FRBR and RDA:
Advances in Resource Description
for Multiple Format Resources

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Executive Summary

The multiple formats issue has been a challenge that current cataloguing standards were unable to resolve. This paper describes the multiple formats issue and demonstrates how the issue is resolved through a new pespective on bibliographic data and a new cataloguing standard. The new perspective on bibliographic data comes from the conceptual model, *Functional Requirements for Bibliographic Records* (FRBR). The new standard is *Resource Description and Access* (RDA), which is built on the theoretical framework expressed in the FRBR conceptual model. RDA and FRBR, the conceptual model on which RDA is founded, resolve the multiple formats issue and point the way for improved access to resources for all users, and particularly for users with print disabilities.

The multiple formats issue, with its two aspects of alternative formats and multimedia resources, has its root in the *Anglo-American Cataloguing Rules 2s'* (AACR2) inconsistent approach to content and carrier and inconsistent categorization of the classes of material. Alternative formats bring to the fore the unresolved problem of whether the content or the carrier should have primacy when describing a resource. Different approaches to the problem were unsatisfactory because they emphasized either the carrier or the content, to the detriment of the other. Resources consisting of multiple types of content and/or carriers were also not well served by AACR2 rules. AACR2 has a bias towards choosing one characteristic as having primacy. Such an approach may give the cataloguer a way to approach the description of the resource, but it does not necessarily allow for a full description of the resource, where all characteristics are equally well described.

In order to understand RDA's resolution of the multiple formats issue, it is important to understand how the solution emerged. Attempts to resolve the multiple formats issue within the AACR2 framework were unsuccessful and eventually led to the deconstruction of AACR2 and the development of RDA. The key to understanding RDA is the fact that it is built upon the conceptual framework expressed in the model known as FRBR.

The FRBR conceptual model is based on a detailed analysis of bibliographic data. The model offers a map to the bibliographic universe and it looks at bibliographic data from the user's perspective. FRBR changes the focus of the cataloguing process. The focus is no

longer on the cataloguer creating a single record, but on the user seeking the record within the context of a large catalogue or database. Both activities continue to co-exist, but the defining viewpoint has changed.

FRBR brings about a collective shift in understanding the bibliographic universe. The problem of cataloguing is not simply the distinction between the book and its content. The categories of book and content have been made more precise and expanded into the four group 1 entities: work, expression, manifestation and item. The attributes of these entities and the relationships between them illuminate clearly the boundaries between content and carrier, and also open up the possibility of doing justice to both content and carrier when describing a resource.

RDA introduces a new framework for technical and content description. The core of the framework consists of three data elements: content type, media type and carrier type. The RDA framework of content, media and carrier types clearly indicates the level of similarity and differences between resources. A difference in content type means a different expression. A difference in media and carrier type means a different manifestation. Content, media and carrier types are three among many attributes that distinguish between expressions and between manifestations. But they are especially significant and useful when looking at alternative formats.

Alternative formats are resources that deliver the same content. Thus attributes such as author, title of the work, genre, etc., will be the same. Among the attributes that will differ, content, media and carrier types allow the user to find and select a version that they can use. If the user has difficulties with one of their senses, such as sight, then the user may be searching for a form of expression that uses hearing or touch. The difference in content type becomes of critical importance. If the user has access to a limited range of media options, then the media and carrier types become of critical importance.

RDA's solution for alternative formats is to move away from the content versus carrier issue to a new approach that respects both the content and the carrier, and gives scope for a full description of both aspects. The close mapping between FRBR and RDA means that RDA descriptions will record attributes of all the group 1 entities, permitting all levels of similarities and differences to be recorded.

FRBR's modelling of the group 1 entities also provides an answer to the problem of describing resources with multiple characteristics. AACR2 was not designed to support the description of resources with multiple, equally predominant characteristics, and it did not adapt well when the need arose. Part I of AACR2 assumes that the cataloguer will determine one predominant "physical form" and then use the chapter that corresponds to the class of material to which the resource belongs. The chapters are organized according to the different classes of material. However, the categorization is flawed because the differences between the classes are not consistent; the classes of material represent different levels of generality, some are content types, some are carrier types. The General Material Desigantion's (GMD) are also similarly inconsistent; in addition, one must select a single GMD.

When the AACR2 classes of material and GMDs are examined from a FRBR perspective, one problem is immediately evident: the classes of material and the GMDs are inconsistent because the categories are at different levels of abstraction and map to different entities. RDA abandons the "class of material" organization used in AACR2 and bases its organizational structure on the FRBR conceptual model. RDA shifts to the principle of having general instructions that apply to all types of resources, followed, where needed, by supplementary instructions for specific types of resources. The possibility of conflicting instructions is further eliminated by the categorization of attributes according to the four group 1 entities. Each entity has its own logical attributes.

RDA's solution is to move away from the need to determine a predominant aspect. Instead, RDA opens up the possibility of describing a simple resource or a complex resource equally well. The description of the resource will include all relevant attributes and relationships. The cataloguer will include attributes at work, expression, manifestation and item level. All aspects of the resource can and should be recorded.

The possibility of describing all aspects of a resource is not limited to the content, media and carrier types. If a data element applies to the resource being described, then one can use it. By using separate data elements, data is well identified and segmented. Any data element can also potentially be used to search and navigate.

RDA offers a way out of the multiple formats impasse. It enables the recording of all aspects of content and carrier, and it improves the collocation of resources, with greater definition of the similarities and differences between resources. RDA achieves the resolution of the multiple formats issue by moving away from the question of whether content or carrier should have primacy and instead affirming the role of both the content and the carrier. RDA provides a new approach to content, media and carrier, and this approach is based on the FRBR modelling of the group 1 entities.

RDA is a content standard, not an encoding standard, and not a display standard. RDA is a key step in the improvement of access to resources, because it governs the recording of metadata and the construction of access points to this data. The creation of well-formed metadata is a vital piece of the infrastructure to support search engines and data displays. RDA alone will not improve navigation and display because the metadata must be used appropriately by well-designed search engines and search interfaces. But the recording of clear, unambiguous data is a required step in the improvement of access to resources

The strength of RDA is that it is built on the theoretical framework expressed in the FRBR conceptual model. Thus, RDA approaches description and access with a logically consistent framework underpinning it. RDA improves the description of resources and access to them, with its carefully defined data elements that record attributes and relationships. This improvement affects all resources. RDA adopts FRBR's focus on the user, and its instructions are given within the context of recording data in order to ensure that the user will find, identify, select and obtain the resource that meets his or her need.

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1.   Introduction

Users, regardless of their abilities, share fundamental needs when trying to discover resources that meet their requirements. They need to find, identify, select and obtain the appropriate resource and they rely on the presence of certain types of bibliographic data in order to accomplish these tasks.

Certain data elements may have critical importance for a user when selecting the appropriate resource. This is evident for a user with a print disability, because the resource may be accessible to the user only if the content is delivered in a particular "format", through a particular media, on a particular carrier. Users with print disabilities will be at a greater disadvantage if a catalogue does not readily allow the retrieval of data according to these criteria.

Cataloguing principles and cataloguing codes have always aimed to serve the needs of the user, with varying degrees of success. As problems have arisen, the fundamental commitment to serve the user has driven the cataloguing community to make changes in order to improve access. One of the current challenges has been the "multiple formats" issue. This background paper will describe the multiple formats issue and will demonstrate how the cataloguing community has responded to this challenge and developed a new perspective and a new response. The new perspective on bibliographic data comes from the conceptual model, *Functional Requirements for Bibliographic Records* (FRBR). The new response is the development of the cataloguing standard, *Resource Description and Access* (RDA), which is built on the theoretical framework expressed in the FRBR conceptual model.

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1.1 Overview of *Resource Description and Access* (RDA)

RDA: Resource Description and Access is the new standard that will replace the *Anglo-American Cataloguing Rules* (AACR). AACR2 is the current standard governing resource description and access, and is used by libraries in Canada, the United States, Australia and Great Britain, as well by libraries in many other countries. This cataloguing standard has been translated into more than 25 languages, which is evidence of its widespread use beyond the four author countries. RDA, a new standard written for the digital age, will replace AACR2.

RDA is a metadata content standard. The term "metadata" is used rather than the narrower term "cataloguing", because RDA was deliberately written so that its use would not to be limited to libraries. Metadata, data about data, encompasses the bibliographic data used in cataloguing records, and the various other types of metadata recorded by communities that collect and record our documentary heritage, such as digital repositories, archives, museums, publishers, etc. The purpose of developing RDA is to improve and facilitate the recording of well-formed metadata in order to improve resource discovery and retrieval, whether in current or newly emerging database structures.[1] The more that communities share metadata standards, the easier it becomes for a user to search not only within library repositories around the world, but also across repositories of other metadata communities.

RDA cannot be considered a revised version of AACR2. RDA represents a change in approach to the cataloguing process. The key to RDA is the fact that it is built upon the conceptual framework expressed in the models known as FRBR and FRAD, *Functional Requirements for Bibliographic Records,*[2] and *Functional Requirements for Authority Data.*[3] The two models were developed through a careful analysis of bibliographic and authority data, and a detailed mapping of the data to

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[1] Joint Steering Committee for Development of RDA. *Strategic Plan for RDA, 2005-2009.* (5JSC/Strategic/1/Rev/2, 1 November 2007). http://www.collectionscanada.gc.ca/jsc/stratplan.html

[2] IFLA Study Group on the Functional Requirements for Bibliographic Records. *Functional Requirements for Bibliographic Records: Final Report.* (München: K.G. Saur, 1998). http://www.ifla.org/VII/s13/frbr/frbr.pdf

[3] *Functional Requirements for Authority Data* is an extension of the FRBR model. IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR). *Functional Requirements for Authority Data: A Conceptual Model.* Draft 2007-04-01. (Final version approved for publication, March 2009; draft removed from website).

the various tasks which users perform when using that data. The FRBR and FRAD models act as the underlying road map for understanding resource description and access. RDA takes the FRBR and FRAD conceptual models as the basis on which to build the guidelines and to structure the organization of the guidelines. The models are also the means to test the RDA guidelines to ensure that they are logically consistent and theoretically sound. With the conceptual models as the theoretical foundation for the standard, RDA represents a major shift in how the cataloguing process is perceived and understood.

An important goal for RDA is to "provide a consistent, flexible and extensible framework for both the technical and content description of all types of resources and all types of content."[4] The standard was designed for both traditional and non-traditional resources, within and beyond the library. Revisions to AACR2 had attempted to open up the cataloguing rules and accommodate new types of resources, but ended up providing band-aid solutions. It was problematic to extend AACR2 to encompass the description of new types of publication because of fundamental logical flaws in AACR2's rules and structure. Limitations in AACR2 were carefully analyzed and led to a new approach for technical and content description in RDA.

RDA is a metadata content standard. It is not tied to a single encoding schema, but it can be used with many encoding schema, for example with MARC21, Dublin Core, MODS.[5] It does not dictate how bibliographic data and bibliographic relationships should be displayed for the user. It does encourage the recording of sufficient and well-formed metadata so that all users can find, identify, select and obtain the information resources that they require.

1.2   Scope and definitions

Ann Chapman, in a 2007 article in *Library trends,* summarized an ideal catalogue. She was looking at the process of resource discovery from the perspective of visually impaired users, but the features she outlines are features that would benefit all users.

