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RDA description of electronic and digital resources in the digital library

Ariel Alejandro Rodríguez García[1] and Adriana Monroy-Muñoz[2]

[1] Instituto de Investigaciones Bibliotecológicas y de la Información, Universidad Nacional Autónoma de México (UNAM) - Library Science and Information Research Institute, National Autonomous University of Mexico
[2] Ph.D. student in Library and Information Studies, Facultad de Filosofía y Letras, UNAM - Faculty of Humanities, UNAM

Abstract: This work focuses on examining the electronic resources description, particularly the RDA description that needs to be added to the digital library. The research stresses the organization of information pertaining to resources with digital features by using RDA: Resources Description & Access (RDA 2011). We add to this, the recording attributes to access the digital collection. Taking into account the theoretical principles underlying the current schemes to describe the information resources, we contrast them with the model that governs RDA for the description of the access points and the recording attributes of works, expressions, manifestations and items. The model of representation and description of the electronic resource is exemplified by digital photography while identifying the attributes of electronic resources and digital photography that will be necessary for the discovery of the resource in the digital medium.
Keywords: Electronic resources, RDA, Electronic resources description, RDA attributes, Digital photography. Digital library.

1. Introduction

Currently, the editing and publishing of electronic resources (ER) has a broad development; which causes these resources to be integrated into library collections increasingly. In order to provide access to intellectual production, dissemination and preservation of collections of digital works through the digital library (DL), regularly in large volumes, it is necessary to address the way in which information is organized and presented through greater interoperability data (Rowley & Hartley 2008). To enhance the collections of electronic resources, also known as e-resources, digital content and e-

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information, among other terms (Jacobs, 2007); it is required to develop a framework based on the current librarianship regulations of use. Hence, retaking the RDA code has been considered. *RDA: Resources Description & Access* (2011) since one of its aims is to enable the description and access to all sorts of resources and content. Besides, in view of the challenge that implies full filling the needs of users accustomed to the digital environment, it is also necessary to incorporate links that allow the interaction with functions belonging to the semantic Web.

Considering the above, this paper focuses on examining the electronic resources description by using *RDA: Resources Description & Access*. In this structure, entities, attributes and their relations have an important role to describe the works, not only in the catalogue, as these relationships have to do with the search for general information (Smiraglia 2002). This leads to take up formal ties: bibliographic, author, topic and access points relations, resulting from the application of cataloguing codes, the MARC 21 format and documentary languages (Tillett 1987) to contrast them against the model underlying the RDA code. Given the need to describe electronic resources and provide access to the information retrieval systems, we propose a profile description for ER taking into account the model of representation and description projected in RDA, showing its application in digital photography and taking into account the descriptive attributes that allow the user to discover the resource in the digital medium.

2. Literature review

The literature review summarizes two main issues that will determine the profile description for ER, bearing in mind the guidelines set forth in RDA and the special characteristics of electronic resources: a) *Changes in the process of cataloging*, b) *Attributes of ER*.

a) Changes in the process of cataloging

Currently, the quality in library cataloguing has been benefited primarily by various changes and updates in the schemes, codes and principles that underpin it. The changes include: updating the *International Cataloguing Principles*, the adoption of conceptual models posed in the *Functional Requirements for Bibliographic Records* (FRBR), consolidation of Area 0 on the *International Standard Bibliographic Description* (ISBD), the publication of *RDA: Resource Description and Access* and even the announcement that 2010 would be the "Year of Cataloging Research" (Carlyle Ed. 2009), among others.

Without minimizing the above, at this time the need to assess and plan the work developed by the cataloger stands out. With this, libraries are forced to change the way in which they represent information entities, including new information entities, such as digital information resources. Thus, the current situation requires redesigning the cataloguing process from the proposed guidelines in RDA (Rodríguez 2012).

