PART II: HOW TO CREATE, APPLY, AND USE METADATA

From Cataloging to Metadata: Dublin Core Records for the Library Catalog

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SUMMARY. The Dublin Core is an international standard for describing and cataloging all kinds of information resources: books, articles, videos, and World Wide Web (web) resources. Sixteen Dublin Core (DC) elements and the steps for cataloging web resources using these elements and minimal controlled values are discussed, general guidelines for metadata creation are highlighted, a worksheet is provided to create...
the DC metadata records for the library catalog, and sample resource descriptions in DC are included. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com> © 2005 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. Dublin Core, cataloging, resource description

INTRODUCTION

Professional positions like Metadata Architect and Metadata Librarian are increasingly becoming common in both business settings and in libraries. Some libraries are even replacing job titles such as Cataloger with them. Metadata creation and cataloging are both activities that involve the description of information resources in order to facilitate their information discovery and retrieval in tools such as library catalogs. However, as more and more information, especially electronic, continues to be produced and proliferated, new and simpler standards for resource description became necessary to accomplish the goal of universal bibliographical control and information access.

Library catalogs use the Anglo-American Cataloging Rules, Second Edition Revised (AACR2R) to describe resources in a standard way; these descriptions are encoded in the Machine Readable Cataloging (MARC) format. Bibliographic utilities like OCLC and RLIN are first checked before the library cataloger creates a bibliographic record for the resource. If the bibliographic description already exists, the record is modified or adapted and exported into the Online Public Access Catalog (OPAC) of the library. Some libraries, rather than using OCLC and an integrated library automation system to hold their OPAC, may use a proprietary database using SQL or other technologies. DC emerged as a simpler alternate to MARC to describe electronic resources and is now used widely to describe all types of resources, including books.

WHAT IS DUBLIN CORE?

DC stands for Dublin Core, a standard from the National Information Standards Organization (NISO) and the International Organization for Standardization (ISO). Originally, there were 15 DC elements that could
be used for creating resource descriptions. Last year DC was extended with a 16th element, Audience. When only the original 15 DC elements are used in metadata creation, the level of DC use is called Simple; this can be considered equivalent to minimal level cataloging. When the 16th element, refinements to the original 15, such as qualifiers and encoding schemes (for example, the vocabulary term and name of the vocabulary from which it is derived), are used, the level of DC use is called Qualified; think of this as full level cataloging. This article provides directions for use of a level of DC that is Qualified and yet very simple and straightforward to practice. I do so because (1) simple DC does not help in the goal of information discovery, (2) not all born-digital resources, i.e., electronic resources, have a print equivalent or share the characteristics of books, serials, videos, computer files, and other information resources traditionally organized in the library, and thus require more complex descriptions than simple, (3) for digital resources to be included in the library catalog integrating new metadata standards such as DC with older standards such as MARC and AACR2R, or more complete standards such as EAD, is necessary. A barrier to electronic resource cataloging is that many library professionals and information specialists continue to believe that cataloging web resources is a waste of time; it is better to make web pages (essentially webliographies or lists) because many of the web resources are too ephemeral to be included in the library catalog. However, new tools such as URL link checkers make the maintenance of metadata for web resources much simpler. It is more efficient to have users start with the library catalog as a single gateway to the universe of knowledge, no matter the format or type of information sought. The usage of DC refinements and principles advocated in this article is both integrative and time saving. It will save the time of the library cataloger and the user because it recognizes the lessons learned by the library, archival, and museum cataloging communities and tries to incorporate them into DC metadata creation.

DC elements of description may be encoded as text in XML, HTML meta tags, or RDF. I will not describe here the encoding of DC records or the use of bibliographic utilities like OCLC or general document interchange standards such as XML or other library standards such as MARC to encode DC. The sixteen DC elements are:

- Title
- Creator
- Subject
Description
Publisher
Contributor
Date
Type
Format
Identifier
Source
Language
Relation
Coverage
Rights
Audience

Each of these elements is described further. Some general guidelines about metadata creation that can be drawn from the rich history of libraries in descriptive and subject cataloging, and museums and archival description are first presented.

**BRIDGING THE CATALOGING AND METADATA CREATION GAP**

Library cataloging has always been considered costly and prone to budget cuts and criticisms. Even as early as the late 1800s American libraries were concerned about the unit cost of cataloging, i.e., how much did it cost to catalog a book? Providing resource descriptions for information access is thus a costly business and little by little libraries have relinquished new forms of materials to others. DC was envisioned as a simple way to get novices–people who are new to cataloging information resources for discovery–as a way to help solve this problem. This has influenced the language used by the DC standard greatly. Thus, cataloging is synonymous for the activity of metadata description. Resource descriptions are synonymous for DC records. Instead of language such as tags, fields, and subfields (words used in the MARC standard), DC uses elements. It is also for this reason that DC has 16 elements while the library MARC has 999 tags, which can be considered the top level
fields of description (not that all resources require 999 tags; most use only about 5 to 10 tags of description). While it certainly is easier to create 15 elements as opposed to 'tags and fields and subfields' it is also less easy to uniquely identify information resources. The best of cataloging practices can however be captured in two simple guidelines for metadata creation using DC. These are:

Guideline 1: Resource description should be **as complete as possible**. If you are unable to describe based on your examination of the resource, first, try to supply the data. For example, if there is no title, make up a title. Leave the element blank only as a last resort. When no information is completed for an element it is essentially meaningless. See also the DC Dumb-down Principle and corollary described below.

