2015

Applying Archival Science to Digital Curation: Advocacy for the Archivist's Role in Implementing and Managing Trusted Digital Repositories

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Applying Archival Science to Digital Curation: Advocacy for the Archivist's Role in Implementing and Managing Trusted Digital Repositories

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Preface

The following is based on a research poster presented at the Society of American Archivists' Research Forum at the annual meeting and conference in 2012.

Introduction

- Increasingly, archivists, librarians, and technologists are focusing attention and resources on digital curation. Examples include curation of research datasets, establishment of institutional repositories, and providing virtual work spaces for researchers to collaborate and archive their scholarly output.

- Information professionals rely on models such as OAIS and standards such as ISO 16363 for design, audit, and certification of trustworthy digital repositories. Archivists have valuable knowledge, skills and abilities to contribute to digital curation efforts, but they must justify their involvement in these activities in ways that non-archivists can understand in order to be included.

Problem Statement & Objectives

- Archivists are sometimes forgotten in an institution's digital curation efforts, or added after the initial planning stages. If archivists allow their exclusion from this type of stewardship of unique digital materials, future archival collections and their researchers will suffer.

- Archivists need successful communication strategies to convince stakeholders of the expertise they bring to digital curation. Terms used by archivists to describe their skills may not be understood by librarians and technologists. Mapping traditional archival functions to terms describing digital curation functions will enable communication efforts across disciplines, allowing archivists to demonstrate how their existing knowledge and expertise in managing archival materials contribute towards digital curation and implementing trusted digital repositories.

Methods

Using the functional entitles of the OAIS reference model, and the ISO16363 standard, functions were identified for digital curation. Using the 10 Basic Characteristics of Digital Preservation Repositories as a framework, archival functions for analog holdings were mapped to functions for digital curation, listing sample techniques and guiding documents in each category to discern commonalities.
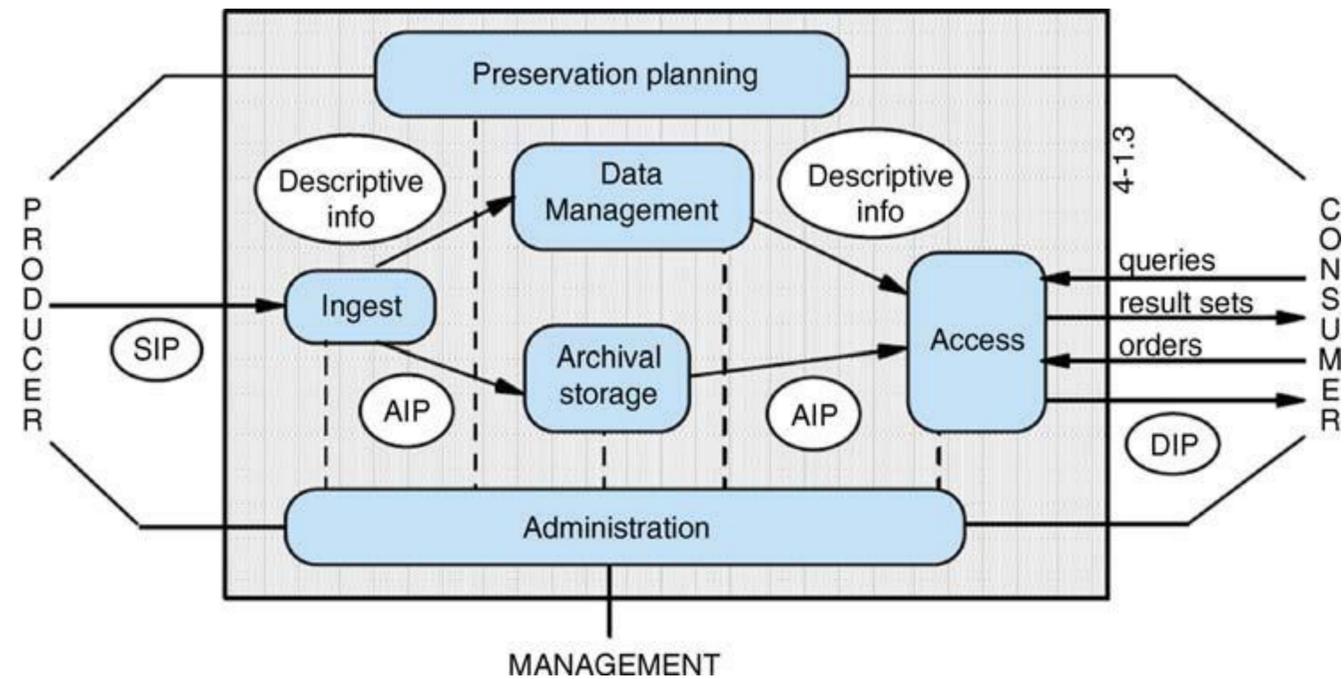