After recognizing that the *Anglo-American Cataloguing Rules* (AACR) were inoperative and the principles that sustain them did not play the same role as

before, the modern cataloging crisis arises. This leads us to consider that the RDA for cataloging code comes with modern rules that allow the description and access to information resources both tangible and intangible, on information retrieval systems' new horizons, entering with this decision into applications of greater openness to the society of knowledge and information (Rodriguez 2010). Traditional cataloging, the central activity of bibliographic control (Gorman 2000), derived in the description of a document and identified the material making up the collections. Authors such as Taylor and Joudrey (2009), mention that records that describe information resources to be made available are created through this act. Over time, cataloging has been modified and further complex and dynamic changes are expected, especially in the processing of materials with different characteristics that printed and the use of new methodological instruments to describe and represent resources as well as the introduction of computers with specific functions in the new library model (Inter & Johnson 2008).

Attention is now focussed more sharply than ever on the new method to describe and represent resources of information, also to the quality cataloguing. Although, the results that we know addressed in the *Report and recommendations of the U.S. RDA Test Coordinating Committee* (2011) and we know some needs that were identified in the communities where the implementation of the new code started are very important, the change on cataloguing needs now. In this sense, the actions to be implemented in the new bibliographic description, both domestically and internationally, will show results in the medium and long term.

Although, even the *Anglo-American Cataloguing Rules*, 2nd ed. rev., updated to 2003 (AACR2r 2004) had already considered the cataloger's criterion to describe three levels of detail; according to Chapman (2006) with the RDA, the cataloger will exercise its judgment taking into account a new set of guidelines that can be used for a variety of resources, but now the model of representation and description of the entities of the bibliographic universe will change. The AACR model describes the physical item, while in the conceptual description and access model what stands out is the attentive description of the tasks that the user follows to the discovery of resources.

The new guidelines allow RDA to make decisions at local, national, regional and international levels to create different practices (Rodríguez 2012b) with which the map of attributes determined by the criterion of the cataloger will benefit the user's tasks.

b) Attributes of ER

The registration of "books" has been transformed from a bibliographic control in the traditional library catalogue to the representation of documentary entities for the tools of access and retrieval of information. During this change, the collections of materials whether they are cartographic, audiovisual, graphic, and other, have had an increasingly greater presence in the library, with the addition of the electronic form resources during the last three decades. In library literature the ER have been referred to as digital resources, among other terms.

On these, some authors agree that analogue materials that have been digitized are also to be called ER.

Several authors have examined the ER theme. This allows us to identify the subject's main features in this work. On this regard, Jacobs (2007) indicates that the ER are to be named *e-resources, digital content, e-information*. Terras (2008) points out those digital resources originate from two sectors those that only exist in a digital format, known by the name of *born digital* and those that result from digitalization. According to the UNESCO & the University of British Columbia, Canada (2012), digital resources include those generated directly in a digital format, also called *digital origin source* and those converted from analogical material. Greenberg (2000) considers among such those resources that are accessible through Internet. Wang & Pribyl (2007) state that digital resources are distinguished by both having an intangible nature and by the way they are organized, located and accessed.

Literature also highlights another approach to describe and classify electronic and digital resources associated to the new description model which describes the work attributes and its various manifestations, expressions as well as the item attributes, giving less significance to the description of characteristics according to physical carrier.

Among the authors that examine ER associated with its works and its expressions is Yee (2007). The digital information resources according to Yee can be classified in works, versions or expressions and equivalent copies or manifestations. For Campbell (2000) digital resources are those that have migrated to the web. The author establishes a classification of document types, in genres or ciber genres according to their origin. In ciber genres, the distinctive characteristic would be which new features with respect to the traditional document are incorporated. In his classification he includes replicated, variant, pop /emergent and spontaneous genres.

When Smiraglia (2002) addresses the issue of *bibliographic entities*, among other varieties, he mentions the ER as a *documentary entity*. Thus, he argues that now by using the tools for information retrieval in the digital domain we review the components of the work and their relationships unlike in the context of the catalog in which we discussed bibliographic control.

Moreover, Tillett (1994) coincides with that indicated by Smiraglia about bibliographic entities, framing works, performances, items, components, etc. in the model for description provided for them, She said that previously, when considering the bibliographic universe, we were referring to books and non-print media (nonbook media). Now the structured representation of bibliographic records in a technological environment seeks to identify bibliographic entities using the Entity-Relationship model.