Guideline 2: Resource description should be **consistent**. Human nature tends to be more inconsistent than consistent. However, the research evidence indicates that principles of consistency and uniformity are used in cataloging and classification to help both the humans doing the work to avoid cognitive overload, lessen judgment, and also aid users with better information retrieval. There are many techniques for ensuring consistency and the simplest is to use words from a pre-determined and authoritative list whenever possible for controlled values.

In addition, there are general principles of metadata creation as per the DC standard. These are:

Guideline 3: All of the DC elements are optional, repeatable, and modifiable by qualifiers. All elements are optional, which means that any of the DC elements may be omitted. All elements are repeatable; this means that if there is more than one person who created the resource, and you can use the Creator element as many times as you need to record the names of multiple creators. Similarly, all other elements (Title, Subject, etc.) may be repeated as many times as needed. DC elements are often modifiable by qualifiers, which means that elements have qualifiers. These include element refinements or encoding schemes that refine the original DC elements further with the use of controlled vocabularies. DC qualifiers are optional, too. Refinement qualifiers may be vocabulary terms from registered lists such as standard library tools like the *Library of Congress Subject Headings* and *Dewey Decimal*
Classification; these two may be used to qualify the subject element. There are other vocabularies that may be used. The name of the vocabulary used is the encoding scheme qualifier.

**HOW TO CREATE DC METADATA**

This section provides an element-by-element description of how to create DC metadata for an electronic (web) information resource; all 16 elements are described in detail and each element includes the following categories of instruction and information: Name, Label, Definition, Comments, Chief Source of Information, Controlled Values, Inputting Guidelines, and Notes. Name is the name given to the element in the DC standard. Label refers to the label you will see in an integrated library system or a bibliographic utility such as OCLC for entering this information. Often, the Label will be the same as the element name, but sometimes it may be different. Definition is the definition given in the DC standard. Comments also come for the DC as appropriate. Chief source of information is instruction that is modeled after the technical reading of the item for cataloging practices of the Anglo American Cataloging Rules, Second Edition, Revised (AACR2R). AACR2R helps the cataloger by providing a list of the places and components in the resource being cataloged that may be consulted for information about the element being described; this is known as technical reading of an item. In other words, the process of technical reading provides specific guidance to the sources of information, the exact places in the resource from which the metadata for each element may be selected. Controlled values is also modeled after AACR2R and MARC to some extent and allows the metadata creator to know if the element uses a list of controlled values, a classification, or controlled vocabulary. These values may be made enforceable by the software or humanly selected from a given list or through consultation of an external list/source such as registries. Controlled values help make meaning clearer and consistent. They do so by keeping the form of element values, the metadata content for each element describing the resource, the same across multiple resources. Precision, increased relevance of results retrieved in response to a query, is improved in subject information retrieval by the use of controlled values and vocabularies. Inputting guidelines provide special directions that must be followed to enter the resource description. These illustrate the general principles of DC metadata creation. Metadata Creator Notes discuss how much of the
cataloger’s (metadata creator) judgment is involved in creating the metadata for each element. Metadata creation is often subjective rather than objective. Without clear rules and standards, two different catalogers may describe the same resource quite differently. The term subjective is used to indicate that a particular element can be described based on the personal judgment of the resource cataloger and objective is used to denote objectivity, when the data or content is found on the resource or may be identified in a similar manner by all resource metadata creators and catalogers. Appendix 1 contains a form that can be used to practice DC metadata creation and Appendix 2 contains samples of DC metadata for web information resources.

**Element: Title**

**Name:** Title.

**Label:** Title.

**Definition:** A name given to the resource.

**Comment:** Typically, a Title will be a name by which the resource is formally known.

**Chief Source of Information:** Take title from the actual information resource; if none found on resource take from the browser title and if nothing is there, use other sources as appropriate or supply the title.

**Controlled Values:** No.

**Inputting Guidelines:** Enter the title information as found in the resource. Use capitalization and punctuation as found in resource.

**Metadata Creator Notes:** Generally, there should be no individual judgment involved as the metadata creator is merely transcribing the title, when the resource has a clearly presented title. Many electronic resources, however, may not have a title clearly visible or the title may be generic for the whole and not the specific part being cataloged. In these cases, creating the metadata for the title, where the cataloger must create or supply title, can become subjective. Follow the guidance prescribed in the Chief source of information and generally take title from the actual information resource whenever possible.

**Element: Creator**

**Name:** Creator.

**Label:** Creator.
**Definition:** An entity primarily responsible for making the content of the resource.

**Comments:** Examples of a Creator include a person, an organization, or a service. Typically, the name of a Creator should be used to indicate the entity.