Fig. 1. Functional entities of OAIS reference model

Trusted Repositories vs. Traditional Archival Practice

Introduction to the Comparison Chart

The functions necessary for digital curation for trusted digital repositories are very similar to traditional archives functions informed by archival theory and practice. The chart below addresses characteristics of a trustworthy digital repository and illustrates how each characteristic can be informed by traditional archival theory and practice. These practices are cross walked to the digital curation practices needed for managing born digital collections. In many cases there is overlap. In some cases, emerging best practices and additional documentation are needed to supplement archivists' practices in managing traditional analog collections. Yet, the basic guiding principles and theory for archives work govern all aspects of trustworthy stewardship, whether the secure repository is a physical vault for storing analog materials or a trusted digital repository.

Comparison Chart:
Trusted Digital Repositories, Archival Practice & Digital Curation

Characteristics: Trusted Digital Repositories	Traditional Archival Practices	Digital Curation Practices
Maintenance	Preservation reformatting; archival holdings maintenance	Normalization, migration; checksums/fixity checks; DOIs; metadata (technical, preservation)
Organizational fitness	Mission statement; qualified staff; adequate resources, authority, support; identification of core customers or communities	Mission statement; qualified staff, adequate resources, authority, support; identification of core customers or communities
Legal rights	Deeds of gift; research usage agreements; rights information included in finding aid	Deeds of gift or submission/ingest agreements, including research usage guidelines; rights and usage information included in metadata
Policy framework	Planning and policy documents: mission statement; strategic planning goals and objectives; collection development policy; access and use policy; reproduction policy	Planning and policy documents: mission statement; strategic plan goals and objectives; collection development policy; access and use policy; reproduction policy; digital preservation policy
Acquires/ingests based on criteria	Collecting policy; deed of gift; accessioning procedures, accession number/unique identifier, physical control (location), intellectual control (content description, documentation of provenance)	Collecting policy; deed of gift or submission agreement; accessioning procedures, virus checks, accession number/unique identifier, physical control (location of media or virtual file location), intellectual control (content description, documentation of provenance)
Integrity, authenticity, usability over time	Deed of gift and accessioning documents; appraisal process; usability and preservation of materials assessed during accessioning and processing; notation of obsolete formats or critical preservation challenges requiring action; usage metrics can inform continuing value (reappraisal)	Deed of gift or submission agreement; accessioning worksheet; virus checks; checksums; unique identifiers; capture provenance metadata; ongoing fixity checks; normalization/migration; audit trails/change history captured in metadata; usage metrics can inform continuing value (reappraisal)

Comparison Chart:
Trusted Digital Repositories, Archival Practice & Digital Curation

