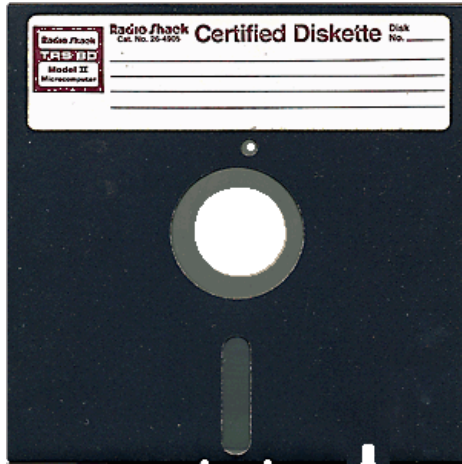
Magnetic Drum



Magnetic tapes



Audio Cassette



8-inch floppy disk



5 1/4 floppy disk



3 1/2 inch floppy disk

Evolution and obsolescence of storage media



Compact disk



Hard disk



DVD

Discontinued Tools, Closed Formats and Outdated Storage Devices

Computer hardware

Continued changes in CPU speed, memory, processing, etc.
New hardware introducing new peripheral connections

Operating System

Upgraded versions or new OS does not run the old software
Continued transition from 8bit OS to 64bit OSs and so on

Software

Software upgrades do not support the former file formats
Proprietary and closed source software
Discontinuation of software, lack of support

File formats

Proprietary and closed format specification
Change in the format specification
Discontinuation of the required software
Data corruption

Storage devices and media

Continued reduction in size and cost of storage devices
Continued increase in storage capacity and performance
Polycarbonate media like CD and DVD have uncertain lifetimes (Cerf, 2010)
Obsolete storage media and unavailable reading devices e.g. 5 1/4" or 3 1/2" floppies
New approaches like storage virtualization

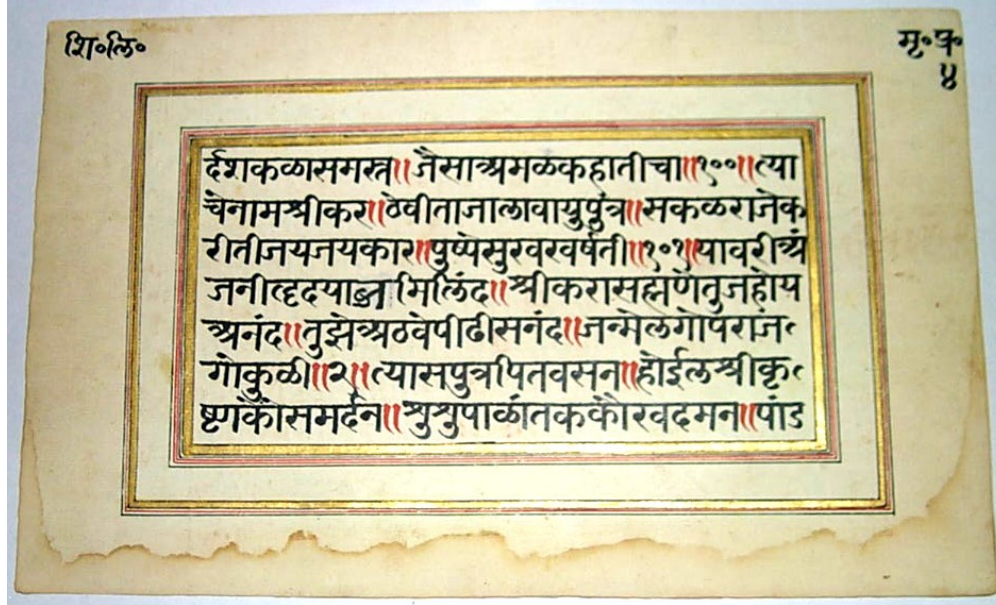


Physical threats

Improper storage environment (temperature, humidity, dust, light)
Overuse and handling of media
Natural disaster
Infrastructure failure
Human error
Sabotage

Tangible versus non-tangible

Electronic These & Dissertation



Preservatives?





Egypt discovers dozens of well-preserved mummies in 4,000-year-old necropolis in Fayoum



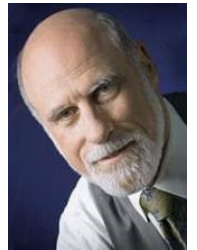
What is Digital Preservation?

Definition

Long Term Digital Preservation (LTDP) is a secure and trustworthy mechanism to ingest, process, store, manage, protect, find, access, and interpret digital information such that the same information can be used at some arbitrary point in the future in spite of obsolescence of everything: hardware, software, processes, format, people, etc.

What does “Long Term” mean?

How can we increase the likelihood that data generated in 2010 or earlier will still be accessible in useful form in 2020 and later? (Cerf, 2010)



Data should normally be preserved and accessible for not less than 10 years for any projects, and for projects of clinical or major social, environmental or heritage importance, the data should be retained for up to 20 years” (Research Councils UK 2008:6)

An archive is expected to provide permanent or indefinite Long Term, preservation of digital information. (OAIS, 2009)

Benefits

Digital preservation provides benefits such as [legal protection](#), [knowledge heritage for future work / future generations](#), [trend analysis](#), [reuse](#) etc.

Digital Universe / Digital Dark Age

As per the “Digital Universe Study Report” by International Data Corporation (IDC), 2010 -

- **Estimated Size of Digital Universe in 2010**

1.2 million Petabytes or 1.2 Zettabytes

- **Estimated Size of Digital Universe in 2020**

35 Zettabytes

(As all major forms of media –voice, TV, radio, print would have completed the journey from analog to digital.)

- **Estimated Size of Unprotected Data needing protection in 2020**

18,000 Exabytes

1 Terabyte = 1,000,000,000,000 bytes B = 10^{12}

1 Petabyte = 1,000,000,000,000,000 bytes B = 10^{15}

1 Exabyte = 1,000,000,000,000,000,000 bytes B = 10^{18}

1 Zettabyte = 1,000,000,000,000,000,000,000 bytes B = 10^{21}

International Trends of Digital Preservation



**National Digital Information Infrastructure and Preservation Program (NDIIPP),
USA – started in 2000**



**Network of Expertise in Long-term STOrage of Digital Resources (NESTOR),
Germany – started in 2003**



**CASPAR - Cultural, Artistic and Scientific knowledge for Preservation, Access and Retrieval
UK – started in 2006**

International Trends of Digital Preservation



Planets: Preservation and Long-term Access through Networked Services



DigitalPreservationEurope (DPE)



Digital Curation Centre (DCC)





APARSEN: Network of Excellence


International Trends of Digital Preservation

Alliance for Permanent Access (APA), EU project


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APARSEN is a new Network of Excellence that aims to bring together an extremely diverse set of practitioner organisations and researchers.