**Chief Source of Information:** Take Creator from the actual information resource; if none found on resource, take from the browser title including parts of the resource, or use other sources as appropriate.

**Controlled Values:** No.

**Inputting Guidelines:** Enter the Creator as found in the resource. Use capitalization and punctuation as found in resource. If Creator is an organization, enter the name of the organization.

**Metadata Creator Notes:** Objective. Cataloging the creator becomes a subjective activity should the creator not be listed in the resource; while it is possible through extra research to find out this information, generally this would take too much time and hence, most cataloging is only done based on actual examination of the resource. If creator cannot be readily determined from this, leave this element blank. Many electronic resources do not have the creator easily identifiable.

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**Element: Subject**

**Name:** Subject.

**Label:** Subject.

**Definition:** The topic of the content of the resource.

**Comment:** Typically, a Subject will be expressed as keywords, key phrases, or classification codes that describe a topic of the resource. Recommended best practice is to select a value from a controlled vocabulary or formal classification scheme.

**Chief Source of Information:** Determine Subject from the actual information resource.

**Controlled Values:** Optional. Use *Library of Congress Subject Headings* (LCSH) or keywords found on the resource.

**Inputting Guidelines:** Input subject from LCSH or from resource as Keywords.

**Metadata Creator Notes:** Objective when the terms are found on the resource. Subjective, if cataloger supplied. Most often will be cataloger supplied.
**Element: Description**

Name: Description.
Label: Description.
**Definition:** An account of the content of the resource.
**Comment:** Description may include but is not limited to: an abstract, table of contents, reference to a graphical representation of content, or a free-text account of the content.
**Chief Source of Information:** Take information from abstract or table of contents of the actual information resource to include in this element; if no abstract or table of contents is found on resource, write a small description in your own words.
**Controlled Values:** No.
**Inputting Guidelines:** Provide abstract, table of contents, or description of the resource.
**Metadata Creator Notes:** Objective if taken from resource. The information in this element may be subjective if it is a summary provided by the cataloger.

**Element: Publisher**

Name: Publisher.
Label: Publisher.
**Definition:** An entity responsible for making the resource available.
**Comment:** Examples of a Publisher include a person, an organisation, or a service. Typically, the name of a Publisher should be used to indicate the entity.
**Chief Source of Information:** Take the name of the publisher from the actual information resource; if none is found on resource take from the browser title including parts of the resource, or use other sources as appropriate.
**Controlled Values:** No.
**Inputting Guidelines:** Enter the Publisher as found in the resource. Use capitalization and punctuation as found in resource. If Publisher is an organization, enter the name of the organization.
**Metadata Creator Notes:** Objective. May become subjective. It is often difficult to find the name of the publisher for electronic resources. For example, consider the homepage. Who is the publisher? We generally consider the organization or individual who is hosting the web page
to be the publisher. Thus, the publisher for this author’s home page is the University of Arizona.

**Element: Contributor**

**Name:** Contributor.

**Label:** Contributor.

**Definition:** An entity responsible for making contributions to the content of the resource.

**Comment:** Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity.

**Chief Source of Information:** Take Contributor from the actual information resource; if none found on resource take from the browser title including parts of the resource, or use other sources as appropriate.

**Controlled Values:** No.

**Inputting Guidelines:** Enter the Contributor as found in the resource. Use capitalization and punctuation as found in resource. Contributors play different roles and you can indicate the role by using parenthesis following the name. Thus, some roles are Editor, Translator, Illustrator. Record these as follows: Smith, Michael (Editor).

**Metadata Creator Notes:** Objective. There are a great many more roles that Contributors can fall into. But, to keep the activity of metadata creation simple and save time, the above three above are sufficient.

**Element: Date**

**Name:** Date.

**Label:** Date.

**Definition:** A date associated with an event in the life cycle of the resource.

**Comment:** Typically, Date will be associated with the creation or availability of the resource. Recommended best practice for encoding the date value is defined in a profile of ISO 8601 [W3CDTF] and follows the YYYY-MM-DD format.

**Chief Source of Information:** Take Date from the actual information resource; if none found on resource take from the browser title including parts of the resource, or use other sources as appropriate.

**Controlled Values:** No. However, the format—the way in which date is to be reported—and exactly what type of date it is are strictly specified. See next page.
**Inputting Guidelines:** Follow the YYYY-MM-DD format and choose from list what type of date is being recorded, whether the date is the date the resource was created or modified. If no date is available, leave blank; if multiple dates are found, enter the most recent only and indicate type. Enter 00-00 for month and date when it is not found on the resource easily. Dates can be entered for the following:

- **Created:** date the resource was created
- **Valid:** date or range of dates a resource is valid
- **Available:** date when the resource became or will become available
- **Issued:** date the resource was published
- **Modified:** date the resource was changed
- **Accepted:** date the resource was accepted (for example, theses have acceptance dates)
- **Submitted:** date resource was submitted

**Metadata Creator Notes:** Objective. Keep cataloging simple and only specify one or two dates, when found, based on your local user needs.