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[4] Joint Steering Committee. *Strategic Plan for RDA, 2005-2009.*
[5] MARC21, see http://www.loc.gov/marc/
  Dublin Core, see http://dublincore.org/
  MODS, Metadata Object Description Schema, see http://www.loc.gov/standards/mods/

Designing a catalog with visually impaired people in mind requires considering several aspects. The content of the bibliographic records must contain appropriate information to support both filtered and unfiltered searching and record display. Record displays must contain sufficient information to enable the user to decide whether an item is suitable for her purpose. Access points must enable the user to search from a variety of starting points. Finally, the catalog itself must be accessible and have easy navigation.[6]

With the rapid proliferation of new types of publications and new types of electronic resources, flaws and problems with current methods of data navigation and display have become increasingly evident. To improve catalogues, not only must the interfaces be redesigned and improved. The bibliographic data that provides the basis for navigation and display must also be improved. This paper focuses on the improvement of bibliographic data to support and advance resource discovery.

This paper will use the same definition of print disabilities as the *Initiative for Equitable Library Access*:

Print disabilities prevent people from reading standard print. They can be due to a visual, perceptual or physical disability which may be the result of vision impairment, a learning disability or a disability that prevents the physical holding of a book.[7]

Tank and Frederiksen underline the urgency of addressing access to information for users with print disabilities:

Knowledge has become the most important capital in the present age, and the success of any society lies in harnessing that capital … In the knowledge society, the much broader concept of print disability may actually even be more relevant than visual impairment. The definition of print disability can vary from country to country, but generally print disability may be defined as the inability to access information in a print format due to either a visual, perceptual, or physical disability. Examples may include blindness, dyslexia, learning disabilities, or the inability to hold a book, follow a line of print, or focus and concentrate.[8]

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[6] Ann Chapman. "Resource discovery: catalogs, cataloging and the user." *Library Trends* 55, no. 4 (Spring 2007): 917.
http://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=25643773&site=ehost-live
[7] Initiative for Equitable Library Access. "What is a print disability?" IELA website.
http://www.collectionscanada.gc.ca/about-us/012-412.10-e.html
This definition is also in line with the definition of perceptual disability in the Copyright Act.
[8] Elsebeth Tank and Carsten Frederiksen. "The DAISY virtual library: Entering the Global Virtual Library." *Library Trends* 55, no. 4 (Spring 2007): 933-934.

This paper will look at the description of resources from both a general and a specific perspective. Many of the challenges and responses described in the paper apply to all resources, and are not specifically targeted at resources for users with print disabilities. However, the paper will draw out the particular impact on resources used by those with print disabilities, and will use relevant examples.

When looking at resources of particular interest to users with print disabilities, these include resources that may be delivered as printed texts, such as large print books, or as sound recordings, such as audiobooks, or in tactile notation, such as braille books. Equivalent content is now also frequently available as an electronic resource. There are many different ways to produce electronic resources: for example, one can have a static PDF file, or a streaming audio file. A "book" in an electronic environment can be a flat, linear reproduction or can be recorded with a document type definition that gives structure to the data so that the user can easily navigate through the resource and readily identify where they are. Audiobooks can also be issued as plain, linear sound recordings, or with a document type definition specifically for talking books, such as the DAISY standard. Resources for users with print disabilities can be delivered on a wide range of carriers, from a printed volume to a USB key, from an audiocassette to a MP3 file.

The content of a resource is frequently, but not always, text or spoken word. There are also other types of content, such as maps, music scores, images, etc.

The phrase "multiple formats" needs to be defined because it can have different meanings.

The meanings generally coalesce around two categories:

>1) alternative formats: identical content delivered on different carriers, e.g. a novel issued as a printed book, an audio book, and an e-book; a journal issued as a print journal, a microfilm and an e-journal; also called multiple versions
>2) a "multimedia" resource: one resource that includes multiple types of content, multiple types of media and/or multiple types of carriers, e.g. a single CD-ROM that includes sounds, text and images; a novel delivered both as an electronic text and a digital

talking book; a collection that includes printed text, sound discs, and maps.

The Council on Access to Information for Print-Disabled Canadians defines multiple formats as "any non-traditional publishing format including but not limited to braille, electronic text, large print or audio." [9] Many government bodies define multiple formats as non-traditional publishing formats, and then list alternative formats for delivering identical content. Industry Canada's webpage about assistive technologies has a simple, but clear definition: "Multiple formats are simply other ways of publishing information." [10]

The term "multiple formats" is sometimes understood to mean a multimedia resource, a resource consisting of multiple formats.

In the sound recording industry, the phrase "multiple formats" may also mean abridged versus unabridged content. For example, Larry Mallach, audio buyer for Borders, is quoted in Trudi Rosenblum's article: "Are we going to get rid of abridgements altogether, or will we still have multiple formats?" [11] The relationship between abridged and unabridged content is important for users, and will be mentioned, though it will not be considered an aspect of "multiple formats".

This paper will address the two understandings of "multiple formats": alternative formats of the same content and resources consisting of multiple types of content, media or carriers. For the purposes of this paper, when identical content is delivered on different carriers, this understanding of multiple formats will also be called "alternative formats". The second type, a resource consisting of multiple types of content, media and/or carriers, will also be called "multimedia", as a shorthand way to refer to this category. The term "multimedia" is understood to be a little misleading, because the multiple types are not limited to multiple media types.

In both cases, multiple formats are resources where there are complex relationships between the content of the resource and the carriers on

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[9] Council on Access to Information for Print-Disabled Canadians. *Policy and Implementation Plan on Providing Access to LAC Publications in Multiple Formats, 2008. Background.* http://www.lac-bac.gc.ca/accessinfo/005003-5201-e.html

[10] Industry Canada. "What are multiple formats?" (Assistive Technology Links). http://www.at-links.gc.ca/guide/zx31001E.asp

[11] Trudi Rosenblum. "Audiobooks at the millenium." *Publishers Weekly* 247, no.1 (January 2, 2000): 35-37.

which they are delivered. In the first case, the same content is delivered on different carriers, and, in the second case, the resource may consist of many content types on one carrier, or one content type on several carriers, or several content types on several different carriers.

1.3   Outline

The paper will begin by looking at some of the areas of difficulty in the description of resources, looking both at resources in general and those of interest to users with print disabilities. The focus will be the challenges presented by "multiple formats", first examining the issues associated with alternative formats, and then with multimedia resources.

In order to understand RDA's resolution of the multiple formats issue, it is important to understand how the solution emerged. Attempts to resolve the multiple formats issue within the AACR2 framework were unsuccessful and led to the evolution of a new standard, RDA. It is through the history of RDA's development that one sees how the new responses to old problems were developed, and one can appreciate the power and efficacy of the new responses. An overview of the development process shows how the cataloguing community wrestled with the issues and why it became necessary to replace AACR2. The response to the multiple formats issue was not an arbitrary decision, nor the decision of a few. Many ideas and avenues were explored. The approach to multiple formats that is found in RDA comes out of wide community discussion and debate, and rests on a foundation of internationally accepted theoretical concepts and principles.

The paper gives a brief overview of the FRBR model because RDA is built on the theoretical framework expressed in the model. FRAD, *Functional Requirements for Authority Data,* is an important extension of the FRBR model that analyzes and models authority data, but it is less relevant to the multiple formats issue, and so is not described. The paper focuses on the modelling of bibliographic data. The FRBR model changed the direction of cataloguing revisions and led to the development of RDA.

The paper describes the salient features of RDA, and focuses particularly on RDA's approach to the description and categorization of content and carrier. It is RDA's approach to content and carrier that

leads to a resolution of the multiple formats issues. However, other aspects of RDA also complement and further support RDA's approach to content and carrier. RDA improves description and access for all resources. The paper gives particular attention to resources of interest to users with print disabilities.

RDA encourages the recording of well-formed metadata, but does not govern the design of databases, search engines or data display. It may not be immediately evident how RDA can make an impact on resource discovery and data display. The paper will give a quick overview of a few applications of FRBR concepts, using current AACR2 data. Despite the shortcomings of current bibliographic data, the application of FRBR concepts leads to a marked improvement in resource discovery and data display. Through these experiments, one can already see the potential for even greater improvements when data will be recorded according to RDA.

The paper also briefly describes how the standard will be used. RDA will be released as an online tool and this additional functionality facilitates use of the standard and promotes consistent application of the standard. It also provides scope for customization which will be of particular use for specialized cataloguing communities, such as those who catalogue for users with print disabilities. It will be possible to use RDA with current encoding schema due to the preparatory work undertaken by appointed groups. Thus, it will be possible to use RDA's solution to the multiple formats issue as soon as implementation occurs.

The concluding section summarizes how RDA and FRBR, the conceptual model on which RDA is founded, resolve the multiple formats issue and point the way for improved access to resources for all users, and particularly for users with print disabilities.

2. Problems with the cataloguing of "multiple formats" in the AACR cataloguing community

2.1 Alternative formats

Alternative formats bring out unresolved questions about the nature of information resources. The resources that are collected in libraries have two aspects: the content and the carrier. It is important not to ignore this complexity. Svenonius gives a succinct synopsis of the history of information organization that demonstrates how this problem has been recognized by the great contributors in the field:

> The distinction between information and its embodying document is so important in the literature of information organization it warrants a brief history. It is claimed to have been recognized as early as 1674 by Thomas Hyde. Certainly Panizzi in the middle of the nineteenth century acknowledged it implicitly in the design of his catalog and in certain passages of his writings. Julia Pettee in 1936 formulated the distinction explicitly, referring to a particular message as a *literary unit* and its embodiment in a medium as a *book.* In 1955 S.R. Ranganathan introduced the distinction, presenting it as the dichotomy between expressed thought and embodied thought … In the 1960s, the significance of the distinction was brought to popular attention as a result of Seymour Lubetzky's eloquent juxtaposition of the work versus the book.[12]

During the latter part of the 20th century, libraries began to add an increasing number of resources to their collections where the intellectual content was identical, but the content was delivered on different physical carriers. Perhaps the two most common examples are microforms and audiobooks. With the increasing volume of alternative formats, the tension between content and carrier was no longer a philosophical question, but a question that confronted cataloguers daily.

The tension between the importance of the physical carrier and the importance of the content could not be resolved within the existing framework of cataloguing rules. Everett Allgood summarizes the challenge:

> A dilemma confronts the Anglo-American cataloging community. Library catalogs display multiple occurrences of titles available in different formats

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[12] Elaine Svenonius. *The Intellectual Foundation of Information Organization.* (Cambridge, Mass.: MIT Press, 2000): 8-9.

as multiple hits for a user's search query, rather than clustering them into a single entry or hit. The variety of formats and versions of resources libraries collect continues to grow, yet the underlying manifestation level principles of the *Anglo-American Cataloguing Rules,* 2nd ed. (AACR2) result in catalogs difficult for users to navigate. This multiple versions (MulVer) problem represents a defining challenge of the automated catalog era.[13]

Alternative formats are also challenging because not all alternative formats present the identical problem. If one takes the example of microforms and audiobooks, there seem to be two categories of alternative formats. In the case of microforms, the content is in no way changed. It is reproduced onto a different physical material. In the case of audiobooks, the content is delivered in a new expression, as spoken word rather than as text. These two examples indicate that one needs to make a distinction between two categories of "alternative formats": i) reproductions, where the difference is only the physical carrier, and ii) alternative formats, where there is a difference in physical carrier, but also a fundamental difference in the way that the content is expressed.