CASPAR – Cultural, Artistic and Scientific knowledge for Preservation, Access and Retrieval – is an Integrated Project co-financed by the European Union within the Sixth Framework Programme (Priority IST-2005-2.5.10, “Access to and preservation of cultural and scientific resources”).

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DIGITAL PRESERVATION



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Digital Preservation



This is the home of the [National Digital Stewardship Alliance](#), [Digital Preservation Outreach and Education](#) and the [National Digital Information Infrastructure and Preservation Program](#).

National Digital Stewardship Alliance



An initiative of the National Digital Information Infrastructure and Preservation Program, NDSA members work together to make a sustained contribution to digital stewardship.

[Read about the NDSA »](#)

Preserving Your Digital Memories



Just as libraries are preserving the nation's digital memory, individuals need to take steps to preserve their own digital memories. Here are some tips on what you can do.

[View the tips »](#)

Digital Preservation Outreach and Education



Fostering a national outreach and education network to encourage the preservation of digital content.

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Library of Congress Web Archives *Minerva*

[LC Web Archives](#)

The Library's Web Archives have been upgraded to a [new presentation](#)! Read more about it in our [announcement](#).

Web Archives Available:

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- [Indian General Elections 2009 Web Archive](#)
- [Indonesian General Elections 2009 Web Archive](#)
- [Iraq War 2003 Web Archive](#)
- [Law Library Legal Blawgs Web Archive](#)
- [Library of Congress Manuscript Division Archive of Organizational Web Sites](#)
- [Papal Transition 2005 Web Archive](#)
- [September 11, 2001 Web Archive](#)
- [Single Sites Web Archive](#)
- [United States 107th Congress Web Archive](#)
- [United States 108th Congress Web Archive](#)
- [United States Election 2000 Web Archive](#)
- [United States Election 2002 Web Archive](#)
- [United States Election 2004 Web Archive](#)
- [United States Election 2006 Web Archive](#)
- [United States Election 2008 Web Archive](#)
- [Visual Image Web Sites Archive](#)



The Library of Congress Web Archives (LCWA) is composed of collections of archived web sites selected by subject specialists to represent web-based information on a designated topic. It is part of a continuing effort by the Library to evaluate, select, collect, catalog, provide access to, and preserve digital materials for future generations of researchers. The early development project for Web archives was called MINERVA.

[LC Web Archives](#)



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[The News-Herald. \(8pp.\)](#)
Hillsboro, Highland Co., Ohio



[The Enterprise. \(4pp.\)](#)
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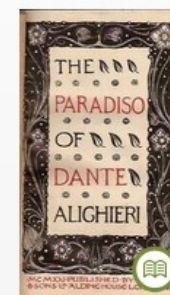
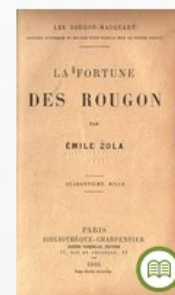
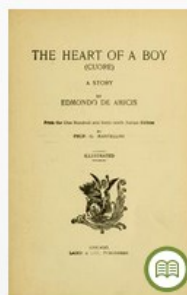
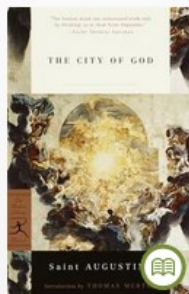
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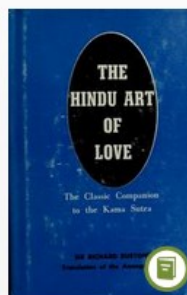
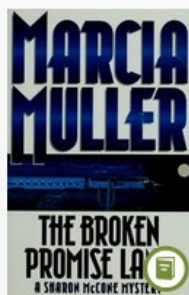
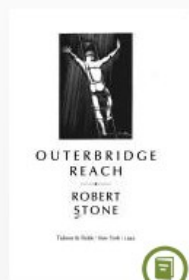
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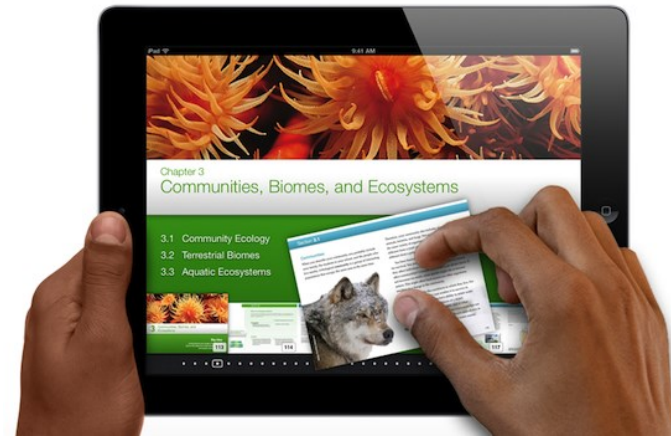




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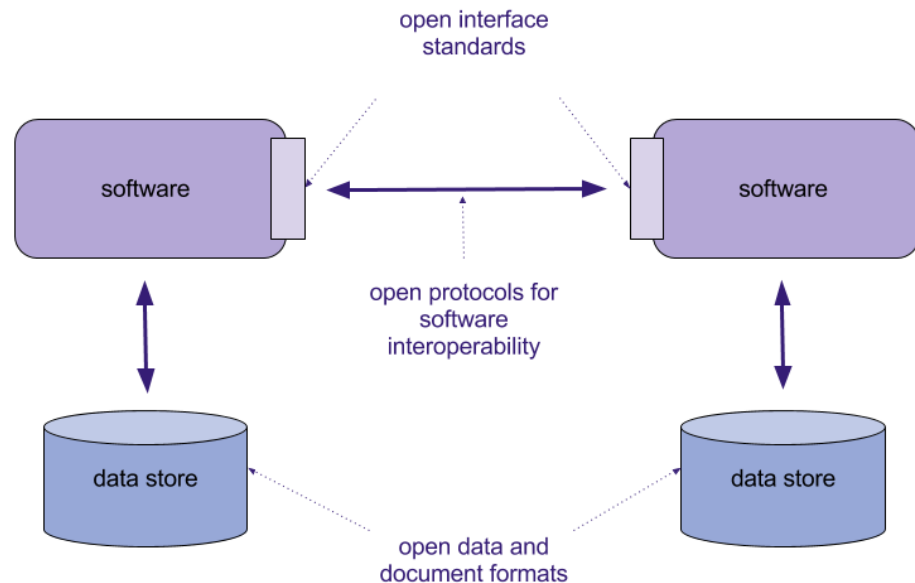
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Use a textbook as is or personalize it