**Element: Type**

**Name:** Resource Type.
**Label:** Type.
**Definition:** The nature or genre of the content of the resource.
**Comment:** Type includes terms describing general categories, functions, genres, or aggregation levels for content. Recommended best practice is to select a value from a controlled vocabulary (for example, the list of DCMI Type Vocabulary [DCMI]). To describe the physical or digital manifestation of the resource, use the Element: Format.

**Chief Source of Information:** Determine Type from the actual information resource and the definition for each type as given below.

**Controlled Values:** Yes. There is a list of ten (10) types used from the DCMI Type vocabulary. Type is also called form or genre, sometimes. Definitions of the values, the vocabulary to be used, for the ten (10) DCMI types are:

- **Collection:** A collection is an aggregation of items. The term collection means that the resource is described as a group; its parts may be separately described and navigated.
- **Dataset:** A dataset is information encoded in a defined structure (for example, lists, tables, and databases), intended to be useful for direct machine processing.
Event: An event is a non-persistent, time-based occurrence. Metadata for an event provides descriptive information that is the basis for discovery of the purpose, location, duration, responsible agents, and links to related events and resources. The resource of type event may not be retrievable if the described instantiation has expired or is yet to occur. Examples—exhibition, web-cast, conference, workshop, open-day, performance, battle, trial, wedding, tea-party, conflagration.

Image: An image is a primarily symbolic visual representation other than text. For example—images and photographs of physical objects, paintings, prints, drawings, other images and graphics, animations and moving pictures, film, diagrams, maps, musical notation. Note that image may include both electronic and physical representations.

Interactive Resource: An interactive resource is a resource which requires interaction from the user to be understood, executed, or experienced. For example—forms on web pages, applets, multimedia learning objects, chat services, virtual reality.

Service: A service is a system that provides one or more functions of value to the end-user. Examples include: a photocopying service, a banking service, an authentication service, interlibrary loans, a Z39.50 or Web server.

Software: Software is a computer program in source or compiled form, which may be available for installation non-transiently on another machine. For software, which exists only to create an interactive environment, use interactive instead.

Sound: A sound is a resource whose content is primarily intended to be rendered as audio. For example—a music playback file format, an audio compact disc, and recorded speech or sound.

Text: A text is a resource whose content is primarily words for reading. For example—books, letters, dissertations, poems, newspapers, articles, archives of mailing lists. Note that facsimiles or images of texts are still considered to be of the genre text.

Physical Object: An inanimate, three-dimensional object or substance. For example, a computer, the great pyramid, a sculpture. Note that digital representations of, or surrogates for, these things should use Image, Text, or one of the other types.

Inputting Guidelines: You may select as many types from the ten (10) DCMI types defined above that can be found in the resource.

Metadata Creator Notes: Objective.
Element: Format

Name: Format.
Label: Format.
Definition: The physical or digital manifestation of the resource.
Comment: Typically, Format may include the media-type or dimensions of the resource. Format may be used to determine the software, hardware, or other equipment needed to display or operate the resource. Examples of dimensions include size and duration. Recommended best practice is to select a value from a controlled vocabulary (for example, the list of Internet Media Types [IMT] defining computer media formats).
Chief Source of Information: Determine Format from the actual information resource.
Controlled Values: Yes. Choose from values given below. Like Type (form) a resource that exhibits more than one Format may be described as many times as needed. Values for formats are usually taken from IMT. Here is a partial list of IMT types; ebook is not from IMT. Use the term Other if your resource falls outside the list given here and you’re unable to select from the IMT list.

- text/html
- text/xml
- text/rtf
- application/ms-word
- application/ms-excel
- application/ms-publisher
- application/pdf
- multipart/mixed
- audio/mpeg
- ebook
- video/mpeg
- video/quicktime
- Other
Inputting Guidelines: Select one or more of the formats. 
Metadata Creator Notes: Objective.

**Element: Identifier**

**Name:** Resource Identifier.  
**Label:** Identifier.  
**Definition:** An unambiguous reference to the resource within a given context.  
**Comment:** Recommended best practice is to identify the resource by means of a string or number conforming to a formal identification system. Example formal identification systems include the Uniform Resource Identifier (URI) (including the Uniform Resource Locator (URL)), the Digital Object Identifier (DOI), and the International Standard Book Number (ISBN).  
**Chief Source of Information:** Take URL from the Location of the actual information resource as seen in the web browser Address bar.  
**Controlled Values:** No. But, the format of the URL is specified (http://...).  
**Inputting Guidelines:** Give full URL starting with http://  
**Metadata Creator Notes:** Objective.

**Element: Source**

**Name:** Source.  
**Label:** Source.  
**Definition:** A reference to a resource from which the present resource is derived.  
**Comment:** The present resource may be derived from the Source resource in whole or in part. Recommended best practice is to reference the resource by means of a string or number conforming to a formal identification system.  
**Chief Source of Information:** Take the original Source Title and URL from the actual information resource, browser title, and/or browser location (address bar).  
**Controlled Values:** No.  
**Inputting Guidelines:** Enter the title followed by a comma and the URL. If no title or URL found or the original source is a print or other format, describe in own words. Many electronic resources are born-dig-
ital and have no print or other digital counterpart. Hence, Source may often be left blank.