2.1.1 Different approaches to microform reproductions

While the volume of resources delivered as reproductions or as alternative formats remained low, questions about how to describe these resources, and how to display bibliographic relationships in the library catalogue were not pressing issues. However, when the production of preservation microforms increased, and libraries began to collect large numbers of these microforms, debates began about how to treat these microform reproductions. There was recognition of the shared intellectual content and also a need to acknowledge the differences in physical carriers.

In the second edition of the *Anglo-American Cataloguing Rules*, (AACR2), published in 1978, the instruction in rule 0.24 was clear that the physical nature of the item in hand determined how to approach the bibliographic description.

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[13] Julian Everett Allgood. "Serials and Multiple Versions, or the Inexorable Trend toward Work-Level Displays." *Library Resources & Technical Services* 51, no. 3 (July 2007): 160. http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=25468318&site=ehost-live

> It is a cardinal principle of the use of part I that the description of a physical item should be based in the first instance on the chapter dealing with the class of materials to which that item belongs. In short, the starting point for description is the physical form of the item in hand, not the original or any previous form in which the work has been published.[14]

Thus a microform was described as a microform, and the cataloguer was directed to chapter 11 for instructions about the bibliographic description. However, the Library of Congress issued its own rule interpretation for the treatment of microforms, where it directed the cataloguer to describe the original, not the reproduction. Thus the cataloguer, for a textual microform that was originally issued as book, was instructed to use chapter 2, and make a note about the microform. AACR2 emphasized the differences between the physical carriers, while the Library of Congress decided to emphasize the similarity of the content. Even within the same Anglo-American cataloguing community, there was a split in approaches. Each approach had its drawbacks because one aspect, either content or carrier, had to be chosen as the dominant feature that shaped the description; neither approach represented a satisfactory resolution.

2.1.2 Multiple Versions Forum, Airlie, Virginia, December 1989

In 1989, the Council on Library Resources, with the support of the Library of Congress, decided to convene the Multiple Versions Forum "to arrive at a consensus on various aspects of constructing bibliographic records for items that are the same in content but differ in physical representation" [15]

The Forum, held in Airlie, Virginia, December 5-8, 1989, approached the problem from the practical application side. "The Forum focused on identifying and evaluating various solutions for the USMARC record-based communications environment." [16] As Lynne Howarth has pointed out, the Forum favoured a two-tiered hierarchical approach, but it never led to an implemented solution. The level of discussion underlined the difficulties in resolving the tension between the

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[14] *Anglo-American Cataloguing Rules.* 2nd ed. (Chicago: American Library Association; Ottawa: Canadian Library Association, 1978), 8.

[15] *Multiple Versions Forum Report: Report from a Meeting held December 6-8, 1989, Airlie, Virginia.* (Washington: Network Development and MARC Standards Office, Library of Congress, 1990), 3.

[16] Ibid

importance of physicality and the importance of content. There was a widely recognized need to resolve this tension.

> A two-tier hierarchical model was advocated as the preferred option among three proposed in the *Multiple Versions Forum Report* (1990) emanating from a meeting held in Airlie, Virginia, in December, 1989. The model proposed an independent bibliographic record for one version of an item at the first level of the hierarchy, with dependent partial records representing equivalent versions of the item described in the level 1 record (USMARC bibliographic record) included in the second level (USMARC holdings record). A complete description of versions included in the second level would be achieved only by combining data from both the first and second level records. The *Report*, while widely discussed in the cataloguing community, was never adopted. It has remained a kind of contrapuntal framework hovering in the background while discourse on the need for changes to the cataloguing code have continued.[17]

Even with the straightforward case of the microform reproduction, there was no easy resolution. In the meantime, some libraries made their own local deviations from standards, such as using the bibliographic description of a print resource to record both the print and the microform holdings. It was an unsatisfactory stop-gap measure, and introduced ambiguous records with misleading information about the carrier. But these libraries were intent on improving the display of the relationship between the content of the different resources at a time when there did not seem to be any solutions quickly forthcoming.

2.1.3 Electronic resources

The 1990s saw the growth of a new type of resource where content was delivered in electronic format. A majority of these new electronic resources were not making new content available, but were delivering content in a new manifestation.

> The early 1990s saw a large-scale proliferation of e-journals and other forms of electronic publishing. This proliferation escalated the need to re-examine how we describe resources and how our descriptive rules are structured. The electronic aspect captured everyone's attention because it

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[17] Lynne C. Howarth. "Content versus Carrier." Conference paper for the International Conference on the Principles and Future development of AACR, October 1997. Version posted prior to the conference, 7.
http://epe.lac-bac.gc.ca/100/200/300/jsc_aacr/content/rcarrier.pdf

was different, but there was also the issue of the connection between the print and electronic versions that shared the same intellectual content. In a cataloging world where one had to determine the primacy of one aspect of the resource in order to describe it, which aspect was one to choose? [18]

In fact, the Anglo-American cataloguing world went through a period of time when two different approaches were advocated, even within one set of cataloguing guidelines, the *CONSER Cataloguing Manual.*

> In the past decade, the serials cataloguing world not only had to deal with the novelty of electronic journals, but also to face a deluge of titles needing immediate attention. The short cut option of the single record approach became very popular with many libraries as a way to achieve some control. The single record option, as described in the *CONSER Cataloging Manual*, is also called the non-cataloguing approach and entails not cataloguing the electronic version, but signaling its existence on the print record. The description is based on the print journal, and the user is alerted to the availability of the content in electronic format, and is pointed to the electronic version. The other option is to catalogue the e-journal, thus making a separate record based on a description of the electronic resource, while also indicating the relationship to the print journal.[19]

The single record approach emphasizes the primacy of content, and accepts a loss of bibliographic data about the second carrier. The separate records approach includes full details about both manifestations, but may not sufficiently emphasize the content relationship between the two. Though there are convincing arguments for both approaches, the fact that the serials cataloguing community had to resort to using two conflicting approaches underlines the fact that neither approach was entirely satisfactory. A user needs to know about the content of a resource and about the relationship of that content to the content of other resources. But a user also needs to know how the content is delivered. Emphasizing one at the expense of the other would never yield a satisfactory outcome.

While the importance of content is always readily acknowledged, libraries have also experienced that, at times, the carrier for the content may play a more important role in the user's selection process than the version of the content. For example, if a student has an exam on *Hamlet*, and needs to review the content but will be driving in a car

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[18] Chris Oliver. "E-Journals and the Development of Resource Description and Access." In *E-journals access and management,* ed. Wayne Jones (New York: Routledge, 2009), 203.
[19] Chris Oliver. "FRBR is everywhere but whatever happened to the format variation issue? *Serials Librarian* 45, no.4 (2004): 33.

most of the weekend, the student may only want *Hamlet* as an audiobook. The student may not care which edition of the content is read in the audiobook. If the car is old and only has a cassette player, then the student will only want the content delivered as spoken word on an audio-cassette carrier. So the deciding factor in selecting the appropriate resource may be the type of carrier. This is especially true for users who may not be able to use all formats equally, whether due to physical disabilities or lack of mediating equipment. Anne Chapman underlines the importance of format for the visually impaired:

> For visually impaired people, the specific accessible format is often crucial to whether they can use the resource. Someone who does not read braille at all does not need to know more than that an item is in braille. But the braille reader needs to know more; someone who can only read grade 1 will struggle with a grade 2 or 3 text, which includes special characters for contractions of words. The need to distinguish between versions is even more crucial with braille music … Knowing the specific carrier form is also important when equipment is required.[20]

Alternative formats are an important part of a library collection. The relationship between alternative formats has not always been well-defined and clear. The users need to know both the degree of relatedness between resources and the exact nature of the differences, in order to select the resource appropriate for their need. These needs are recognized and acknowledged in the library community, but information about both the similarity and the difference has not been equally transmitted to the user. Often, either the difference or the similarity has been emphasized, to the detriment of the other.

2.1.4 Alternative formats: resources for users with print disabilities

Resources for users with print disabilities are often resources that deliver content in an alternative format. The content is delivered in a format that is accessible to the user and can range from a large print version of a printed book to a DAISY digital talking book. Thus, the description of these resources and access to them share the same problems as found with all alternative formats. However, the problem is more urgent and obvious because a high proportion of the resources of interest to a user with a print disability are likely to be content delivered in an alternative format.

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[20] Chapman, "Resource discovery: catalogs, cataloguing and the user," 928-929.

When users want a resource, they navigate through bibliographic data to find, identify, select and obtain the resource that matches their need. Morayo Ibironke Atinmo described the national union catalogue created to track resources for users with print disabilities that were available in Nigeria. The categories of data selected for inclusion closely correspond to the data that is used in most library catalogues or databases:

> A template was designed to collect documentary data on the alternative format materials in the institutions visited around the country. It contained the following fields:
> **Author:** The individual or corporate body responsible for the intellectual content of the material
> **Title:** The title of the material was copied from the braille or large print material; for talking books, titles were taken from the labels of the cassette or the catalog of the hosting institution
> **Subject:** This was determined from the call number and/or title of the material
> **User level:** Primary, secondary, or tertiary as indicated by the host institution or investigator's judgement
> **Publisher:** Publisher information was either given on the material or provided by the hosting institution where possible
> **Publication Year**: Supplied if not found on the publication
> **Edition:** Supplied if found on the publication; for some volumes determined by counting the number of volumes per title
> **Number of volumes:** braille books usually run into several volumes
> **Languages:** Refers to the language of the material
> **Format:** The alternative format in braille, large print or tapes
> **Status:** This indicates the braille grade of the material, whether 1, 1.5, or 2
> **Duration:** This indicates length of time for tapes as shown on the cassette
> **Terms of availability**: This indicates whether or not the host institution will allow the material to be borrowed or if it is strictly for reference or for sale
> **Price:** Some materials are for purchase
> **Organization's Name:** This refers to the name of the host institution and all other information necessary for communicating with the institution, such as postal address. Web site address, and e-mail address. [21]

While all users navigate through the same bibliographic data, users with print disabilities may be only interested in a particular subset of a

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[21] Morayo Ibironke Atinmo. "Setting Up a Computerized Catalog and Distribution Database of Alternative Format Materials for Blind and Visually Impaired Persons in Nigeria." *Library Trends* 55, no. 4 (Spring 2007): 835-836.
http://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=25643769&site=ehost-live

library's holdings, because they can only use resources that are accessible to them.

On its website, the CNIB asks the question: How much of what is available in print is also available in an alternative format? The answer is less than 5%.[22] The proportion of resources available for a person with a print disability is dramatically lower than for a person who does not need an alternative format. Given this situation, it becomes imperative to ensure that resources in alternative formats are not buried and impossible to find.

There are means to describe and code resources in alternative formats. There are also many frustrations.

> Cataloguing accessible materials is a difficult task if you have high demands on cataloguing. Most accessible materials have a source in the form of a printed book which has to be described as well. The cataloguing rules and the MARC format are not well suited to display some of the important bibliographic information about the printed book in the talking book record.[23]

Westlind is addressing primarily the cataloguing of DAISY talking books. But he touches on an important issue: making sure that the relationship between the content of the print book and of the talking book is clear to the user.