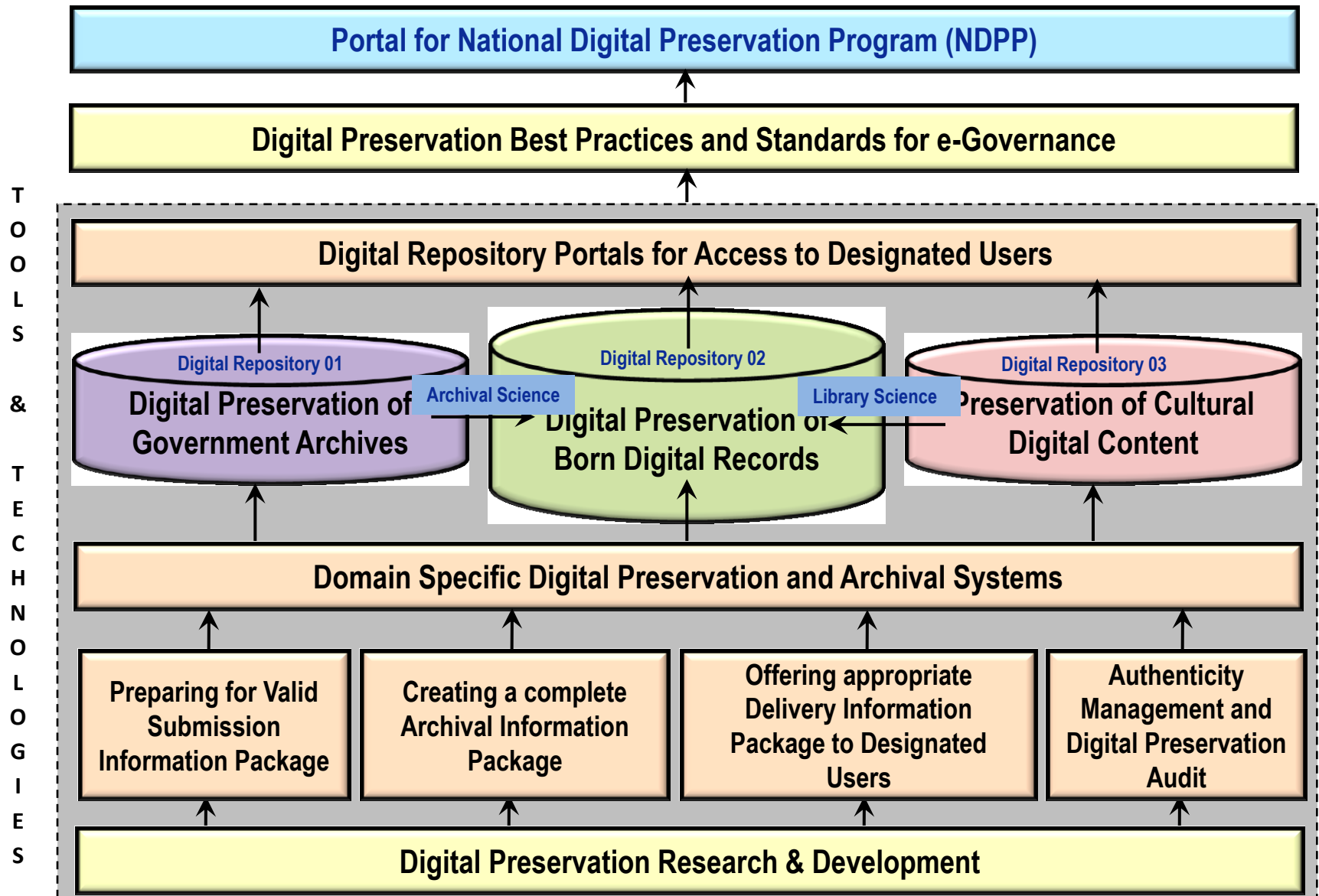


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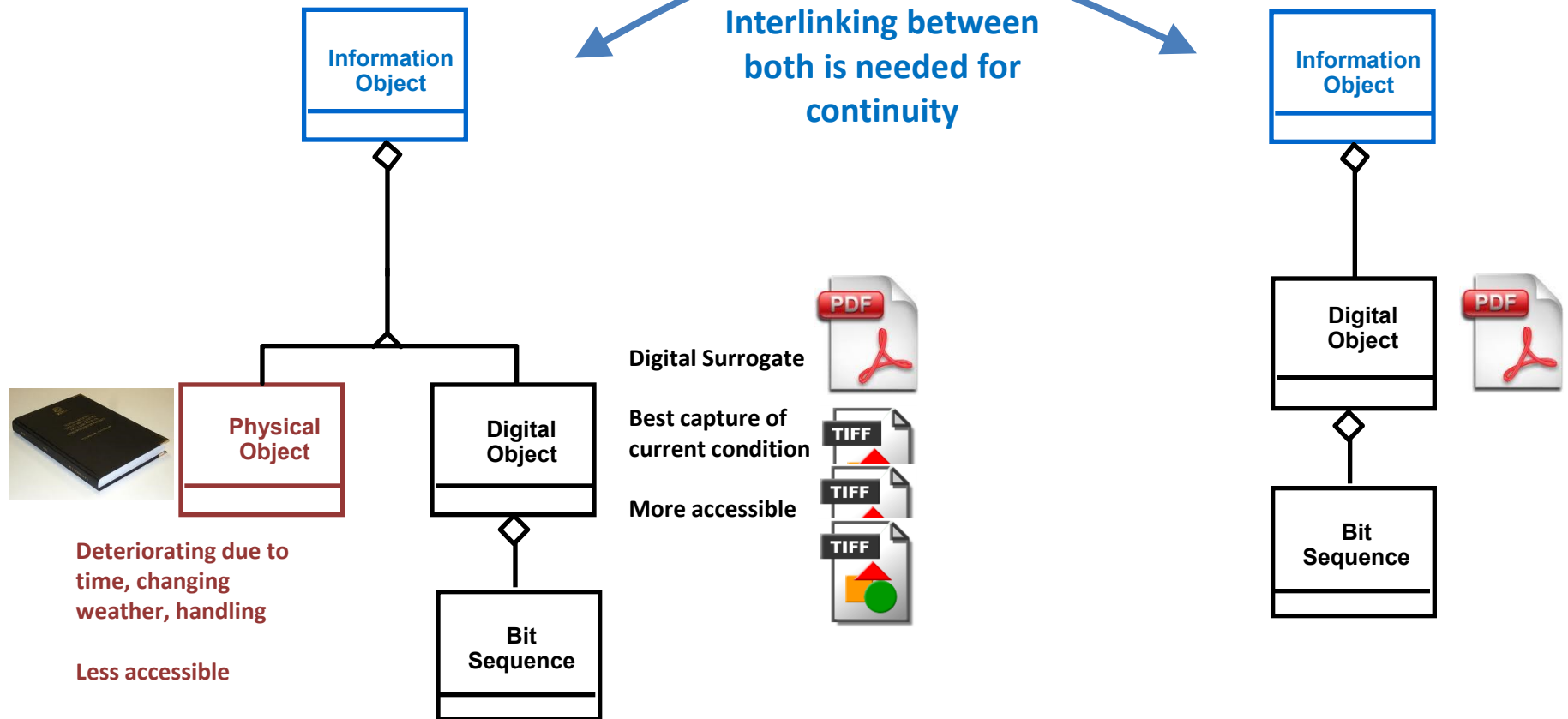