Characteristics: Trusted Digital Repositories	Traditional Archival Practices	Digital Curation Practices
Metadata about actions taken, access support, usage contexts	Collection documentation including processing notes, deed of gift, donor correspondence, accessioning documents, condition reports, & finding aids document actions taken during preservation, accessioning, processing; access support & usage processes documented in finding aid and/or use policies; commitment to access stated as part of mission.	Processing notes; submission agreement; accessioning documents; audit trails/change histories metadata; digital preservation policy documents commitment and challenges to long-term preservation, level of commitment over time specified; reappraisal of content; deaccessioned objects are documented; DOIs; commitment to access stated as part of mission
Dissemination	Materials used in secure environment (reading room) according to usage policy; rights information in finding aid; reproduction policy clarifies dissemination; related materials listed in finding aid; citation information in finding aid.	Materials used in secure digital environment according to usage policy; rights information in metadata; reproduction policy clarifies dissemination; links provided between related objects in metadata; repository enabled for harvesting by other repositories and aggregators; citation information in metadata.
Program for preservation	Roles, responsibilities for preservation specified (structure, staffing, budget); preservation assessment during accessioning, processing; stabilization, reformatting, and/or restoration completed as feasible; usage metrics and collecting priorities used in future reappraisal; decisions documented; emergency response plan.	Roles, responsibilities for preservation specified in organizational structure (structure, staffing, budget); accessioning and processing workflows include identification and verification of file formats and virus checks; technology watch; regular fixity checks; preservation metadata; audit trails/change history; usage metrics and collecting priorities used in future reappraisal; decisions documented; emergency response plan.
Technical infrastructure for maintenance, security	Access policies, limited access to collection storage areas; security and preservation monitoring; archival holdings maintenance; emergency response plan; some collections may be reproduced and stored in multiple locations (for example, separation of analog masters from digital or microfilm copies)	Access policies, limited access/dark archive for master objects with separate storage for access copies; ongoing fixity checks; audit trails/change history; firewalls; virus checks; emergency response plan; redundancy (LOCKSS) with geographic distribution.

Results

The actions necessary to building, implementing, and managing trusted digital repositories are very similar to traditional archival practices and are informed by both archival theory and practice. For traditional analog materials and digital materials, it is critical to have an infrastructure that includes guiding documents such as mission statements, collecting policies, and use policies. Adequate staffing and other resources are needed to ensure sustainability. Mapping traditional archival functions to functions for digital curation illustrates the ways archivists' existing knowledge, skills, and abilities can be used to inform the processes needed in managing digital collections. Just as importantly, mapping these functions allows archivists to justify to librarians, technologists, administrators and other stakeholders the role archivists can and should play in digital curation and managing trusted digital repositories.

Conclusion

Archivists have led digital curation and preservation efforts for as long as computers have been used, to manage and preserve information of long-term value. Unfortunately, the groundbreaking work of archivists in digital preservation and data curation is not always recognized outside the archives profession. By using common terminology, and understanding how digital curation functions expand upon traditional archival functions, archivists can communicate with confidence the role they play and the value they bring to digital curation activities and creation of trustworthy digital repositories. The need for institutions to demonstrate trustworthiness offers opportunities for archivists to communicate specific ways they can contribute to meeting the ISO 16363 standard for digital repositories. Based on the functional mapping results, archivists are particularly well-suited to creation of policies and procedures relating to appraisal, accessioning, and preservation, including security and emergency plans, all critical components of trustworthy repositories.

Literature Cited

- 10 Basic Characteristics of Digital Preservation Repositories, 2007. As accessed from Center for Research Libraries July 31 2012: http://www.crl.edu/archiving-preservation/digital-archives/metrics-assessing-and-certifying/core-re

- Audit and Certification of Trustworthy Digital Repositories; CCSDS 652.0-M-1; Consultative Committee for Space Data Systems: Washington, DC, 2011.

- Reference Model for an Open Archival Information System (OAIS); CCSDS 650.0-B-1; Consultative Committee for Space Data Systems: Washington, DC, 2002.

Applying Archival Science to Digital Curation: Advocacy for the Archivist's Role

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INTRODUCTION

Increasingly, archivists, librarians, and technologists are focusing attention and resources on digital curation. Examples include curation of datasets, establishment of institutional repositories, and providing virtual work spaces for researchers to collaborate and archive their scholarly output.