As part of the DAISY Cataloguing Workshop held at the Celia Library for the Visually Impaired, Helsinki, in 2007, Deines-Jones reported on a survey of cataloguing practices.[24] The survey was not extensive, with only 14 responses, but it is interesting because of the comments submitted. When asked directly whether current cataloguing practices were sufficient to meet the needs of their organization, most responded positively. In questions related to cataloguing and standards with open-ended responses, the comments point to areas where cataloguing rules could be improved:

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[22] CNIB. "Issues and Myths about Library Services for Canadians with a Print Disability." http://www.cnib.ca/en/services/library/advocacy/publications/issues-myths.aspx

[23] Marcus Westlind. "Dynamic materials force dynamic cataloguing : accessible materials in a new digitial age." *Library Review* 57, no. 6 (2008): 428. http://www.emeraldinsight.com/10.1108/00242530810886698

[24] Courtney Deines-Jones. "Report from the field: how things are now." PowerPoint presentation given at the DAISY Cataloguing Workshop, Celia Library for the Visually Impaired, Helsinki, Finland, June 14-15, 2007. http://www.celialib.fi/info/Daisy_workshop2007/deines_jones.ppt. Also the results of the survey available from the workshop's website: http://www.celia.palvelee.fi/23

The need for good methodology to capture the media type and characteristics of DAISY books of various types - audio only; audio plus text, etc.

ISBN of alternative formats - link to FRBR

The MARC21 500-field becomes too "crowded" in DAISY cataloging. We need more hierarchy and specific subfields. FRBR is useful for structuring the OPAC.

The metadata needs to reflect two different requirements - that of managing the content from the service provider perspective and that of searching

Problems with the cataloguing of DAISY resources are many of the same problems confronting the wider cataloguing community. DAISY books are complex resources that require descriptions that highlight both the similarity to aspects of other resources and also the differences. The content may be unique, but, in many cases, it is equivalent to the content of another resource, such as a regular printed book.

These cataloguers also voice their frustration with collocation in the catalogue which makes it difficult for the user to discover the resource that matches his/her need. The problems identified in the survey focus both on recording sufficient data to make the DAISY version easy to find, and on enabling meaningful clustering of search results so that users can readily identify the relationships between resources.

2.2   Problems with the cataloguing of a single resource consisting of multiple content types, media types and/or carrier types (multimedia)

2.2.1 All resources

Rule 0.24 in AACR2 was intended to make the cataloguing decision process straightforward. It emphasized the primacy of the physical form of the item in hand. If a resource consisted of multiple "physical forms", AACR2 directed the cataloguer to the rules at 1.10. Even at 1.10, the rules are biased towards the description of resources where the cataloguer can identify one "predominant component". Unfortunately, in a resource with a collective title, when there are multiple "physical forms" of equal importance, one is led to use the general material designations of "kit" or "multimedia", neither of which

convey precise, unambiguous information about the nature of the resource. The assumption is that these resources are delivered on multiple physical carriers and that the options to give full information in the physical description area will be sufficient. There are no provisions for multiple, equally predominant types of content.

The introductory chapter of Nancy Olson's widely used manual, *Cataloging of Audiovisual Materials*, summarizes the problems confronting a cataloguer trying to describe a resource made up of several types of material:

> The first, and frequently most difficult, decision in the cataloguing of audiovisual material is to decide what the item is … When cataloguing an item that does not fit neatly into one chapter of *AACR2*, decide by elimination which chapter to use. In other words, eliminate all chapters that do not relate to the item and see which chapter is left. In some cases you will have multiple chapters and must decide which chapter represents the primary nature of the item … When there are two or more kinds of media in the package, one must first decide if one type is dominant …When no one part is dominant, the set may be called a kit.[25]

Even if one achieved a description of the resource consisting of multiple material types, AACR2 did not give clear guidelines for access to these materials. An example is the music moving image resource, such as the video of an opera. An ALA task force, Task Force on the Cataloging of Music Moving Image Materials, was given this charge:

> Specifically, the Task Force is charged with reviewing the cataloging rules regarding the main entry for moving image materials with prominent musical content (such as music videos, videorecordings of live orchestral performances and operas, and including music interactive multimedia and computer files), determining the specific areas of AACR2 which give rise to the existing conflicting interpretations, and making recommendations regarding what course of action CC:DA should take, including the proposal of rule changes, etc.[26]

AACR2 was not clear about how to choose the main entry, with different rules if the resource was moving image as opposed to music. The advent of new types of electronic resources further challenged AACR2's approach to the description of these types of resources.

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[25] Nancy Olson. Cataloging of Audiovisual Materials and Other Special Materials. 5th ed. (Westport, Conn.: Libraries Unlimited, 2008): 19-20.
[26] ALCTS CC:DA Task Force on the Cataloging of Music Moving Image Materials. "Charge." http://www.libraries.psu.edu/tas/jca/ccda/tf-mmim.html

Devising guidelines for representing interactive multimedia proved challenging because of the packaging of several distinct media -- videorecordings; sound recordings; computer files; printed text; each with their own separate chapters for descriptive cataloguing in *AACR2R* -- into one work. In that case, the determination of primary medium was sufficiently daunting to raise the question of creating a separate chapter in the code to deal exclusively with interactive multimedia.[27]

The Cataloging and Classification Section of the American Library Association expressed frustration with AACR2's ability to deal with new types of resources and published its own set of guidelines for electronic resources that consisted of two or more media on one or more physical carriers: *Guidelines for Bibliographic Description of Interactive Multimedia.* While trying to stay true to the principles of AACR2, the American manual intentionally deviated from AACR2:

> Necessarily, practical departures from AACR2R were made … to bring out the critical importance of treating interactive multimedia works as entire entities, while also highlighting the salient nature of the media within. [28]

These guidelines, published in 1994, were not adopted by the larger AACR cataloguing community, but they did underline problems with description and access for this type of resource. According to the guidelines, parts of AACR2 work, and other parts do not work and require deviations. The preface to the guidelines already hints at the logical inconsistency of AACR; in the preface, a distinction is made between intellectual versus physical categories of information. While the chapters in Part I of AACR correspond to the different classes of material, the chapters (and classes of material), are not always about the physical characteristics of the resource:

> Indeed, there are chapters in AACR2R which also focus more on gathering together intellectual characteristics of the entire package of information rather than on specific physical manifestations: serials, analytics, manuscripts (particularly regarding collections), music and cartographic materials.[29]

Another area of difficulty with the description of resources consisting of multiple types has been the selection of an appropriate general material designation. Again, this underlines the bias of AACR2 towards

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[27] Howarth. Content versus Carrier, 4.
[28] ALCTS CC:DA Interactive Multimedia Guidelines Review Task Force. *Guidelines for Bibliographic Description of Interactive Multimedia.* (Chicago: American Library Association, 1994): vi.
[29] Ibid, iv.

the determination of a predominant class of material. 1.1C4 pushes one to choose the GMD that matches "the predominant constituent of the item", and in the absence of a predominant constituent, directs one to use *kit* or *multimedia.* If one catalogues in accordance with AACR2, there are authorized GMDs and one is not permitted to record two GMDs. There is evidence of departures from this rule in some library catalogues, with the use of an unauthorized new term, such as interactive multimedia, or the use of a specific carrier term, such as DVD instead of videorecording. In Jean Weihs' survey to determine the level of satisfaction with GMDs, most respondents still felt that the information conveyed by the GMD was useful. But many were dissatisfied with the authorized list of GMDs and proposed ways to string multiple GMDs together, either with the use of qualifiers, the use of compound terms, or the assignment of multiple single terms joined by +, e.g. braille + sound recording.[30] The solutions proposed during Weihs' survey support the notion that users do want to know about the type of material, whether it is a simple resource with one predominant type, or a resource consisting of multiple types. But the authorized list of GMDs was not a wholly satisfactory solution, especially in face of the development and publication of new types of resources.

Issues arising from the description of alternative formats for the same content and resources consisting of multiple formats were difficult to resolve because they signalled a fundamental problem with AACR's approach to physical items and intellectual content.

Raghavan and Neelameghan summarize this problem, and they do not see it as the problem of one particular cataloguing code, but a problem shared by many codes:

> In our efforts to improve access to information resources, we would do well by starting with the fundamentals. It appears that, when we examine the history of codes of cataloguing, the distinction between the carrier of the embodied ideas or information and the information itself are not always very clear.[31]

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[30] Jean Weihs. "General Material Designation in the Twenty-First Century: Results of a Survey." http://ublib.buffalo.edu/libraries/units/cts/olac/capc/gmd.html
[31] K.S. Raghavan and A. Neelameghan. "Composite Media Works on CD." *Cataloging & Classification Quarterly.* 33, no. 3 (2002): 196.
http://dx.doi.org/10.1300/J104v33n03_10

2.2.2 Multimedia resources: resources for users with print disabilities

Certain types of resources for users with print disabilities are difficult to describe because of the same problems that affect all resources with multiple characteristics. The source of the problem lies with AACR2's approach to the physical and content aspects of the resource.

DAISY digital talking books are a good example of a single resource that combines characteristics: they are audio, and they are digital. They have different functionality from a PDF electronic book, though they may be delivered on the same types of carriers. They may consist of the audio aspect only, but some also have the capability to deliver audio and text.

In the survey of DAISY cataloguing that was mentioned above,[32] some of the comments touched upon the problems with describing all the relevant aspects of DAISY resources:

> The need for good methodology to capture the media type and characteristics of DAISY books of various types - audio only; audio plus text, etc.

> Better indication of what specific information should be included in rules for DAISY description, e.g. compression rate, version of standard, etc. Agreement on other information to include in catalogue records, e.g. source document.

> Some standardisation of elements. Organisations may need to retain individual differences and accountability for fields such as genre; however elements such as physical description, GMD, location and wording of Daisy levels should be the same across all.

> The MARC21 500-field becomes to "crowded" in DAISY cataloging. We need more hierarchy and specific subfields.

Cataloguers of DAISY resources share the same frustration with the rest of the cataloguing community about the limitations of AACR2 to capture the exact nature of the resource and to describe it sufficiently and consistently. Again, the GMDs are seen as a stumbling block because there is no mechanism to record both content and carrier. Some important data is lost in the general notes and cannot be used to narrow searches and allow the user to identify quickly the appropriate resource.

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[32] Reported by Deines-Jones at the DAISY cataloguing workshop held at the Celia Library for the Visually Impaired, Helsinki, in 2007: Deines-Jones. "Report from the field: how things are now."

Phillips and Stump discuss increasing the visibility of materials for the blind and visually impaired, focusing particularly on the Mississippi library system.

> There are many ways to make materials for the blind and visually impaired accessible through an OPAC, and it is imperative that libraries advertise the ways these materials can be accessed. [33]

They go on to describe ways to describe the resources, choose general material designations, and encode in MARC. They also suggest using genre terms. However, for all the coding and careful use of access points, if the OPAC cannot be configured to retrieve and display significant data, then these resources remain inaccessible. One of the areas of particular difficulty is finding a way to identify the type of material and being able to use this data to limit a search set. They observe that some libraries use unorthodox means of creating access. The frustration that drives some libraries to deviate from standards is echoed in their comment:

> Some of these means may be correct according to cataloguing rules and some of them may not be correct, but each library must find ways to access these materials.[34]

A resource may be accessible to a user with a print disability only if the content is delivered in a particular "format", through a particular media, on a particular carrier. Thus, certain data elements will have greater importance in the process of selecting the appropriate resource. These data elements need to be consistently recorded and available for navigation. When a catalogue does not readily allow navigation or retrieval using these data elements, the user is placed at a disadvantage because they have to wade through large retrieval sets that include irrelevant material.