According to these ideas, Smiraglia (2002) also indicates that the work can have derivations and mutations. The derivations can take the form of simultaneous editions, successive editions, enlargements or extracts and between the mutations there are the translations, adaptations and interpretations. While Tillett (1991) includes seven categories in the taxonomy of bibliographic relationships: equivalent relations, derived relations, descriptive relations,

relations from whole to part (or from part to whole), relations between companions, sequential relations and relations of common characteristics.

Due to the extensive development that has taken the editing, production and publication of electronic resources now, it would be impossible to try to mention in detail the characteristics of each of the resources that are included as part of the range in this term. To this effect, the *Anglo-American Cataloguing Rules*, second edition, 2002 revision, upgrade edition in 2003 (AACR2r 2002), adequately summarize the essential features present in the ER. In such work it is indicated that ER consist of data representing numerical information, text, graphics, still and moving pictures, maps, music and sound, among others. ER also consist of programs for data processing, or combination of data and programs. Another added feature in the AACR2r is that the ER can be accessed on the carrier by physical or network access.

Taking into consideration all the above mentioned, it is not only important to describe in the catalog and other access tools the physical characteristics of the ERs, but to consider if the ER is of digital origin or it has been converted from an analog material, it may have derivations in translations, adaptations, expanded editions, etc. For this reason even when the current catalogs describe the physical aspects of the different support materials separately, it is convenient to consider the new model to relate intellectual content more than physical aspects.

3. Integration of profile for ER representation and description

Although in many libraries cataloguing is still performed by the AACR2r (2004), currently a switch in the tendency to emphasize the physical features is being considered, which offers the possibility of transforming the model of bibliographic description. Let us remember that in the AACR2r the Scope rules of each chapter are used to determine how each material and / or publication type is described. Regularly this was done separately considering the physical characteristics.

Although the AACR2r indicate that *electronic resources* frequently exhibit characteristics of other classes of materials and for that reason, they can be employed in combination with the chapter for other materials. These instructions have not been fully implemented.

In addition to demanding a change to the approach of preferentially pointing out the physical characteristics to distinguish the resources; the recovery of information through these tools has led to consider other strategic factors in its retrieval. That is, to the traditional access points of author, title and themes, we add now cross searches by language, publication date, format and place of publication, among others.

Besides describing the expected attributes for ER, through the digital library we intend to include components that link electronic and digital resources to allow adequate access and interconnect records and collections with the structure of the Semantic Web, such information is regularly available on the web as URLs.

Taking the example of digital photography and considering what was mentioned in the previous section:

- ER are those of digital origin and those result of digitization, converted from analog material;
- ER include images representing data.
- Although distinguished by their intangible nature, they can be accessed locally or remotely in the case of those resources that have migrated to the Web, and
- ER denominated as *work*, the authors can be generated different versions or copies and equivalent expressions or manifestations.

This is, digital photography that is stored in USBs / memories, disks, tapes, etc., may be accessed remotely and photos stored on the Web are accessed remotely. In both cases, we might find digitally originated photographs or those that are the result of digitization. In addition, since digital photography is part of the broad group of ER, they integrate certain data which are generated automatically and / or with the intervention of a person through the software of a digital camera, computer, mobile phone, etc., such features are known as metadata.

When digital photography is stored, organized, viewed, edited or printed, such metadata can be very useful. -Although we recognize that for users and creators of the work, the title, date of creation, software employed version, resolution, ISO speed, among others, may be of major, minor or no importance at all.- For cataloging purposes, some of these data are considered as central to the recovery and access of digital photography. Therefore, central and complementary attributes identified by using RDA instructions from the description model work, expression, manifestation, and item are presented below. These data were integrated in a profile after confronting the digital photography features and reviewing in detail the attributes mentioned in the RDA text.

4. Rendering of attributes of the RE

The description by the AACR2r (2004), allows to represent the resources object of this research, under the concept of ER. In other countries, this is done through the AACR2r (2002) and the *International Standard Bibliographic Description for Electronic Resources* (ISBD ER).

However it is now required to describe electronic and digital resources by approximating different points of view according to the *RDA: Resource Description and Access* (RDA 2011), as to integrate them into the current digital library catalogs and into spaces related to new recovery axes by resource discovery applications

The structure of the RDA records takes among other fundamental aspects, punctuated entities and attributes in FRBR (*Functional Requirements for Bibliographic Records*) and FRAD (*Functional Requirements for Authority Data*). Thus through RDA, the attributes description of the entities work, expression, manifestation, and item are expressed.