Information professionals rely on models such as OAIS and emerging standards such as ISO 16363 for design, audit, and certification of trustworthy digital repositories. Archivists have valuable knowledge, skills and abilities to contribute to digital curation efforts but they must justify their involvement in these activities in ways that non-archivists can understand in order to be included.

PROBLEM STATEMENT AND OBJECTIVES

Archivists are sometimes forgotten in an institution's digital curation efforts, or added after the initial planning stages. If archivists allow their exclusion from stewardship of unique digital materials, future archival collections and their researchers will suffer.

Archivists need successful communication strategies to convince stakeholders of the expertise they bring to digital curation. Terms used by archivists to describe their skills may not be understood by librarians and technologists. Mapping traditional archival functions to terms describing digital curation functions will enable communication efforts across disciplines.

METHODS

Using the functional entitles of the OAIS reference model, and the ISO16363 standard, functions were identified for digital curation. Using the 10 Basic Characteristics of Digital Preservation Repositories as a framework, archival functions for analog holdings were mapped to functions for digital curation, listing sample techniques and guiding documents in each category to discern commonalities.
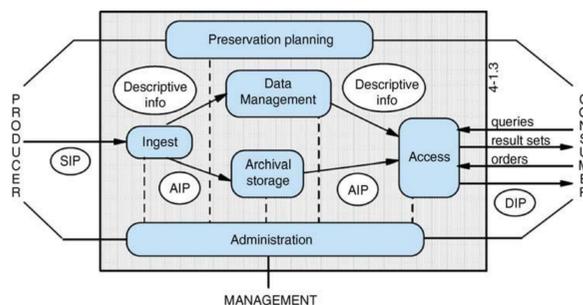

Fig. 1. Functional entities of OAIS reference model

RESULTS

The functions necessary for digital curation for trusted digital repositories are very similar to traditional archives functions informed by archival theory and practice (see Fig. 2). For both traditional analog materials and digital materials, it is critical to have an infrastructure that includes guiding documents such as mission statements, collecting policies and use policies, as well as adequate staffing and other resources to ensure sustainability. New techniques for expanding archival functions into digital curation to address workflow revisions for stewarding digital versus print collections are identified in the chart below in orange font. Mapping traditional archival functions to functions for digital curation illustrates the ways archivists' existing knowledge, skills, and abilities can be used to justify or inform new processes needed in digital curation.

CONCLUSION

Archivists have led digital preservation efforts for as long as computers have been used to record information of long-term value that archivists must preserve, but the groundbreaking work of archivists in digital preservation and data curation are not always recognized outside the archives profession. By using common terminology, and understanding how digital curation functions expand upon traditional archival functions, archivists can communicate with confidence the role they play and the value they bring to digital curation activities and creation of trustworthy digital repositories. The need for institutions to demonstrate trustworthiness offers opportunities for archivists to communicate specific ways they can contribute to meeting the ISO 16363 standard for digital repositories. Based on the functional mapping results, archivists are particularly well-suited to creation of policies and procedures relating to appraisal, accessioning, and preservation, including security and emergency plans, all critical components of trustworthy repositories.