The inadequacy of AACR2 for the description of multimedia resources causes problems for all users of the catalogue. The problem is exacerbated when a user is not able to use all resources equally, but needs to discover the particular resources that are accessible to him or her.

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[33] Joi Jone Phillips and Sheryl Stump. "Making Materials for the Blind and the Visually Impaired Visible in the Library's Catalog and Web Site." *Mississippi Libraries* 70, no. 2 (2006): 35.
[34] Ibid, 35.

2.3 International Conference on the Principles & Future Development of AACR

By the mid 1990s, it was becoming increasingly evident that AACR2 required significant revisions to deal with problem areas, both for the description of resources and access to them. The content versus carrier issue was one of the issues that needed to be addressed. The Joint Steering Committee for Revision of AACR (JSC)[35] held an international conference in Toronto, Ontario, October 23-25, 1997 and invited experts to present discussion papers about key issues and future directions for AACR. The conference, International Conference on the Principles & Future Development of AACR, was the starting point for a major reshaping of the cataloguing code. It began with a modest list of outcomes, action items that needed immediate attention.

- Action: Pursue the recommendation that a data modeling technique be used to provide a logical analysis of the principles and structures that underlie AACR.

- Action: Create a list of the principles of AACR2.

- Action: Formalize the recommendations on seriality endorsed during the Conference and introduce them into the rule revision process.

- Action: Solicit a proposal to revise rule 0.24 to advance the discussion on the primacy of intellectual content over physical format.

- Action: Maintain an AACR Web site, and publicize and reaffirm, on the AACR Web site, JSC policies, procedures and activities as well as the current processes for submitting rule revision proposals emanating from within or outside AACR author countries.

- Action: Develop a mission statement for JSC.

- Action: Determine if there are any existing surveys on the extent of use of AACR2 outside the Anglo-American community and if no such survey exists, conduct such a survey.[36]

At first, it was assumed that the outcomes would lead to revisions and amendments of AACR2, and AACR2 would continue to be the shared

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[35] The Joint Steering Committee for Revision of AACR changed its name to the Joint Steering Committttee for Development of RDA in 2007. When reference is made to the JSC, or the Joint Steering Committee, it refers to this committee, under its earlier or later name, depending on the context.

[36] Joint Steering Committee for Revision of AACR. "International Conference on the Principles & Future Development of AACR: Action Items, Progress Report, July 2005." http://www.collectionscanada.gc.ca/jsc/intlconf2.html

cataloguing standard. The action item on seriality soon led to a complete revision of chapter 12, plus the revision of related rules in the other chapters. These changes were implemented through the regular amending process. However, the impact of pursuing other action items, notably the revision of 0.24 and the logical analysis of the principles and structures of AACR, led to major changes in direction. The first shift in 2004 was the decision to announce a new edition of AACR, AACR3, and the second shift in 2005 was the decision to replace AACR2 with a new standard, *RDA, Resource Description and Access*.

> RDA FAQ 1.4. Why is it necessary to issue a brand new standard?
> … The International Conference on the Principles and Future Development of AACR that was held in Toronto in 1997 identified substantive problems with AACR2. Although the updates issued in the years following that conference addressed some of these problems, it became clear that a fundamental rethinking of the code was required to respond fully to the challenges and opportunities of the digital world.[37]

These two action items, revision of O.24 and the logical analysis of AACR2, were the actions that would also have the most impact on alternative formats and multimedia resources. Any revision of 0.24 would be expected to have an impact, because the original instruction states that "the starting point for description is the physical form of the item in hand, not the original, or any previous form in which the work had been published". However, the logical analysis also shed light on many problem areas, including the multiple formats issue.

At the International Conference, Tom Delsey gave the paper recommending a logical analysis of AACR:

> The principal value to be gained from modeling the logical structure of AACR is that it would assist us in shifting our focus from the process of cataloguing to the entities or objects that we are endeavouring to represent in our catalogues, from the specifics of individual rules to the operative assumptions and principles that inform the rules, and from the formal structure of the catalogue record to the logical structure underlying the data in the record. The discipline of the modeling exercise itself would serve to highlight anomalies within the rules and inconsistencies in the application of basic principles. It would also oblige us to clarify our thinking with regard to the concepts that are integral to the logical design of the

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[37] Joint Steering Committee for Development of RDA. "RDA FAQ. 1. RDA Basics." http://www.collectionscanada.gc.ca/jsc/rdafaq.html#1

code. Perhaps most important of all, the development of a model would provide us with a clear framework to be used in determining how to develop and extend the code to reflect newly emerging phenomena in the universe of information objects.[38]

Though not specifically addressing alternative formats or multimedia resources, this logical analysis would bring to light limitations, anomalies and inconsistencies in AACR2, including those that affect alternative formats and multimedia resources. When Delsey suggested identifying entities, their attributes and the relationships between the entities, it was the work in this area that had the maximum impact on the resolution of problems associated with alternative formats and multimedia resources.

3.   FRBR: the conceptual model

3.1   Origins and impact of FRBR

The FRBR conceptual model has its origin in the report of a study group appointed by IFLA, the International Federation of Library Associations and Institutions. While the Anglo-American cataloguing community was in the process of identifying problem areas that needed urgent attention, the international cataloguing community was also in the midst of grappling with the nature of bibliographic data and bibliographic records. There were two main factors that were prompting the need to analyze the nature of bibliographic data: the increasing cost of cataloguing and the accelerating growth of published materials, both traditional and electronic. In face of these challenges, there were calls both to increase shared cataloguing and to move away from full bibliographic records. A seminar was held in Stockholm in 1990, prior to the IFLA annual conference. Olivia Madison summarized the question facing the participants at the Stockholm seminar and their conclusions:

> Can cataloguing be considerably simplified? … The seminar concluded with consensus that the international cataloguing community needed to establish broad-based international agreement on the primary functions of the bibliographic record in response to user needs and to enhance international sharing of bibliographic data … To accomplish this, the

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[38] Tom Delsey. "Modeling the Logic of AACR." Conference paper for the International Conference on the Principles and Future Development of AACR, October 1997. Version posted prior to the conference, 3.
http://epe.lac-bac.gc.ca/100/200/300/jsc_aacr/modeling/r-bibun.pdf

participants agreed … that an international study focused on the functional requirements of bibliographic records should be undertaken.[39]

In the early 1990s, the IFLA Division of Bibliographic Control appointed a study group to examine the functional requirements of bibliographic records. By 1991, the first members of the study group were appointed and the group grew and adjusted its membership between 1991 and 1993. By 1992, there were formal terms of reference. The study was extensive, and carried out over several years, including a period for world-wide review. In 1997, the final report was approved by IFLA's Standing Committee on Cataloguing and the report was published the subsequent year: *Functional Requirements for Bibliographic Records: Final Report.*[40]

The final report of the IFLA Study Group on the Functional Requirements for Bibliographic Records contains the description of the entity-relationship model that the Group used to analyze bibliographic records and make their recommendations.

> The study has two primary objectives. The first is to provide a clearly defined, structured framework for relating the data that are recorded in bibliographic records to the needs of the users of those records. The second objective is to recommend a basic level of functionality for records created by national bibliographic agencies. (*FRBR* 2.1)

While development of a framework or model was one of two objectives, it is the model that has continued to be discussed, applied, and developed. The model has led to a major change in the way bibliographic data is understood.

> The innovative impact of the model is such as to challenge the cataloguing ideology implicit in current cataloguing codes, in the international descriptive standards, the various ISBDs …[41]

Pat Riva, the current Chair of the FRBR Review Group, summarizes how the model has made its mark:

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[39] Olivia Madison. "The Origins of the IFLA Study on Functional Requirements for Bibliographic Records." *Cataloging & Classification Quarterly* 39, no. 3/4 (2005): 18.

[40] IFLA Study Group on the Functional Requirements for Bibliographic Records. *Functional Requirements for Bibliographic Records.* (Munich: K. G. Saur, 1998) http://www.ifla.org/VII/s13/frbr/frbr.pdf

[41] Teresa Grimaldi. "The Object of Cataloguing." In *Seminar FRBR: Functional Requirements for Bibliographic Records, Florence 27-28 January 2000: Proceedings.* (Rome: Associazione italiana biblioteche, 2000): 68.

Since the release of FRBR in 1998, there has been a growing reflection in the bibliographic community around the ideas it represents. FRBR has provided a unifying framework and a common terminology for discussion … Since FRBR, most theoretical studies and applications have been using FRBR terminology, and this makes it easier for one study to build on another. … As more and more people internalized the richness of the model, its potential in providing principles to guide cataloging rule revision was felt.[42]

Evidence of the explanatory power of the model can be seen, for example, in the volume of writing about FRBR, and the number of projects that take FRBR as their framework, as documented in the FRBR bibliography.[43] The bibliography shows how the FRBR model has been received around the world with great interest, and used as the starting point for new applications and new research. FRBR models bibliographic data, and is not tied to the cataloguing tradition of any one country.

> FRBR's enduring strength is its neutrality as to bibliographic conventions and its theoretical approach that focuses on the user, the object and function – all of which has enabled its timelessness to application.[44]

With the broad, international recognition of the validity of the model, IFLA decided to appoint new groups to extend the FRBR model to include authority data (FRAD), and subject authority data (*Functional Requirements for Subject Authority Records*, FRSAR). It also decided to establish the FRBR Review Group to review, maintain and encourage the application of FRBR. FRBR has also become a key part of the foundation for the International Cataloguing Principles. From the introduction in the final version of the *Statement of International Cataloguing Principles*:

> This statement builds on the great cataloguing traditions of the world, and also on the conceptual model in the IFLA *Functional Requirements for Bibliographic Records (FRBR)*.[45]

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[42] Pat Riva, "Introducing the Functional Requirements for Bibliographic Records and Related IFLA Developments." *Bulletin of the American Society for Information Science & Technology* 33, no. 6 (2007): 9-10. http://www.asis.org/Bulletin/Aug-07/Riva.pdf

[43] FRBR Review Group. *FRBR Bibliography*. http://www.ifla.org/VII/s13/wgfrbr/bibliography.htm

[44] Olivia Madison. "Utilizing the FRBR Framework in Designing User-Focused Digital Content and Access Systems." *Library Resources & Technical Services* 50, no. 1 (2006): 15.

[45] IFLA Meetings of Experts on an International Cataloguing Code (IME-ICC). *Statement of International Cataloguing Principles.* February 2009. http://www.ifla.org/VII/s13/icc/imeicc-statement_of_principles-2008.pdf

With the FRBR model as the theoretical framework underpinning shared international cataloguing principles, there can be little doubt about the model's impact, and the model's explanatory power.

3.2   User tasks

The FRBR model is an entity relationship model. There are three components in the model: entities, attributes of the entities and relationships between the entities. The entities are the objects of interest to users of bibliographic data, such as the products of intellectual or artistic creation, the persons or corporate bodies responsible for creating those products and the subjects of those products of intellectual and artistic creation. In describing the methodology for the study, the Study Group gives an overview of the modelling technique:

> The entity-relationship structure derived from the analysis of entities, attributes, and relationships has been used in this study as the framework for assessing the relevance of each attribute and relationship to the tasks performed by users of bibliographic data. Each attribute and relationship is mapped to the four generic user tasks defined for the study, and relative values are assigned to each attribute and relationship with specific reference to the task performed and the entity that is the object of the user's interest. (*FRBR* 2.3)

The original study had two objectives, one of which was to relate "the data that are recorded in bibliographic records to the needs of the users of those records." Thus, the starting point for the model is the definition of the needs of the users and these needs are summarized in the four user tasks: find, identify, select and obtain.