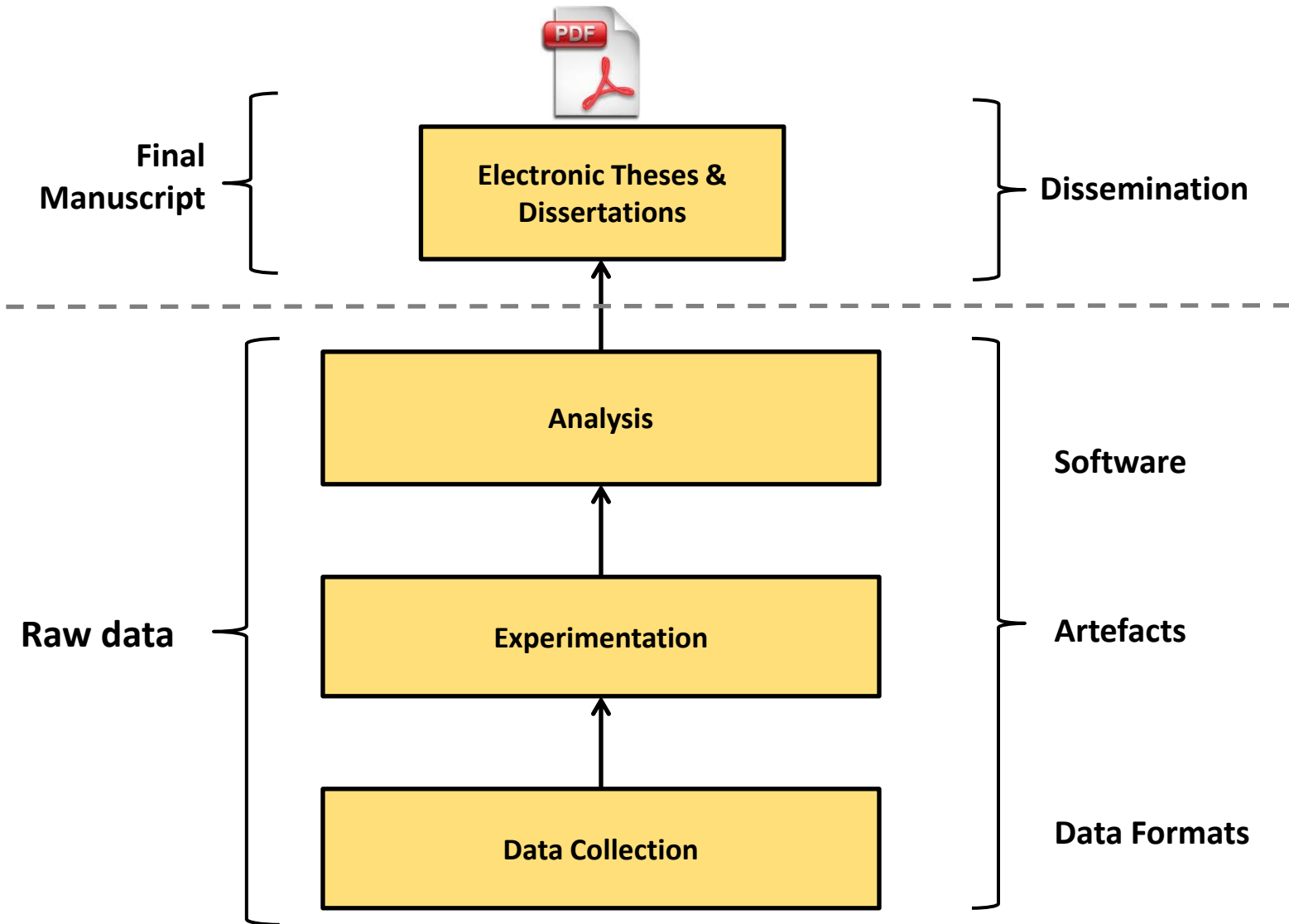
Motivations for Management of Electronic Theses and Dissertations

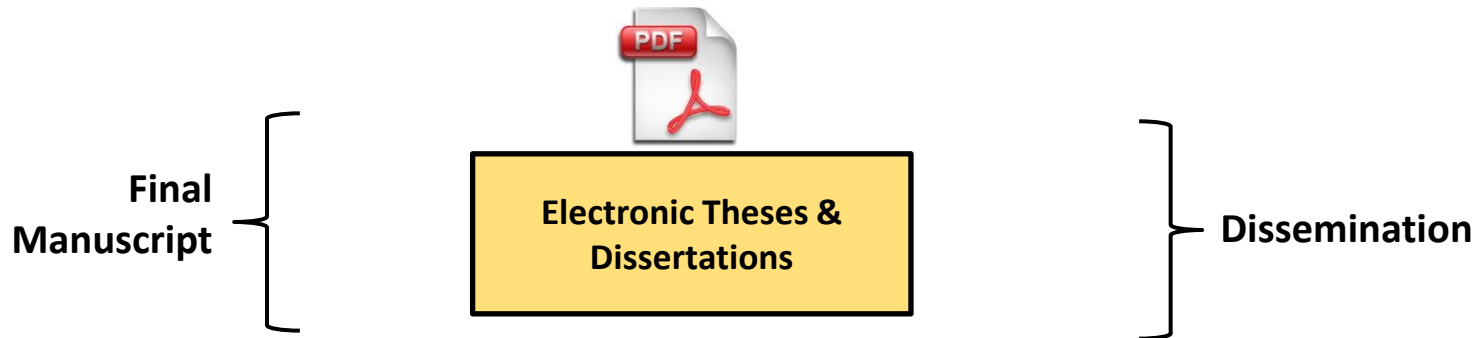
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- Make it accessible to designated users
- Enable further research advancements
- Knowledge enhancement, problem solving
- Collective growth
- Comparative quality