**Metadata Creator Notes:** Objective.

**Element: Language**

**Name:** Language.

**Label:** Language.

**Definition:** A language of the intellectual content of the resource.

**Comment:** Recommended best practice is to use RFC 3066 [RFC3066], which, in conjunction with ISO 639 [ISO639], defines two- and three-letter primary language tags with optional subtags. Examples include “en” or “eng” for English, “akk” for Akkadian, and “en-GB” for English used in the United Kingdom.

**Chief Source of Information:** Determine language from the actual information resource.

**Controlled Values:** No.

**Inputting Guidelines:** Select the language of the resource.

**Metadata Creator Notes:** Objective. Note that many learning resources are available in versions other than English; therefore, record the language to match the object being cataloged. Do not use the Language element to record version information. Use Relation HasVersion (described below).

**Element: Relation**

**Name:** Relation.

**Label:** Relation.

**Definition:** A reference to a related resource.

**Comment:** Recommended best practice is to reference the resource by means of a string or number conforming to a formal identification system.

**Chief Source of Information:** Determine from the actual information resource(s).

**Controlled Values:** No. The following refinements, each of which are defined, may be used:

- **IsVersionOf** is version, edition, or historical state of the second resource
- **HasVersion** contains version, edition, or historical state of the second resource
IsReplacedBy is supplanted, displaced, or superseded by the referenced source
Replaces supplants, displaces, or supercedes the referenced resource
IsRequiredBy is required by second resource for functioning, delivery, content, etc.
Requires requires second resource for functioning, delivery, content, etc.
IsPartOf is contained in another resource
HasPart contains part of another resource
IsReferencedBy is referenced by second resource
References references second resource
IsFormatOf is format or mechanically reproduced representation of second resource
HasFormat has format or mechanically reproduced representation of second
ConformsTo resource conforms to an educational, accessibility or other standard

Inputting Guidelines: Select the appropriate relationship(s) between two or more resources. A resource may have multiple relationships. Add Title and URL.

Metadata Creator Notes: Objective.

Element: Coverage

Name: Coverage.
Label: Coverage.
Definition: The extent or scope of the content of the resource.
Comment: Coverage will typically include geographical and historical coverage in terms of spatial location, a place name, feature name, or geographic coordinates such as Paris, Pima River, temporal period, a period label such as Ming, Jurassic, Renaissance, date, or date range, and/or jurisdiction, such as a named administrative entity. Recommended best practice is to select a value from a controlled vocabulary. For example, the Thesaurus of Geographic Names and, where appropriate, use named places or time periods in preference to numeric identifiers such as sets of coordinates or date ranges.
Chief Source of Information: Determine from the actual information resource(s).
**Controlled Values:** No.

**Inputting Guidelines:** Select the appropriate spatial, temporal, jurisdiction coverage of the resource and use the words in the resources or your own to describe.

**Metadata Creator Notes:** Objective. For some types of literary materials, this might be subjective.

**Element: Rights**

**Name:** Rights Management.

**Label:** Rights.

**Definition:** Information about rights held in and over the resource.

**Comment:** Typically, a Rights element will contain a rights management statement for the resource, or reference a service providing such information. Rights information often encompasses Intellectual Property Rights (IPR), Copyright, and various Property Rights. If the Rights element is absent, no assumptions can be made about the status of these and other rights with respect to the resource.

**Chief Source of Information:** Take from the actual information resource, and if unavailable, look for a rights management or copyright statement page.

**Controlled Values:** Yes. See list below and select as appropriate.

- Accessible freely
- License restrictions apply
- Restrictions apply
- Subscription needed
- Public domain

**Inputting Guidelines:** Enter from list above as many as needed. If a separate page is given with rights information, include the URL. Example: Restrictions apply. URL:

**Metadata Creator Notes:** Objective.

**Element: Audience**

**Name:** Audience.

**Label:** Audience.
**Definition:** Intended user for the resource.

**Chief Source of Information:** Determine from the actual information resource; if none found on resource use your best judgment.

**Controlled Values:** Yes. Use one or more from the list of values for educational level given below:

- Elementary
- Middle School
- High School
- Undergraduate Level
- Graduate Level
- Professional
- General Education

**Inputting Guidelines:** Look for this information on the main resource page; if none is found, browse the resource and select one or more of the values from above.

**Metadata Creator Notes:** Subjective, if not found explicitly stated in resource.

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**CONCLUSION**

The traditional library catalog, over the last 100 years, has evolved to fulfill the following functions:

- Finding
- Identifying
- Locating
- Selecting
- Collocating

The first objective of the library catalog is to help the user find, identify, and locate materials when the author, title, or subject is known. The second objective of the catalog is to bring like materials together (collocation) and aid in selection. In digital libraries, the information discovery function (finding and locating) continues to be given the most impor-
tance. Thus, in the development of the DC metadata standard by the DCMI, initial emphasis has been in getting minimal bibliographic control over electronic resources. Recently, phrases such as the life of the catalog record or lifecycle of the metadata record point to the fact that resource metadata creation can be an ongoing process. That is, metadata for electronic records are more similar to serials catalog records, which require constant maintenance, changes, and updates as serials evolve throughout their life. I have tried to bridge the cataloging and metadata creation gap by outlining some important ways in which DC metadata can be created in harmony with and harnessing the lessons learned by the library cataloging community.