The Study Group defined the four generic user tasks:

- to <u>find</u> entities that correspond to the user's stated search criteria (i.e., to locate either a single entity or a set of entities in a file or database as the result of a search using an attribute or relationship of the entity);
- to <u>identify</u> an entity (i.e., to confirm that the entity described corresponds to the entity sought, or to distinguish between two or more entities with similar characteristics);
- to <u>select</u> an entity that is appropriate to the user's needs (i.e., to choose an entity that meets the user's requirements with respect to content, physical format, etc., or to reject an entity as being inappropriate to the user's needs);

- to acquire or <u>obtain</u> access to the entity described (i.e., to acquire an entity through purchase, loan, etc., or to access an entity electronically through an online connection to a remote computer). (*FRBR* 6.1)

These are the four tasks that users perform using the bibliographic data that libraries record and store, whether using a book catalogue, a card catalogue or an online database. Other tasks have been mentioned, such as "navigate", "manage", and however valid they may be, they are not included as one of the original four user tasks. The "navigate" task can be seen as part of the "find' task because FRBR does not look at the bibliographic record in isolation, but at the record within the context of a large catalogue or database.

With the FRBR model, the data that is analyzed is data that is of interest to the user because it allows the users to accomplish these four basic tasks. The model promotes a view of the bibliographic universe where the focus is on what is important to the user. Cataloguing principles and cataloguing codes have always aimed to serve the needs of the user, sometimes explicitly stating this goal, sometimes implying it. For example, Charles A. Cutter, in 1876, did explicitly state, in his *Rules for a Printed Dictionary Catalog*, that the objective of the catalogue was to help the user: "to enable a person to find a book … to show what the library has … and to assist in the choice of a book …" [46] S.R. Ranganathan, with his five laws of library science, first published in 1931, also underlined the basic principle that we organize information for the benefit of the user: "books are for use; every person his or her book; every book its reader; save the time of the reader; a library is a growing organism." [47] The FRBR model continues in the tradition of focusing on the user, but it goes further by providing a detailed view of the way in which each attribute and relationship recorded in the bibliographic record is relevant and important to the user.

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[46] Charles A. Cutter. *Rules for a printed dictionary catalog.* 4th ed. (Washington : Government Printing Office, 1904):12. Digitized by University of North Texas Digital Collections. http://digital.library.unt.edu/permalink/meta-dc-1048

[47] S.R. Ranganathan. *The Five Laws of Library Science.* (Madras: Madras Library Association, 1931). Digtized by DLIST, Digital Library of Information Science and Technology. http://dlist.sir.arizona.edu/1220/

3.3   Brief outline of the entity-relationship model

The IFLA Study Group decided to use an entity-relationship model for their analysis of the functional requirements for bibliographic records. The first step is to identify the entities:

> The first step in the entity analysis technique is to isolate the key objects that are of interest to users of information in a particular domain … the analysis first focuses attention not on individual data but on the "things" the data describe. Each of the entities defined for the model, therefore, serves as the focal point for a cluster of data. (*FRBR* 2.3)

The FRBR model defines three groups of entities:

Group 1 entities: products of intellectual or artistic endeavour

> **entities:** work, expression, manifestation item

Group 2 entities: those responsible for the intellectual or artistic content, the physical production and dissemination, or the custodianship of the entities in the first group

> **entities**: persons, corporate bodies

Group 3 entities: subjects

> **entities:** concept, object, event, place
> + all the entities in groups 1 and 2

The group 2 and 3 entities are fairly self-explanatory. The four group 1 entities are an important key to unravelling confusion in content versus carrier issues, as will be seen below. Thus, it is important to have a clear understanding of the FRBR group 1 entities to understand the impact of FRBR on the content versus carrier issue.
At first glance, the group 1 entities are both straightforward and puzzling. We are used to the words "work", "manifestation" and "item". The FRBR model uses these familiar terms, with strict definitions of what these terms mean. The model also defines the entity "expression", an abstract entity that helps to clarify the bibliographic universe with an important layer between work and manifestation.

The FRBR definitions of these four entities reveal their inter-relatedness. The entities do not stand alone, but are aspects that

correspond to a user's interests in the products of intellectual and artistic creation (*FRBR* 3.1.1).

item: a single exemplar of a *manifestation*

manifestation: the physical embodiment of an *expression* of a *work*

expression: the intellectual or artistic realization of a *work* in the form of alpha-numeric, musical, or choreographic notation, sound, image, object, movement, etc., or any combination of such forms

work: a distinct intellectual or artistic creation

The definitions of the group 1 entities demonstrate the primary relationships that exist between these four entities. The diagram from section 3.1.1 of the FRBR report demonstrates these relationships:

work

  is realized through

                expression

                  is embodied in

                    manifestation

                      is exemplified by

                        item

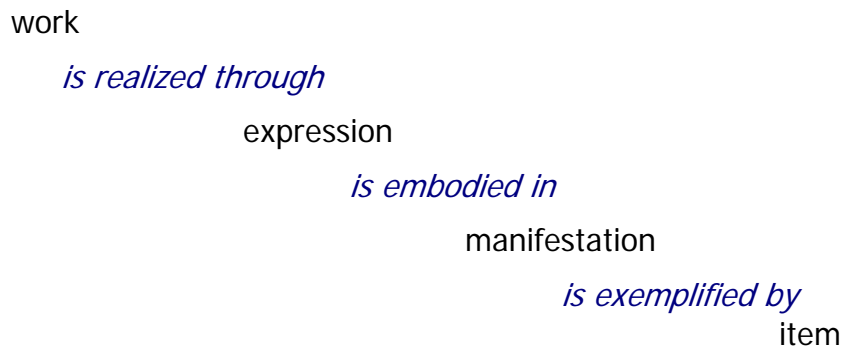Figure 1. Diagram illustrating the definitions and relationships between the Group 1 entities.

When I pick up the copy of Robinson Crusoe that I am reading, I am holding an item, but, at the same time, it is also the exemplar of a particular manifestation, it embodies a particular expression, and it is the realization of the work. The item in my hand has all four aspects: item, manifestation, expression and work.

work

w = idea for the Robinson Crusoe story (in Defoe's head)

is realized through

expression

e = original English text as Defoe wrote it

is embodied in

manifestation

m = Oxford : Oxford University Press, 2007

is exemplified by

item
i = copy owned by McGill University

Figure 2. Diagram illustrating the definitions and relationships between the Group 1 entities, using Daniel Defoe's Robinson Crusoe as an example.

Barbara Tillett, in *What is FRBR?*, explains these different aspects from the point of view of the user, who may have different types of needs and interests when looking for a book:

> For example, when we say "book" to describe a physical object that has paper pages and a binding and can sometimes be used to prop open a door or hold up a table leg, FRBR calls this an "item."

> When we say "book" we also may mean a "publication" as when we go to a bookstore to purchase a book. We may know its ISBN but the particular copy does not matter as long as it's in good condition and not missing pages. FRBR calls this a "manifestation."

> When we say "book" as in 'who translated that book,' we may have a particular text in mind and a specific language. FRBR calls this an "expression."

> When we say "book" as in 'who wrote that book,' we could mean a higher level of abstraction, the conceptual content that underlies all of the linguistic versions, the story being told in the book, the ideas in a person's head for the book. FRBR calls this a "work." [48]

The group 2 entities, persons and corporate bodies, are defined in terms of their relationship to the group 1 entities. The group 2 entities

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[48] Barbara Tillett. *What is FRBR? A Conceptual Model for the Bibliographic Universe.* (Washington: Cataloging Distribution Service, Library of Congress, 2004): 2-3. http://www.loc.gov/cds/downloads/FRBR.PDF

can be responsible for the creation of a work, for the realization of an expression, for the production of a manifestation (or the embodiment of an expression into a manifestation), and may have relationships to an item, such as owning an item. FRBR focuses on the relationship of the group 2 entities to the group 1 entities. The FRAD model, Functional Requirements for Authority Data, builds on the FRBR model and extends the entities to cover those entities that are important for users of authority data. Thus, FRAD looks at the relationships between the group 2 entities. FRAD's starting point is the set of entities defined in the FRBR model. FRAD expands the group 2 entities to include family as well. Descriptions of the FRBR model now often assume the FRAD definition of group 2: person, family and corporate body. [49]

The group 3 entities are the subjects of the group 1 entities. This group includes four entities that are specific to this group: concept, object, event and place. It also includes all the group 1 entities and all the group 2 entities because these too can be the subjects of works. The IFLA Working Group on Functional Requirements for Subject Authority Records (FRSAR) is working on extending the FRBR model to cover subject authority data.

Each entity has a set of characteristics or attributes, and these attributes can be inherent or externally imputed. Inherent attributes are attributes that can be discovered by examining the item, such as the extent, statements on title pages, type of content, date of publication, etc. An example of an externally imputed attribute would be an assigned identifier, such as thematic catalog numbers used for a musical composition (*FRBR* 4.1). Barcode numbers, provenance, inscriptions are examples of attributes of the item. Publisher, date of publication, form of carrier and extent are examples of attributes of the manifestation. The form and language of the expression, the type of score, and the scale of a cartographic image are examples of attributes of the expression. The form or genre of the work, the medium of performance of a musical work, the coordinates of a cartographic work are examples of attributes of the work. Some attributes have widespread applicability, such as "title" and "date". Other attributes only apply to certain types of resources, such as "scale" and "projection" for cartographic resources.

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[49] Barbara Tillett. "The Influence of FRBR on RDA." Presentation for the 2008 ALA annual conference for the session "Getting ready for RDA."
http://presentations.ala.org/images/1/1e/Getting_ready_for_RDA_FRBR_influences_2008rev_color.pdf

The FRBR model identifies attributes for all the entities. Examples of the attributes for the group 2 entity, person, are names, dates, title (i.e., title as a term of address). The group 3 entities each have the attribute "term", such as "economics' for concept, "ships" for object, "Battle of Hastings" for event, "Ottawa" for place.

After analyzing the bibliographic entities and their attributes, the FRBR model maps out the relationships between the entities, and identifies the different types of relationships. The relationships between the entities play a very important role in assisting the user to complete the tasks of finding, identifying, selecting and obtaining and are the key to navigating through the bibliographic universe.
As with entities and attributes, these bibliographic relationships are familiar to anyone working with bibliographic data. What is new is the way in which the model underlines the importance of these relationships with its explicit identification and classification of relationships. The relationships explain the nature of the links that exist between the entities.

The FRBR model looks at the relationships between the groups of entities. A person creates a work. A family owns an item. A corporate body publishes a manifestation A person realizes an expression, e.g. a person performs a work or a person translates a work. These are examples of relationships between group 2 entities and group 1 entities. There are also the relationships between group 3 entities and group 1 entities, the subject relationships, such as a concept is the subject of a work, etc.

The FRBR model also focuses attention on the relationships between the entities in the same group, especially the relationships between the group 1 entities. The primary relationships between the four group 1 entities were already evident in the definition of the group 1 entities: an item is the exemplar of a manifestation, which is the embodiment of an expression, which is the realization of a work.