Reformatted Digital Information

Born Digital Information







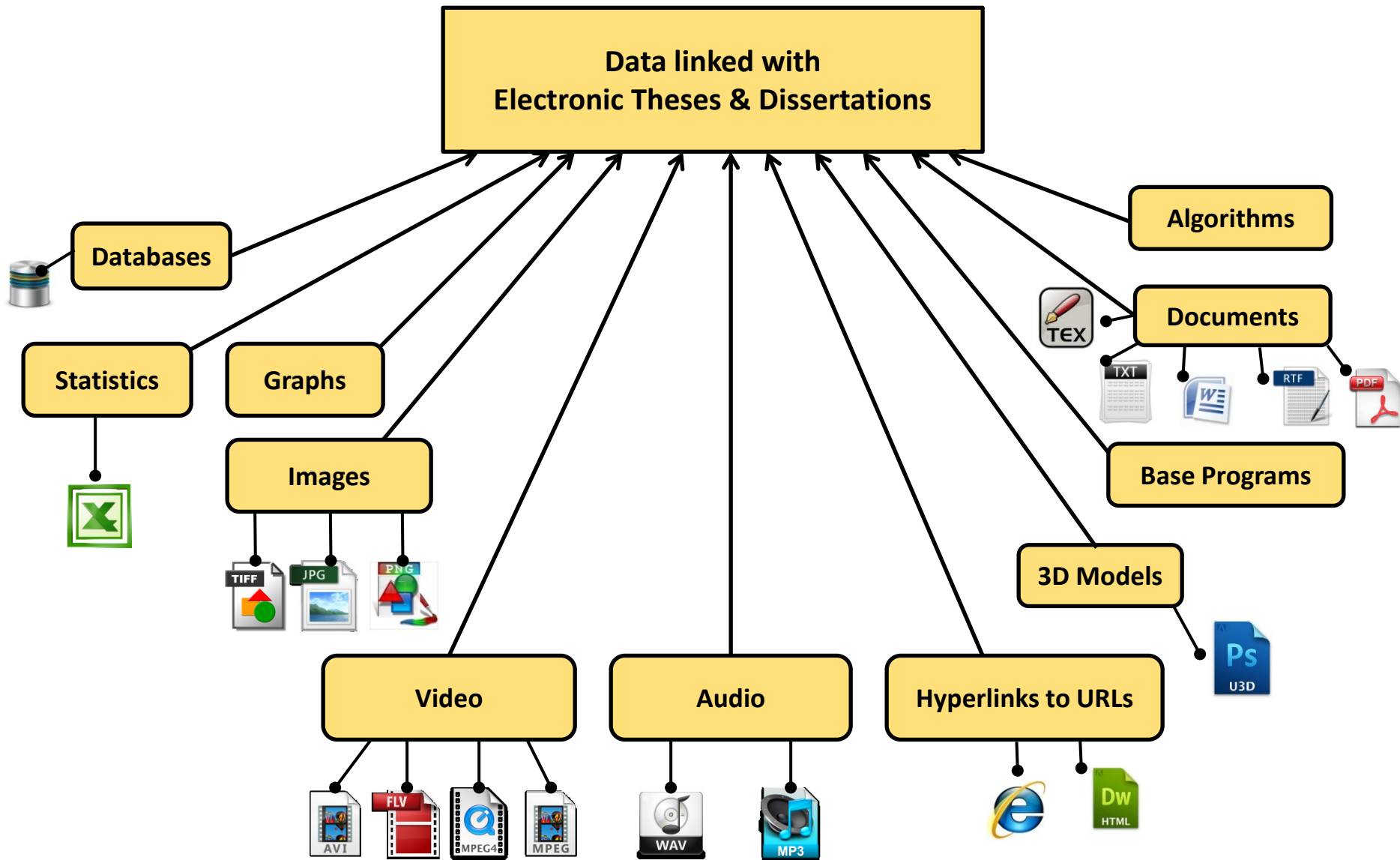
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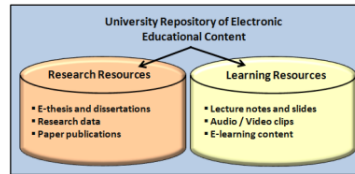
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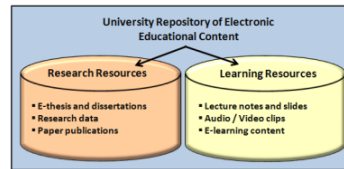