Chapters integrated in RDA are not split by type of publication, nor have specifications to define a profile to describe the ER attributes. The core elements according to the main characteristics of the ERs are shown below. In these tables you will observe other elements added to the traditional records according to the new descriptive model taking into consideration the instructions in RDA for the ERs.

As an example here is the record of a digital photograph which according to the aforementioned definitions is conceived as an ER.

a) Atributes of manifestation and item

Among the attributes used to describe the manifestation, and item are the information about the title, statement of responsibility, edition, place, date and name of the producer, editor, serial number, identifier of the manifestation (e.g., ISBN, ISSN. URN, etc.) As well as some AACR2R features currently part of the Notes Area, the Area 8 of the Standard Number and the Terms of Availability (AACR2R 2004); history of the custodian, acquisition source, item identifier, title note and date of access to the resource.

b) Describing carriers: characteristics of the carrier of the resource

To describe the attributes of resource carrier we note data included in the physical description area of the AACR2R in the General Material Designation (GMD) and in label 008 MARC 21: *Bibliographic*. We find among these highlighted data applicable to ER: the media type, carrier type, extent, dimensions, base material, encoding format, file size, equipment and system requirements.

c) Attributes of manifestations

The data that identify the manifestations and through which relationships with works and expressions can be built are: terms of availability, contact information, access restrictions, use restrictions and Uniform Resource Locator (URL). All these data are also part of the Area of Notes and of the Area 8 Standard number and of the terms of availability in AACR2r.

d) Attributes of expressions

The data that identify the attributes of the expressions are: date of expression, language of expression, other distinguishing characteristics of the expression and identifier for the expression.

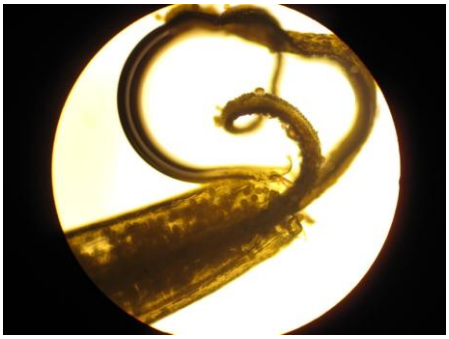
e) Describing content (work and expression

Data describing the content of RDA, for work and expression are traditionally regarded with the Area of Physical Description, the Area of Notes in AACR2R and the label 008 of MARC 21: *Bibliographic*. Among other data we can find: intended audience, summarization of the content, language of the content, illustrative content, colour of image, artistic and/or technical credits, scale of three-dimensional images and awards.

f) Attributes of persons and attributes of corporate bodies

We add attributes to the registration of people, corporate bodies, etc. Features that relate to the main and secondary headings and data entered through MARC 21: Authorities.

This example is an illustration of digital photography



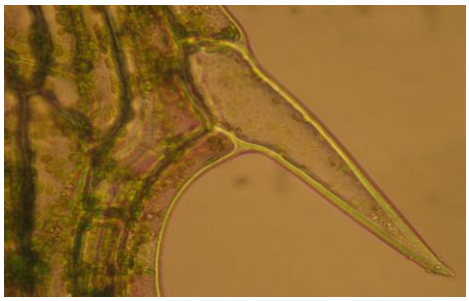
Picture 1. Dandelion (*Taraxacum officinale*): pollen grain photographed with a magnification of 40x. (© 2013, Melly Valenzuela Jiménez. Used with permission). Picture taken in the Science Lab of the College of Sciences and Humanities, Campus Vallejo, UNAM (Laboratorio de Ciencias del Colegio de Ciencias y Humanidades, Plantel Vallejo, UNAM)