WORKS CITED


This document is updated regularly and provides a list of digital libraries and tools useful for metadata creation. It also points to resources such as the Metadata Resources page maintained by IFLA.


This WWW document is a small controlled vocabulary for the DC element Type. It lists the names of the vocabulary terms used for this element and provides a brief definition. These controlled vocabulary terms have all been approved by the DCMI Usage Board. A new vocabulary term, Physical Object was added in the last year.


This is the most recent (published August 26, 2003), newly revised, official guide to using the DC elements, available freely via the WWW. The previous version of this document was published in 2001. The new version provides more examples for the elements. It also streamlines the distinctions between using DC in one of two levels: simple and qualified. The Bibliography covers the years 1994 through mid-2003 and lists more than 100 entries and is arranged by year. Diane Hillman is the author of the base document titled Using Dublin Core. But, in the tradition of WWW resources, which seldom have one creator, others have contributed sections. The whole document is available by following hyperlinks in the Table of Contents.
The title and creators of the section and direct URLs for each of the sections are as follows:

- Introduction–Diane Hillman
- Syntax, Storage and Maintenance Issues–Diane Hillman
- Element Content and Controlled Vocabularies–Diane Hillman
  <http://dublincore.org/documents/usageguide>
- The Elements–Diane Hillman
- Dublin Core Qualifiers–Diane Hillman
  <http://dublincore.org/usageguide/qualifiers.shtml>
- Glossary–Mary S. Woodley, Gail Clement, and Peter Winn
  <http://dublincore.org/usageguide/glossary.shtml>


This document is an Adobe PDF file (needs the Adobe Acrobat reader). The Learning Technologies Standards Committee has been working on Learning Object metadata for a long time and it is now a fully approved IEEE standard. A joint memorandum was signed in 2001 by IEEE and Dublin Core agreeing to work together on the development of the educational elements of the metadata.


This document provides detailed help on the definition of electronic resources, how to determine form and type and on ‘integrating resources.’ It is a good background document to read although it is a guide for using MARC in electronic resources cataloging.


This online form is part of the University of San Diego’s TPOT, Technical Processing Online Tools website, which has been serving the libraries since 1994. This site shows how electronic government documents and other genres of electronic resources are fast becoming standard items for description in the library catalog. The related websites cataloging practice section is an especially good one to read. Common bibliographic relationships among web documents are described.

Web Resources on “Cataloging Internet Resources”–the following two guides were written in the 1990s. They are thus not about cataloging using DC but, they are excellent guides, although outdated, for cataloging electronic resources using MARC/AACR2R.
APPENDIX 1. DC Metadata Creation Form

Name of Metadata Creator: ____________________________________________________

Date of Metadata Creation: ________________________________________________

Title: ___________________________________________________________________

Identifier (URL): __________________________________________________________

Description: [Use Abstract to provide your own brief summary of the resource; use quotation marks if summary is taken directly from resource. Use TableOfContents to include the sections/components.]

Abstract: __________________________________________________________________

TableOfContents: __________________________________________________________________

Subject: [Use Library of Congress Subject Headings or just enter Keywords.]

1. _____________________________  2. _____________________________
3. _____________________________  4. _____________________________

Keyword: [Use keywords to express additional ideas and concepts to describe the resource not already expressed in the Title, Description, Coverage, or Subject Fields. Use keywords from the resource itself and not from a controlled vocabulary.]

1. _____________________________  2. _____________________________
3. _____________________________  4. _____________________________

Coverage: [Use geographical terms to indicate spatial coverage and time periods or years to indicate temporal.]

Temporal: ______________________ Spatial: ______________________

Date: [Enter date in YYYY-MM-DD format. Enter the last date found or estimated for one or more of the following as is possible. Leave month and day blank if it is not found on resource, and leave date blank if it is not possible to easily determine from resource.]

Created: ______________________ Issued: ______________________
Valid: ______________________ Modified: ______________________
Available: ____________________ Accepted: ____________________
Submitted: ____________________

Creator [First Author]: ____________________________

Creator [Second Author]: __________________________

Creator [Third Author]: ____________________________

Contributor: [Enter additional contributors, if any, as follows:] ______________________

Editor(s): ____________________________

Translator(s): ____________________________

Illustrator(s): ____________________________

Publisher: [Enter the publisher name.] ____________________________
### Rights:
[Search the resource for an explicit copyright statement and/or information about cost or license and select from list below. Add notes and URL as necessary.]

<table>
<thead>
<tr>
<th>Accessible freely</th>
<th>License restrictions apply</th>
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<td>Restrictions apply</td>
</tr>
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### Type:
[Select ONLY ONE categorical Type (form or genre) of the resource.]