State Level Repository of Electronic Educational Content

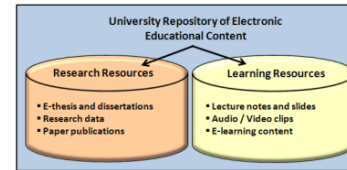
Univ 1



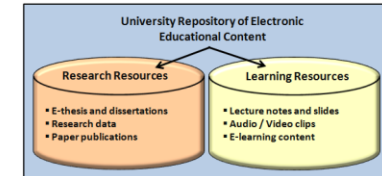
Univ 2



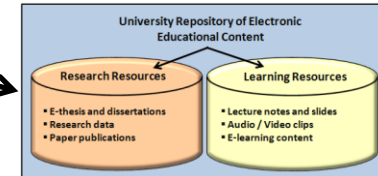
Univ 3



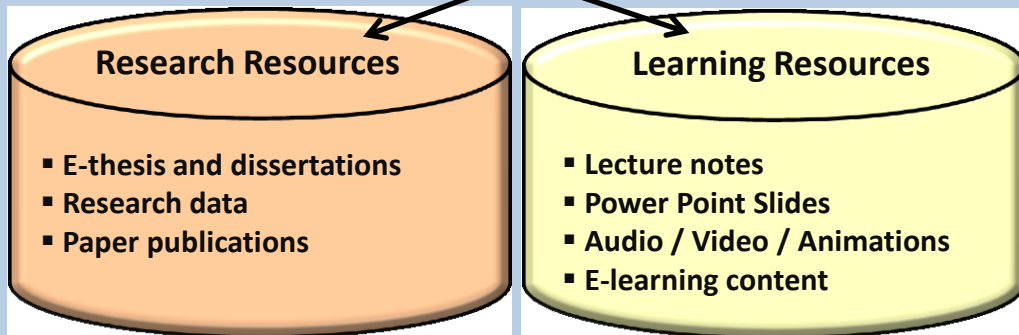
Univ 4



Univ 5



University Repository of Electronic Educational Content

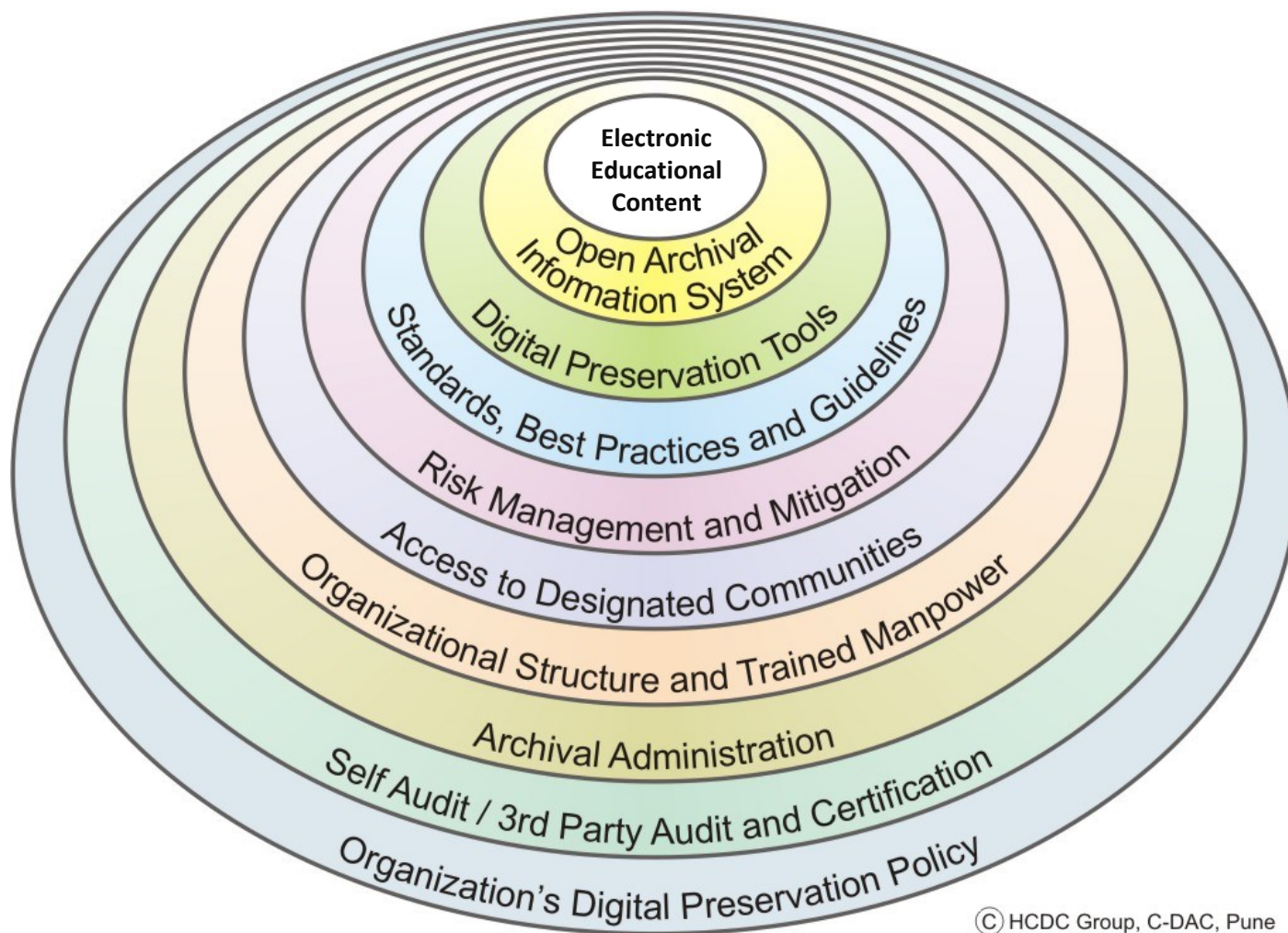


Engineering Degrees Awarded (2008) (R Banerjee , Engineering Education in India, 2008)

| | |
|----------|--------|
| Ph.D.s | 1000 |
| Masters | 20000 |
| Bachelor | 230000 |

Annual projection of Science Ph.Ds in India in 2020 - 20,000
(Education: The PhD factory, Nature, 20 April 2011)

Trusted Digital Repository of Electronic Educational Content



Physical setup

| |
|-------------------------------------------------|
| Location, building architecture |
| Server hardware / racks / KVM |
| Storage hardware (SAN, NAS) |
| Backup device |
| Network Infrastructure (Switches, routers, UTM) |
| Raised flooring |
| Connectivity and bandwidth |
| Disaster recovery site |
| Physical Security |
| Biometric Security |
| Network Security (Firewall) |
| Motion detection for lighting |
| CCTV digital recorders |
| Humidity control |
| Cooling |
| Fire suppression |
| Smoke detection |
| Redundant power supply |

Key concerns in ETD and e-content preservation

- **Raw research data**
- **Use of Indian languages for thesis writing**
- **Specifications for learning objects**
- **Version control**
- **De-duplication**
- **Copyright protection**
- **Authentication**
- **Type of data and file formats**
- **Define the standard practices**
- **Digital preservation strategy**
- **Data and value sharing rules**



Credits:

**The design diagrams used in this presentation
are copied from NDPP project of
India's National Digital Preservation Programme
www.ndpp.in**

Organizing Digital Information

G Santhosh Kumar
Cochin University

Digital Librarian

A digital librarian, a type of specialist information professional who manages and organizes the digital library, combines the functionality for information, elicitation, planning, data mining, knowledge mining, digital reference services, electronic information services, representation of information, extraction, and distribution of information, coordination, searching notably CD-ROMs, online, Internet-based WWW, multimedia access and retrieval.