Taking the example of Shakespeare's Hamlet, and looking at a few expressions and manifestations, one can map out the primary relationships between the work, several expressions, several manifestations of different expressions, and several exemplars of manifestations. In the table below, only one or two attributes of each entity are used:

work	expression	manifestation	item
title of work	*language of expression* *form of expression*	*place of publication* *date of publication*	*location of copies* *(owned by X library)*
Hamlet	# original English alpha-numeric notation	(1) London, 1603	Rare Books Dept.
		(2) New York, 1998	Humanities Library
	# French translation alpha-numeric notation	Paris, 1946	c1 Humanities Library c2 Special Collections
	# French translation alpha-numeric notation	Neuchatel, 1949	Music Library
	# German translation alpha-numeric notation	Hamburg, 1834	Special Collections
	# French translation spoken word	Paris, 1983	Audio-Visual Dept.

Figure 3. Relationships between a few expressions and manifestations of Shakespeare's Hamlet.

Likewise, this same work, *Hamlet,* also has relationships to other works.

>   *Hamlet* is subject of*:*
>   **Modern Hamlets & their soliloquies**
>   > Critical responses to Hamlet, 1600-1900

>   *Hamlet* is imitated:
>   **Hamlet travestie**

>   *Hamlet* is transformed into an opera:
>   **Hamlet : opéra en cinq actes**
>   > musique de Ambroise Thomas; paroles de Michel Carré et Jules Barbier

>   *Hamlet* is adapted for a juvenile reader:
>   **Hamlet: the young reader's Shakespeare:**
>   > a retelling / **by** Adam McKeown

Figure 4. Types of work to work relationships, between Shakespeare's Hamlet and related works.

The model maps out the relationships and organizes them into types. The model categorizes the full range of relationships between works, between expressions of the same work, between expressions of different works, between manifestations, between manifestations and expressions, between items, between items and manifestations, etc. These bibliographic relationships are not new. The level of information recorded about bibliographic relationships and about the exact nature of the relationship has varied over time and in different cataloguing contexts. By focusing attention on bibliographic relationships, and relating each bibliographic relationship to the user tasks, FRBR underlines the role that bibliographic relationships play when a user navigates a large catalogue or database. The FRBR model looks at the bibliographic record not as a record to be dissected in isolation, but to be analyzed within the context of large databases of bibliographic data. Clarifying bibliographic relationships is key to enabling a user to achieve the user tasks.

3.4   Impact of the FRBR model on the content versus carrier issue

As mentioned above, the cataloguing community around the world quickly recognized the usefulness and validity of the FRBR model, and began applying it in different studies, analyses, and applications involving bibliographic data. Jennifer Bowen gives a good summary of FRBR's impact:

> FRBR is thus not something new and foreign, but a fresh, more rigorous way of thinking about what libraries already do that provides a basis for designing new ways to improve users' access to library resources.[50]

An important aspect of FRBR's impact is the reinforcement of the importance of collocation. Barbara Tillett summarized FRBR's role in achieving the collocation objective of the catalogue:

> One of the beauties of FRBR is that it reminds us of the basic objectives to enable finding and collocating bibliographic records in a catalog. FRBR describes the model to facilitate the collocation of related entities in the vast bibliographic universe. This model requires basic attributes of the hierarchically related entities to be present in national bibliographic records. Additional relationships are also recommended for aggregates

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[50] Jennifer Bowen. "FRBR: Coming Soon to Your Library?" *Library Resources & Technical Services* 49, no. 3 (2005): 186.

and components, for whole-part, and other relationships, so displays can be created to show the families of works and related works, as well as their expressions and various manifestations in multiple physical formats, even down to specific distinctive items and where they are located or accessible. [51]

The FRBR model clarifies issues related to the primacy of content or carrier, and on the level of relatedness between versions of the same work. In order to see the impact of the FRBR model, it is useful to look further at those relationships that are most relevant, the relationships between the entities of the same work.

The identification of four entities within group 1, the products of intellectual and artistic creation, gives an important insight into the relationships between resources that deliver the same content, but in different formats. Within the family of relationships for the same work, the distinction between expressions and manifestations clarifies the level of difference and similarity between resources. Looking at the attributes of expression, a key attribute is the "form of expression". As defined in FRBR, the form of expression:

> is the means by which the *work* is realized (e.g., through alpha-numeric notation, musical notation, spoken word, musical sound, cartographic image, photographic image, sculpture, dance, mime, etc.)" (*FRBR* 4.3.2).

Looking at the attributes of manifestations, a key attribute is the form of carrier. The definition of the form of carrier is:

> the specific class of material to which the physical carrier of the *manifestation* belongs (e.g., sound cassette, videodisc, microfilm cartridge, transparency, etc.). The carrier for a *manifestation* comprising multiple physical components may include more than one form (e.g., a filmstrip with an accompanying booklet, a separate sound disc carrying the sound track for a film, etc.) (*FRBR* 4.4.9).

Thus, the audiobook version of the work is a different expression than the text version of the work, even if the exact same words are used in both. The fact that the work is realized in spoken word instead of using alpha-numeric notation is an important distinction and it is a different type of distinction than the difference between regular print and large print of the same alpha-numeric expression of the work, or between the CD and cassette versions of the same spoken word expression.

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[51] Barbara Tillett. "FRBR and Cataloging for the Future." *Cataloging & Classification Quarterly* 39, no. 3/4 (2005): 200.

The FRBR models maps out relationships between expressions of the same work, and these relationships are different types of relationships from those between manifestations of the same expression:

> Relationships between *expressions* of the <u>same</u> *work* (Table 5.3) occur when one *expression* has been derived from another. In these types of relationships, one *expression* is seen to be a modification of the other. The modification may be a literal translation, in which the intent is to render the intellectual content of the previous *expression* as accurately as possible (note that free translations are treated in the model as new *works*); a revision, in which the intent is to alter or update the content of the prior *expression*, but without changing the content so much that it becomes a new *work*; an abridgement, in which some content of the previous *expression* is removed, but the result does not alter the content to the extent that it becomes a new *work*; or an arrangement of a musical composition. (*FRBR* 5.3)

If the audiobook is an adaptation or a paraphrase of the original work, then there is a relationship between the works, a derivative relationship of transformation. But each is a different work. Likewise, if the original work was a novel, and the audiobook was a dramatization of the novel, they would be two separate works, but linked through the relationship of transformation.

When the audiobook delivers the same content as the original expression, but delivers it in a new form of expression, then it is a new expression of the same work. A translation of a work is also a new expression of the same work. Taking the Hamlet example, the French translation of Hamlet in alpha-numeric notation is a different expression from the original English text. The same French translation in spoken word is a different expression from the French translation in text; it is also a different expression from the English text or the English spoken word. The French spoken-word expression differs from the original in two expression-level attributes: language and form of expression.

If the audiobook is an abridgement of the original work, it can be considered an expression of the same work if the abridgment is not so extensive that it effectively changes the content: "an abridgment, in which some of the content of the previous expression is removed, but the result does not alter the content to the extent that it becomes a new work." (*FRBR* 5.3). In this case, the abridgment remains in the same work family, but it is a different expression from an expression that has the complete content. In cases such as this, the differences

between expressions of the same work can come close to becoming differences between works.

Looking at resources for the visually-impaired, identical content delivered in braille notation would be considered a different expression from the alpha-numeric notation of the same work. It is a notation, but it is a tactile notation rather than an alpha-numeric notation and requires the use of a different sense. It is a different expression because it has a different form of expression.

Looking at the manifestation to manifestation relationships, the FRBR model identifies two main categories of relationships: reproduction and alternate. In terms of the reproduction relationship, the FRBR model uses an understanding of reproduction that "may involve varying degrees of fidelity to a previous *manifestation*. It puts more stress on the content: what is important is that the same intellectual or artistic content is represented in the subsequent *manifestation*; replicating the look and feel of the previous *manifestation* is not the intent" (*FRBR* 5.7).

If two audiobooks are the same expression, but one is a CD and another is an audio-cassette, the difference is a manifestation-level difference. If one audiobook is a CD, and the other is delivered as an online resource, again, the carriers differ, but they are two manifestations of the same expression.

If one looks at the relationship between large print and regular print versions of the same content, they are both delivered on the same form of carrier, but they have different type sizes. Type size is a manifestation level attribute. Other manifestation level attributes would probably also be different, such as the extent of the carrier, publisher, identifier, etc. Thus the relationship between the two would be two different manifestations of the same expression.

When one looks at the question of alternative formats, it is important to distinguish whether the difference is at the level of expression or manifestation. In some cases, a user may find manifestation-level attributes as important or more important than expression-level attributes. But what is crucial is clarifying the nature of the similarities and differences between resources, and recording this information in a way that it can be used to guide the user to the appropriate resource. The difference between expression and manifestation relationships plays an important role in sorting out the nature of the relationships so

that the user can be led to the appropriate resource or can be shown a data display that makes clear the nature of the relationships between different resources in the retrieval set.

4. Towards a resolution of the multiple formats issue

After the 1997 International Conference on the Principles & Future Development of AACR, there were two action items, in particular, that began a process of revision that resulted in a complete deconstruction of AACR2, and the development of the new successor standard, *RDA: Resource Description and Access:*

- *Action: Pursue the recommendation that a data modeling technique be used to provide a logical analysis of the principles and structures that underlie AACR.*
- *Action: Solicit a proposal to revise rule 0.24 to advance the discussion on the primacy of intellectual content over physical format.*

4.1 *The Logical Structure of the Anglo-American Cataloguing Rules*

Tom Delsey, who had delivered the paper, "Modeling the Logic of AACR", at the International Conference, and was a member of the IFLA Study Group who had developed the FRBR model, was asked to carry out the logical analysis. He used an entity-relationship model, and, drafted, with assistance from others,[52] a detailed analysis of both Parts 1 and 2 of AACR which brought to light certain fundamental problems in the logical structure of AACR. The analysis is reported in the document *The Logical Structure of the Anglo-American Cataloguing Rules.*

The first key issue addressed was the question: "Does the concept of class of materials as currently reflected in the code serve as a viable basis for an extended structure accommodating new forms of digital materials?" [53] To approach the question of whether AACR could easily

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[52] For Part 1, the Logical Structure was drafted with the assistance of Beth Dulabahn, Michael Heaney and Jean Hirons, for Part 2, with the assistance of Beth Dulabahn and Michael Heaney.
[53] Tom Delsey. *The Logical Structure of the Anglo-American Cataloguing Rules.* (1998): Part 1, key issue no. 1 http://www.collectionscanada.gc.ca/jsc/docs.html#logical

extend to describe new types of bibliographic resources, Delsey examined the assumption underlying the concept of "class of materials". Rule 0.24 assumed that class of material was defined on the basis of a physical carrier:

> It is a cardinal principle of the use of Part I that the description of a physical item should be based in the first instance on the chapter dealing with the class of materials to which the item belongs … In short, the starting point is the physical form of the item in hand …

However, in the course of modelling the data and looking in more depth at the chapters in Part I, Delsey demonstrated that only five classes of material were defined by physical carrier: sound recordings, motion pictures, videorecordings, computer files and microforms. Cartographic material, graphic materials, and three-dimensional artefacts and realia were not in fact defined according to physical carriers, but according to the type of content. Music, in the AACR context, is only music as expressed in musical notation, i.e., scores. Taking the FRBR model as a way to clarify the problem, one sees that some classes of material are defined according to attributes at the manifestation level, such as videorecordings, one is defined according to an attribute at the expression level, i.e., music scores, and some are defined according to attributes at the work level, such as cartographic material. It is little wonder that it was difficult to extend AACR2 to describe new types of resources and difficult to describe resources consisting of different types of material. The categories were assumed to be equal, but were in fact disparate and inconsistent. In light of this inconsistency, there were two pressing questions: if a resource belongs to two or more classes of material, rules associated with which class should take precedence? And similarly, for a new type of resource, if it falls into two or more classes of material, which class of material should take precedence?