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<td>Software</td>
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<tr>
<td>Event</td>
<td>Sound</td>
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<tr>
<td>Image</td>
<td>Text</td>
</tr>
<tr>
<td>Interactive Resource</td>
<td>Other</td>
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### Format:
[Use this to indicate the media-type, the physical manifestation of the resource and select as many as are applicable.]

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<td>Video/mpeg</td>
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<td>Video/quicktime</td>
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<td>Image/jpg</td>
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### Language:
[Select one or more from list; add other languages as needed.]

<table>
<thead>
<tr>
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### Relation:
[Select from list and add Title and Identifier (URL), when available.]

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### Source:
[Enter Title and URL or description.]

### Audience:
[Select the educational level of the audience for the resource from list.]

<table>
<thead>
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<tbody>
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<td>Middle School</td>
<td>Professional</td>
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<td>High School</td>
<td>General Education</td>
</tr>
<tr>
<td>Undergraduate Level</td>
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</tr>
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</table>
APPENDIX 2. Sample Resource Descriptions

Resource # 1: Resource is a database of educational standards described as Service

Name of Metadata Creator: Anita Coleman

Date of Metadata Creation: 2003-09-03

Title: McRel: Online Compendium of Standards and Benchmarks: the 4th edition of content knowledge in Language Arts, Mathematics, and Science

Identifier (URL): http://www.mcrel.org/compendium/kSkillsIntro.asp

Description: "As part of the ongoing effort to provide the best of current information related to standards, we have undertaken a significant update of the standards database. As the 4th edition for each subject area is completed, it will be added to those available from this page. By the end of 2003, geography and economics will be placed on line. By the end of 2004, the balance of the social studies (behavioral studies, civics, and history) in Content Knowledge will also be revised to include the following features and additions: Browsable Topics, Knowledge skill/statements, Revised vocabulary terms, and Pre-kindergarten benchmarks."

Table of Contents:

Subject: [Use Library of Congress Subject Headings or just enter Keywords.]

1. Language arts–Standards
2. Mathematics–Standards
3. Science–Standards
4. Education–Standards

Keyword: [Use keywords to express additional ideas and concepts to describe the resource not already expressed in the Title, Description, or Subject Fields. Use keywords from the resource itself and not from a controlled vocabulary.]

1. ___________________________ 2. ___________________________

Coverage: [Use geographical terms to indicate spatial coverage and time periods or years to indicate temporal.]

Temporal: Nineteen nineties
Spatial: United States

Date: [Enter date in YYYY-MM-DD format. Enter the last date found or estimated for one or more of the following as is possible. Leave month and day blank if it is not found on resource, and leave date blank if it is not possible to easily determine from resource.]

Created: Modified:
Valid: 2003-12-03
Accepted:
Available: Submitted:
Issued:

Creator [First Author]:
Creator [Second Author]:
Creator [Third Author]:

Part II: How to Create, Apply, and Use Metadata
### APPENDIX 2 (continued)

**Contributor:** [Enter additional contributors, if any, as follows.]

**Editor(s):**

**Translator(s):**

**Illustrator(s):**

**Publisher:** [Enter the publisher name.] Mid-continent Research for Education and Learning, http://www.mcrel.org/

**Rights:** [Search the resource for an explicit copyright statement and/or information about cost or license and select from list below. Add notes and URL as necessary.]

<table>
<thead>
<tr>
<th>Accessible freely</th>
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</table>

**Type:** [Select ONLY ONE categorical Type (form or genre) of the resource.]

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<tr>
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<td>Interactive Resource</td>
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**Format:** [Use this to indicate the media-type, the physical manifestation of the resource and select as many as are applicable.]

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<thead>
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<th>Image/png</th>
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</table>

**Language:** [Select one or more from list; add other languages as needed.]

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<thead>
<tr>
<th>English</th>
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<th>French</th>
<th>Spanish</th>
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</thead>
</table>

**Relation:** [Select from list and add Title and Identifier (URL), when available.]

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<tr>
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<th>Content Knowledge, 3rd ed,</th>
</tr>
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<tbody>
<tr>
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<td><a href="http://www.mcrel.org/standards-benchmarks/">http://www.mcrel.org/standards-benchmarks/</a></td>
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<td>IsPartOf</td>
<td></td>
</tr>
<tr>
<td>HasPart</td>
<td></td>
</tr>
</tbody>
</table>
Resource # 2: Resource is a ‘mathematical problem’ described as Text

Name of Metadata Creator: Anita Coleman
Date of Metadata Creation: 2003-08-03
Title: Problems: Mathematics
Identifier (URL): http://www.student-automotive.com/problems/mathematics.html

Abstract: The objectives of this webpage on mathematical problems are two fold: for pre-university students to be able to use mathematics in solving automotive problems, and for them to be able to understand the importance of mathematics for professional preparation in automotive engineering.

Table of Contents:
1. Torque
2. Engine model
3. Vehicle dynamics
4. Damped oscillations
5. Model of the motion of a car

Coverage: For geographical terms to indicate spatial coverage and time periods or years to indicate temporal.