Goal of a DL

The ultimate goal of a DL is to facilitate access to information just-in-time to the critical wants of end users and additionally to facilitate electronic publishing

The digital librarian plays a distinctive and dynamic role in easy accessing of computer- held digital information including abstracts indexes, full-text databases, sound and video recording in the digital format

Goal of a DL

For finding the right information at the right time, the research, education and training, learning and developmental work and disseminating to the user in required format are the basic requirements of DL.

Organizing e-Resources

G. Santhosh Kumar
Cochin University



What are e-resources?

- Electronic resources comprise of library online catalog, Online Journals, Databases, Newspapers, Reference Materials, Open Access Journals, e-books, and online bookshops



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to 2013



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We are pleased to inform you that the INFLIBNET Centre has renewed subscription of E-resources subscribed under UGC - Infonet Digital Library Consortium for the year 2009. The Consortium offers access to more than 5,000 peer reviewed electronic journals besides few indexing and abstracting databases.

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- [ACM PORTAL](#)
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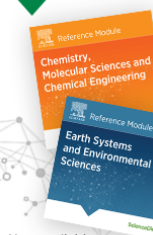
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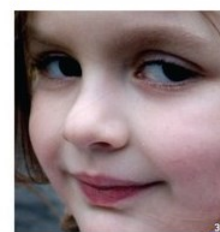


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About the Cover: While mobile technologies exist to support those who care for people with dementia, the challenge is to align these app users with the range of different care strategies. This month's cover story (p. 60) details ways to be more sensitive to these differences when designing tools to help those who help others. Cover photo illustration by Brian Greenberg/Andriy Borys Associates, portrait photograph by Robert Bentley Harrison.