TABLE 1. ELEMENTS IN RDA		
Attributes of manifestation and ítem		
Element type	***Description level***	***Guidelines and instructions***
Title proper: Diente de León (*Taraxacum officinale*)	Core element	2.3.2
Other title information: pollen grain photographed with a magnification of 40x	Additional element	2.3.4
Variant title: Dandelion (*Taraxacum officinale*) pollen grain photographed with a magnification of 40x	Additional element	2.3.6
Statement of responsibility: Melly Valenzuela Jiménez	Core element	2.4
Place of manufacture: Mexico	Additional element	2.10.2
Date of manufacture: 2013	Core element	2.10.6
Identifier for the manifestation (e.g. ISBN, ISSN, URN)	Core element	2.15
Identifier for the item	Additional element	2.19
Note on production statement: Picture taken in the Science Lab of the College of Sciences and Humanities, Campus Vallejo, UNAM (Laboratorio de Ciencias del Colegio de Ciencias y Humanidades, Plantel Vallejo, UNAM)		

Date of viewing of an online resource	Additional element	2.20.12.5

TABLE 2. ELEMENTS IN RDA		
Attributes of manifestation and ítem		
Describing carriers: characteristics of the carrier of the resource		
Element type	***Description level***	***Guidelines and instructions***
Media type: Computer	Additional element	3.2
Carrier type: Computer card	Core element	3.3
Extent: 1 photograph	Core element	3.4
Enconding format: JPEG	Additional element	3.19.3
Equipment and system requirements	Additional element	3.2

This example is an illustration of digital photography



Picture 2. Waterweed, Elodea photographed at 4x magnification. (© 2013, Eduardo Chávez Olguín. Used with permission). Picture taken in the Science Lab of the College of Sciences and Humanities, Campus Vallejo, UNAM (Laboratorio de Ciencias del Colegio de Ciencias y Humanidades, Plantel Vallejo, UNAM)

TABLE 3. ELEMENTS IN RDA		
Attributes of manifestation and ítem		
Element type	***Description level***	***Guidelines and instructions***
Title proper: Elodea fotografiada con aumento a 4x	Core element	2.3.2
Other title information	Additional element	2.3.4

Variant title: Waterweed, Elodea photographed at 4x magnification	Additional element	2.3.6
Statement of responsibility: Eduardo Chávez Olguín	Core element	2.4
Place of manufacture: Mexico	Additional element	2.10.2
Date of manufacture: 2013	Core element	2.10.6
Identifier for the manifestation (e.g. ISBN, ISSN, URN)	Core element	2.15
Identifier for the item	Additional element	2.19
Note on production statement: Picture taken in the Science Lab of the College of Sciences and Humanities, Campus Vallejo, UNAM (Laboratorio de Ciencias del Colegio de Ciencias y Humanidades, Plantel Vallejo, UNAM)		
Date of viewing of an online resource	Additional element	2.20.12.5

TABLE 4. ELEMENTS IN RDA

Attributes of manifestation and ítem

Describing carriers: characteristics of the carrier of the resource

Element type	***Description level***	***Guidelines and instructions***
Media type: Computer	Additional element	3.2
Carrier type: Computer card	Core element	3.3
Extent: 1 photograph	Core element	3.4
Enconding format: JPEG	Additional element	3.19.3
Equipment and system requirements	Additional element	3.2

5. Conclusions

The organization of electronic collections has had a great impact on digital libraries. Such libraries are considered an important support in educational, cultural, industrial, technological and scientific institutions amongst others. In such a way, the cataloguing and recording of information through new schemes of description, metadata and the addition of technical elements for proper interaction in the Semantic Web will be part of the key elements to improve the use and management of information in such communities.

Currently, the cataloguing of ER, as well as the organization of information through new discovery tools within digital libraries, will contribute to a higher level of information use and recovery. That is why all resources must be recorded using standardized schemas to share records among peer institutions.

Electronic and digital resources need to be described via RDA according to the model description of works, expressions, manifestations and items. Each of these principles can also be applied to describe a wide range of information resources, regardless of the medium in which they are published.

According to RDA instructions in the descriptive record for an ER there are new elements which are not included in traditional catalogs. For this reason, librarians should update his knowledge in the cataloguing and resource organization regardless of the kind of carrier used in their institution.

Even when the librarian does not work in cataloguing, the user will be in touch with this new form of information organization through the catalog, so the library services will be related with this new aspect of librarianship and information studies.

Although this paper presents the central and complementary attributes identified in RDA from the entity-relationship description model, the possibility remains open that the integrated profile may be revised, modified or improved according to attributes of digital photography not identified by us.

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