Temporal: Spatial:
APPENDIX 2 (continued)

**Date:** [Enter date in YYYY-MM-DD format. Enter the last date found or estimated for one or more of the following as is possible. Leave month and day blank if it is not found on resource, and leave date blank if it is not possible to easily determine from resource.]

Created: Modified: 
Valid: 2003-12-00 Accepted: 
Available: Submitted: 
Issued: 

**Creator [First Author]:** Fonteijne, Robert J. 
**Creator [Second Author]:** 
**Creator [Third Author]:** 
**Contributor:** [Enter additional contributors, if any, as follows:] 

**Editor(s):** 
**Translator(s):** 
**Illustrator(s):** 

**Publisher:** [Enter the publisher name.] Fonteijne, Robert N. 

**Rights:** [Search the resource for an explicit copyright statement and/or information about cost or license and select from list below. Add notes and URL as necessary.] 

Accessible freely License restrictions apply 
Copyrighted Restrictions apply 
Copyright unknown Subscription needed 
Copyright and cost restrictions unknown Public domain 
Cost Unknown 

**Type:** [Select ONLY ONE categorical Type (form or genre) of the resource.] 

Collection Interactive Resource 
Dataset Service 
Event Software 
Image Sound 

**Format:** [Use this to indicate the media-type, the physical manifestation of the resource and select as many as are applicable.] 

Application/ms-word Image/png 
Application/ms-excel Multipart/mixed 
Application/ms-publisher Text/html 
Application/pdf Text/xml 
Audio/mpeg Text/rtf 
Ebook Video/mpeg 
Image/gif Video/quicktime 
Image/jpg Other 

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Resource # 3: Resource is a Tutorial

Name of Metadata Creator: Anita Coleman

Date of Metadata Creation: 2008-03-03

Title: PowerPoint Tutorials: Electric Teacher

Identifier (URL): http://www.electricteacher.com/tutorial3.htm

Description: This tutorial describes how to do several common tasks in PowerPoint with detailed directions and screenshots. Table of contents: Starting Presentations, Common Features, Working with Text, Working with Graphics, and Finishing Up.

Abstract: This tutorial describes how to do several common tasks in PowerPoint with detailed directions and screenshots. Table of contents: Starting Presentations, Common Features, Working with Text, Working with Graphics, and Finishing Up.

Table of Contents: _______________________________________________________

Part II: How to Create, Apply, and Use Metadata
APPENDIX 2 (continued)

Subject: [Use Library of Congress Subject Headings or just enter Keywords.]
1. Microsoft PowerPoint
2. Computer software—Study and Teaching

Keyword: [Use keywords to express additional ideas and concepts to describe the resource not already expressed in the Title, Description, or Subject Fields. Use keywords from the resource itself and not from a controlled vocabulary.]
1. __________________________________ 2. __________________________________

Coverage: [Use geographical terms to indicate spatial coverage and time periods or years to indicate temporal.]
Temporal: ____________________________ Spatial: ____________________________

Date: [Enter date in YYYY-MM-DD format. Enter the last date found or estimated for one or more of the following as is possible. Leave month and day blank if it is not found on resource, and leave date blank if it is not possible to easily determine from resource.]
Created: ____________________________ Modified: ____________________________
Valid: ____________________________ Accepted: ____________________________
Available: ____________________________ Submitted: ____________________________
Issued: ____________________________

Creator [First Author]: Chamberlain, Cathy
Creator [Second Author]:
Creator [Third Author]:

Contributor: [Enter additional contributors, if any, as follows:]
Editor(s): ____________________________
Translator(s): ____________________________
Illustrator(s): ____________________________

Publisher: [Enter the publisher name.] Electric Teacher

Rights: [Search the resource for an explicit copyright statement and/or information about cost or license and select from list below: Add notes and URL as necessary.]
\Accessible freely
\Copyrighted
Copyright unknown
Copyright and cost restrictions unknown
Cost Unknown

Public domain

Right restrictions apply
Restrictions apply
Subscription needed

Type: [Select ONLY ONE categorical Type (form or genre) of the resource.]
Collection
Dataset
Event
Image
Interactive Resource
Service
Software
Sound
Text
Part II: How to Create, Apply, and Use Metadata

Format: [Use this to indicate the media-type, the physical manifestation of the resource and select as many as are applicable.]

- Application/ms-word
- Application/ms-excel
- Application/ms-publisher
- Application/pdf
- Audio/mpeg
- Ebook
- Image/gif
- Image/jpg

Language: [Select one or more from list; add other languages as needed.]

- English
- German
- French
- Spanish

Relation: [Select from list and add Title and Identifier (URL), when available.]

- IsVersionOf
- HasVersion
- IsReplacedBy
- Replaces
- IsRequiredBy
- Requires
- IsPartOf
- HasPart
- IsReferencedBy
- References
- IsFormatOf
- HasFormat
- ConformsTo

Source: [Enter Title and URL or description.]

Audience: [Select the educational level of the audience for the resource from list.]