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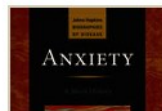
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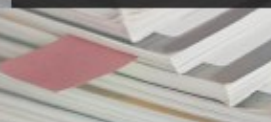
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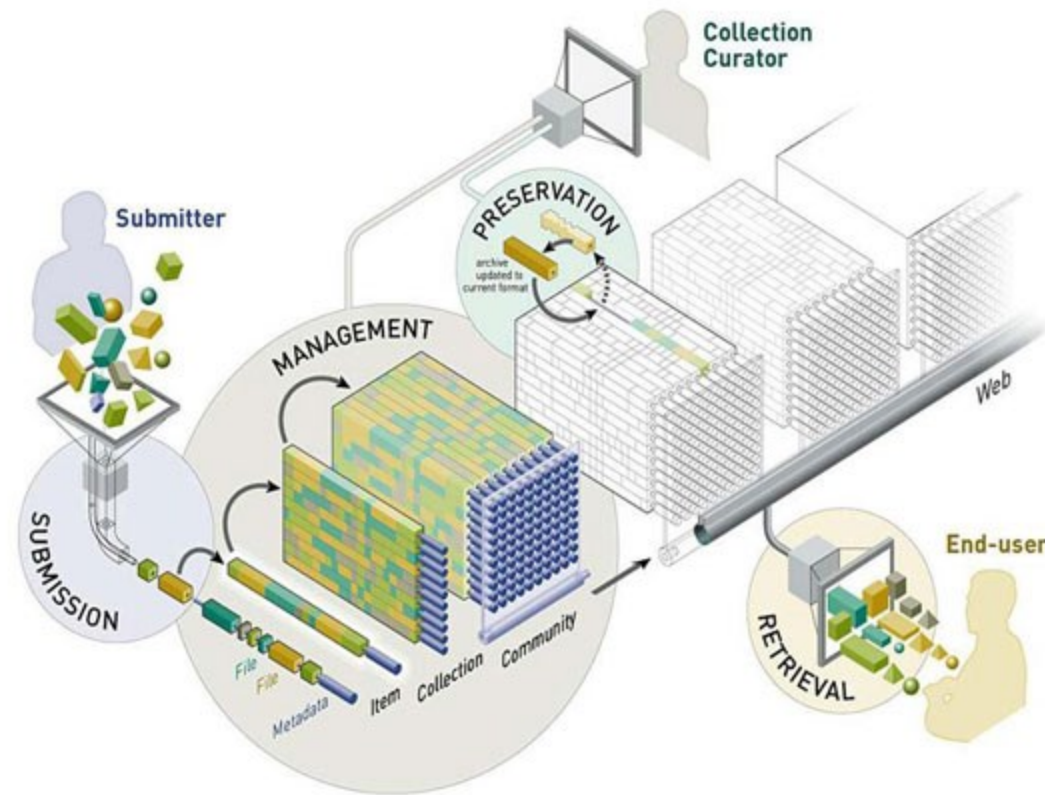
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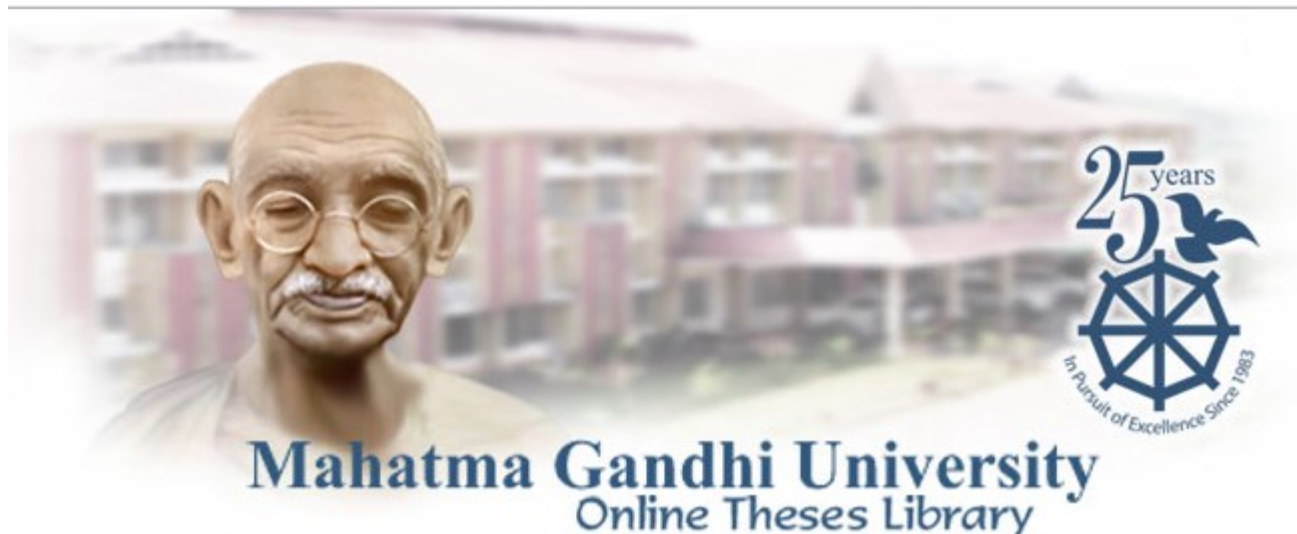
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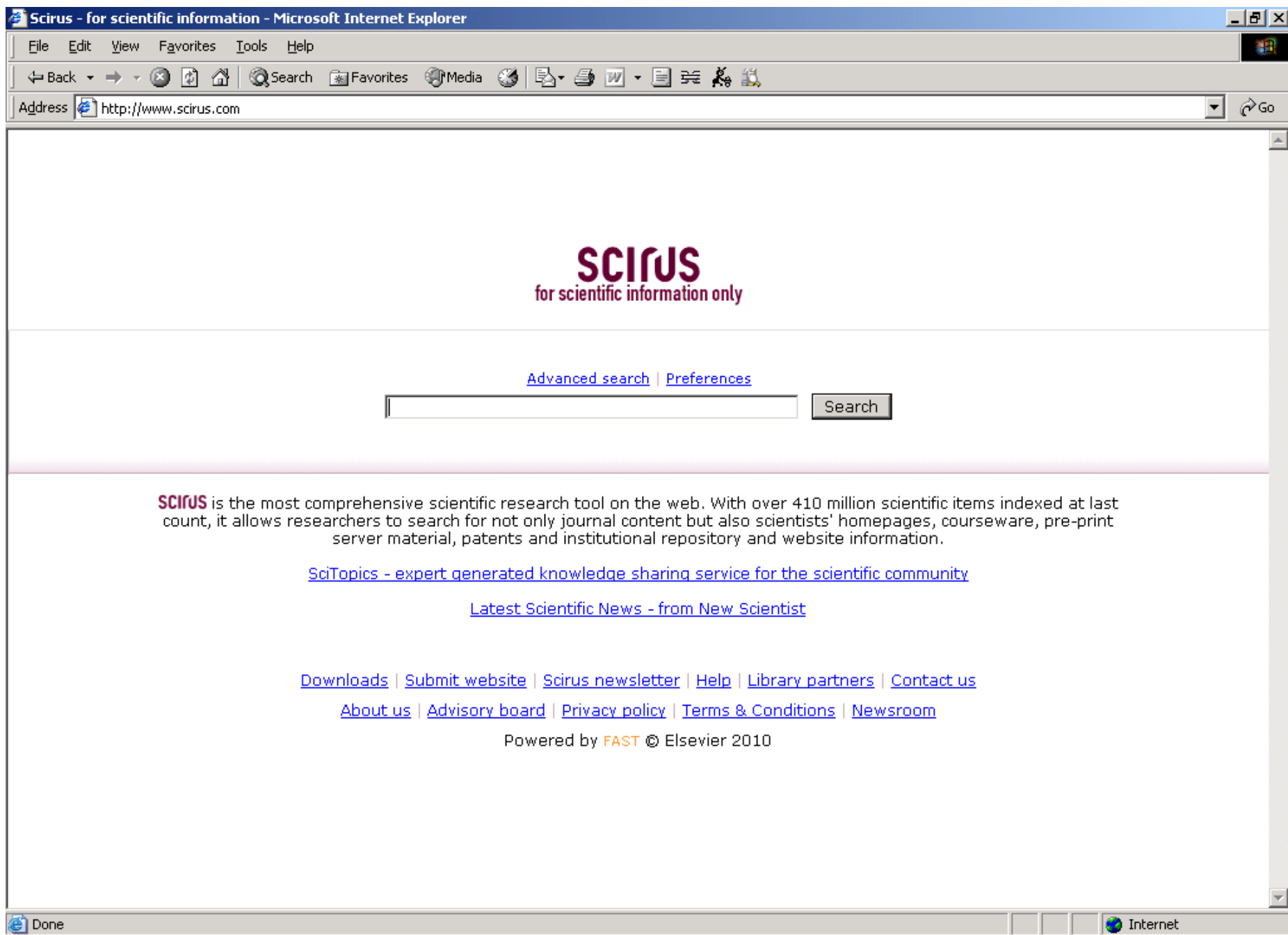
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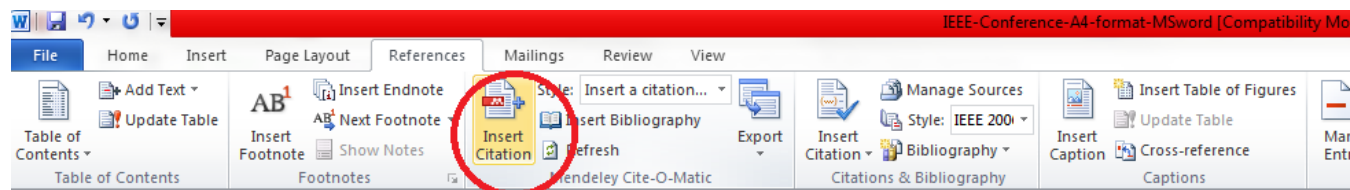
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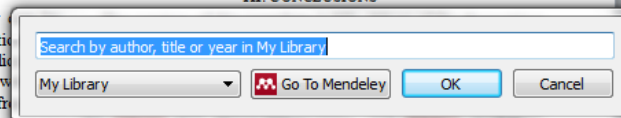
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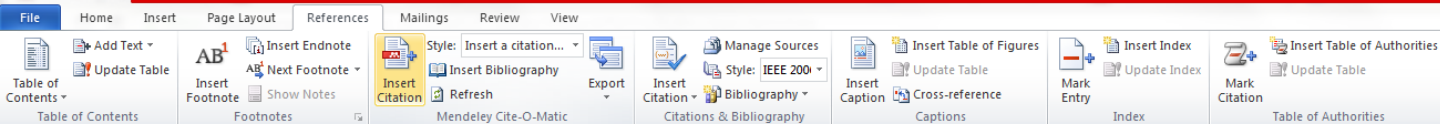
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[1] S. Cherukodan, N. K. Sheeja, and others, “Analytical Study of Typographical Errors in OPACS and Corrective Measures,” 2013.

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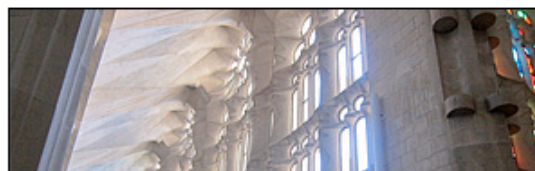


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