LITERATURE CITED

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Characteristic	Traditional Archival Practices/Guiding Documents	Digital Curation Methods
Maintenance	Preservation reformatting; archival holdings maintenance	Normalization; checksums/ongoing fixity checks; DOIs; metadata (technical, preservation)
Organizational fitness	Mission statement; qualified staff; adequate resources, authority, support; identification of core customers or communities	Mission statement; qualified staff, adequate resources, authority, support; identification of core customers or communities
Legal rights	Deeds of gift; research usage agreements; rights included in finding aid	Deeds of gift or submission/ingest agreements; research usage guidelines and rights information included in metadata
Policy framework	Planning and policy documents: mission statement; strategic plan goals and objectives; collection development policy; access and use policy; reproduction policy	Planning and policy documents: mission statement; strategic plan goals and objectives; collection development policy; access and use policy; reproduction policy; digital preservation policy
Acquires/ingests based on criteria	Collecting policy; deed of gift; accessioning procedures, accession number/unique identifier, physical control (location), intellectual control (content description, documentation of provenance)	Collecting policy; deed of gift or submission agreement signed; accessioning procedures, accession number/unique identifier, physical control (location of media or virtual file location), intellectual control (content description, documentation of provenance)
Integrity, authenticity, usability over time	Deed of gift and accessioning documents; appraisal process; usability and preservation of materials assessed as part of accessioning and processing; notation of obsolete formats or critical preservation challenges	Deed of gift or submission agreement; accessioning worksheet; checksums; unique identifiers; capture provenance metadata; ongoing fixity checks; audit trails/change history captured in metadata; usage metrics
Metadata about actions taken, access support, usage contexts	Processing notes, deed of gift, donor correspondence, accessioning documents, condition reports, & finding aids document actions taken during preservation, accessioning, processing.; access support & usage processes documented in finding aid and/or use policies; commitment to access stated as part of mission.	Processing notes; submission agreement; accessioning documents; audit trails/change histories metadata; digital preservation policy documents commitment and challenges to long-term preservation, level of commitment over time specified; reappraisal of content; deaccessioned objects are documented; DOIs; commitment to access stated as part of mission.
Dissemination	Materials used in secure environment (reading room) according to usage policy; rights information in finding aid; reproduction policy clarifies dissemination; related materials in finding aid; citation information in finding aid.	Materials used in secure online environment according to usage policy; rights information in metadata; reproduction policy clarifies dissemination; links provided between related objects in metadata; repository enabled for harvesting by other repositories and aggregators; citation information in metadata.
Program for preservation	Roles, responsibilities for preservation specified (structure, staffing, budget); preservation assessment during accessioning, processing; stabilization, reformatting, and/or restoration completed as feasible; usage metrics and collecting priorities used in future reappraisal; decisions documented; emergency response plan.	Roles, responsibilities for preservation specified in organizational structure (structure, staffing, budget); accessioning and processing workflows include identification and verification of file formats and virus checks; technology watch; regular fixity checks; preservation metadata; audit trails/change history; usage metrics and collecting priorities used in future reappraisal; decisions documented; emergency response plan.
Technical infrastructure for maintenance, security	Access policies, limited access to collection storage areas; security and preservation monitoring; archival holdings maintenance; emergency response plan; some collections may be reproduced and stored in multiple locations	Access policies, limited access/dark archive for master objects with separate storage for access copies; ongoing fixity checks; audit trails/change history; firewalls; emergency response plan; redundancy (LOCKSS) with geographic distribution.

Fig. 2. 10 Basic Characteristics of Digital Preservation Repositories: mapping traditional archival functions to functions for trustworthy digital repositories
Orange text signifies new or expanded methods for digital curation

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About the Author

Sammie L. Morris is Associate Professor, University Archivist, and Head of Archives and Special Collections at Purdue University, where she directs the Virginia Kelly Karnes Archives and Special Collections Research Center. Morris has a MLIS specializing in archival enterprise from University of Texas at Austin and a BA in English Literature from Louisiana Scholars' College. She is an active member of the Academy of Certified Archivists, Society of American Archivists, Midwest Archives Conference and is a past president of the Society of Indiana Archivists. She currently serves on the editorial board for *Archival Issues* and the Outreach Committee for MetaArchive. She has published and presented on a variety of topics relating to archival leadership, archival literacy, preservation and digitization. She is an alumna of the first class of the Archives Leadership Institute (2008). Morris served on the Indiana State Historical Records Advisory Board from 2006-2010. In previous positions she worked as Associate Dean for Special Collections at Florida State University and as Managing Archivist for the Dallas Museum of Art.