The recommendation in answer to this key issue was to consider the possibility of "deconstructing" class of materials and developing a more flexible approach so that AACR could easily extend to the description of new types of material. Since the concept of class of materials dominated the structure of Part I, the recommendation was worded as "Use the model developed for this study to assess the options for restructuring Part I of the code." [54] It also goes on to suggest the possibility of reorganizing Part I according to the ISBD areas.

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[54] Ibid, Part 1, recommendation no. 1.

4.2 Partial revision of rule 0.24

The second action item, "Solicit a proposal to revise rule 0.24 to advance the discussion on the primacy of intellectual content over physical format", was assigned to the ALCTS CCS Committee on Cataloging: Description & Access (CC:DA). They were asked to examine 0.24 and prepare a rule revision proposal. The CC:DA task force identified two aspects of the problem: (1) how to describe a bibliographic resource that has multiple characteristics and (2) how to deal with identical intellectual content existing on a variety of carriers, also called the format variation problem in their report.[55] They prepared a revision proposal that led to the amendment of rule 0.24 in 2001.

> It is important to bring out all aspects of the item being described, including its content, its carrier, its type of publication, its bibliographic relationships, and whether it is published or unpublished. In any given area of the description, all relevant aspects should be described.

The revision responded to the problem of how to describe a bibliographic resource that has multiple characteristics. It did not indicate any precedence among the classes of materials, nor did it address the inconsistency in categorization of the classes of material. Any changes to classes of material would necessarily entail changes to the structure of Part I of AACR2.

The task force also explicitly supported the recommendation made by Tom Delsey to restructure Part I, and recognized that the full resolution of the 0.24 problem could not be done simply as a revision of one rule. The task force clearly indicated that the wording of the revision proposal was intended as an interim step:

> It is recognized that the editing required to reorganize AACR2 by ISBD area will be extensive. Thus, CC:DA recommends that a staged approach be taken such that the text for rule 0.24 would be changed immediately, but more time would be devoted to reorganizing the chapters of AACR2R according to ISBD area.[56]

The Task Force also predicted that "the format variation problem" would have far-reaching consequences and recommended that the

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[55] ALCTS CC:DA Task Force on Rule 0.24. *Overview and Recommendations Concerning Revision of Rule 0.24*, (JSC document, 4JSC/ALA/30, August 16, 1999): 3. http://www.libraries.psu.edu/tas/jca/ccda/tf-024a.html#report
[56] Ibid, 5.

Joint Steering Committee appoint another task force to explore this problem.

4.3   Format Variation Working Group

The Joint Steering Committee appointed the Format Variation Working Group (FVWG). As Jennifer Bowen, its Chair, summarized:

> While the group had several different terms of reference requesting that it undertake various specific tasks for the JSC, all of these tasks had the common element of dealing with the FRBR entity expression. [57]

The first term of reference was to examine the viability of expression-level cataloguing. At first glance, one might wonder why JSC framed the term of reference in this way, rather than asking the Group to look at the "format variation problem", as described by the ALCTS Task Force. The ALCTS Task Force had defined the format variation problem as the multiple versions problem: "where the same expression of the same work can exist on different carriers (the "multiple versions" problem)" [58] However, given the insights from the FRBR model, the format variation question is not solely a question about how to approach the description of identical content on different carriers. It is also a question of how to approach the description of different expressions of the same work. The FRBR model identifies form of carrier as an attribute at the manifestation level, and form of expression as an attribute at the expression level. It is in taking the perspective of the FRBR model that one can see how "format variation" is a question of how to describe and how to give access to different expressions of the same work, as well as different manifestations of the same expression. The focus of the group was on the expression entity, and on the bibliographic relationships between expression and the other group 1 entities, especially between work and expression.

Pat Riva, a member of the FVWG, summarized the group's work:

> The expression entity was the Group 1 entity least explicit in AACR2. The FVWG engaged in a three-year journey of reflection that eventually prompted proposals about headings for works and expressions that could serve as citations or identifiers for those entities, to clarify the structure among manifestations of a single work. The committee also considered

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[57] Bowen, "FRBR: Coming Soon to Your Library?" 176.
[58] ALCTS CC:DA Task Force on Rule 0.24. *Overview and Recommendations Concerning Revision of Rule 0.24*, 3.

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how to provide a meaningful basis for grouping manifestations by form of expression or basic type of content; this work was intended to provide background towards reassessing the role, function and form of the General Material Designation (GMD).[59]

By 2002, the JSC was rethinking the general material designation (GMD). In September 2002, the JSC gave an additional term of reference to the FVWG that clearly indicates this intention:

> JSC has been exploring the feasibility of "deconstructing" the GMD through the use of a term or device in the bibliographic record to represent the mode of expression, and moving terms representing physical format and form of carrier to area 5 or to notes … It has been suggested that the expression-level indicator could be an element in the expression-level citation that is being proposed by the Format Variation Working Group. The Working Group is asked to develop these ideas and to make recommendations on how the mode of expression could be represented in the bibliographic record.[60]

The GMD is "a term indicating the broad class of material to which an item belongs" (AACR2 glossary). Once the concept of class of material was under scrutiny, as a result of Delsey's logical analysis, it was evident that the same inconsistencies also applied to the general material designation. As with class of material, if one looks at the terms used as GMDs, there are some terms that describe attributes at the manifestation level, such as microform, one at the expression level, music, and some at the work level, such as realia. Like the class of material concept, the categories are disparate and inconsistent.

The FVWG did some initial work on categorizing "modes of expression". It was evident that an extensible grid or framework was needed to replace the GMDs. The FVWG focused on the form of expression, and its relationship to the form of content. This work was happening at a time when the JSC was making the decision to change from amending AACR2 to developing a new edition, to be called AACR3. With the decision to move to a new edition, the JSC appointed Tom Delsey as the editor. The work of the FVWG, both on expression-level citations, and the preliminary work on ways to replace the GMDs, was forwarded, to the new editor and subsumed in the work on AACR3.

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[59] Riva, "Introducing the Functional Requirements for Bibliographic Records," 10.
[60] Joint Steering Committee for Revision of AACR. *Format Variation Working Group: Additional Term of Reference.* (4JSC/Chair/71/Rev/2, 20 October 2002). http://www.collectionscanada.gc.ca/jsc/forvarwg1add.html

4.4   AACR3

Tom Delsey had suggested in recommendation 1 of his Logical Analysis, Part 1, that a possible way to re-organize Part I of AACR2 might be to use the ISBD areas as the underlying structure for the rules, instead the existing structure of chapters based on class of material. As early as 1999, work had begun on an experimental "alpha" prototype of a reorganized Part I of AACR2, created by Bruce Johnson and Bob Ewald. The prototype simply rearranged the rules, but it was the first step in the "deconstruction" process. It took the rules out of the structure based on class of material chapters, and organized them according to the ISBD areas. The rearrangement highlighted some problems and discrepancies. An ALA task force, ALA Task Force on Consistency across Part I of AACR2, was asked to analyze the consistency of rules across the chapters in Part I. It took the process of "deconstruction" a step further. Taking the prototype of rearranged text, it was asked to look at the degree of overlap between similar rules originating from different chapters, and to identify inconsistencies, discrepancies or conflicts between these similar rules. The Task Force proposed revisions to increase consistency. The Task Force then consolidated their work on the rearranged rules and prepared another prototype for a reorganized Part I.[61] The rearrangement of the text of the rules began a process of visualizing a new organization for the structure of the cataloguing code.

In 2002, a member of the Format Variation Group, Pat Riva, was asked by the Joint Steering Committee to examine the terminology used in AACR2 and to propose ways to make AACR2 terminology consistent with FRBR terminology. This process of incorporating FRBR terminology into AACR2 highlighted problem areas where FRBR terminology could not simply be grafted onto AACR2, but required rethinking a new approach. The task of incorporating FRBR terminology was an early catalyst for the alignment of the cataloguing code with the FRBR model, and an early step in the transformation of AACR2 into RDA. Work on this task continued until 2004, when the newly appointed editor of AACR3 was charged with continuing the work to incorporate FRBR terminology and concepts.

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[61] ALCTS CC:DA Task Force on Consistency across Part 1 of AACR. "Documents."
http://www.libraries.psu.edu/tas/jca/ccda/tf-con1.html

In April 2004, the Committee of Principals (CoP) and JSC decided that the degree of reorganization and changes required had surpassed the level of "amendments" and warranted a comprehensive revision of the rules. They named the new revision *AACR3: Resource Description and Access.*

A new draft of Part I was prepared. In the background comments from the JSC, there was a summary of the goals for the new edition:

> The revisions being undertaken will entail a re-articulation of the function of the catalogue and a logical "deconstruction" of many of the concepts that underlie the current structure and formulation of the rules. In that context, the objectives established for the revision will entail aligning the rules with the concepts and terminology used in the *Functional Requirements for Bibliographic Records*, and re-examining underlying assumptions pertaining to concepts such as class of materials, main entry, authorship, and uniform titles. The adaptation of the concepts underlying the rules to accommodate the description of newly emerging forms of digital resources is a major issue to be addressed with the new edition.[62]

The proposed changes for AACR3 increased the integration of FRBR into the cataloguing rules and explored a new organization and structure. Objectives and principles were articulated and there was an intention to incorporate a theoretical framework in order to build cataloguer judgment. The division into Parts I and II continued to mirror AACR2's structure, with the addition of a third part for authority control. But there was a new structure for the chapters within Part I. The draft also demonstrated a new approach to class of materials and GMDs, where there was a conscious differentiation between the type of content and the type of medium. The class of material concept was in the process of being removed and replaced with a new, more logically rigorous and extensible framework for the technical and content description of resources. This was the first stage in a new approach to describing content, medium and carrier. But as the new changes were proposed and discussed, it became evident that the standard was moving in the right direction, but it had not yet gone far enough.

From Library of Congress's response to the AACR3 draft, March 2005 (5JSC/AACR3/I/LC response):

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[62] Joint Steering Committee for Revision of AACR. *AACR3. Part I. Constituency Review of December 2004 Draft* (5JSC/AACR3/I, 17 December 2004): 3.
http://www.collectionscanada.gc.ca/jsc/docs/5aacr3-part1.pdf

> The Library of Congress supports the JSC in the initiative to improve the cataloguing rules and offers the following constructive comments towards that end. We would like to see the next edition of the rules go further towards achieving the objectives and principles stated for the rules. We would like to see more aggressive changes that respond to Web catalogues and future capabilities …[63]

The British Library also voiced the need to move ahead more radically in their response to the draft (5JSC/AACR3/I/BL response):

> The text as drafted in Part I is familiar to AACR2 users and there is great validity in generalizing, clarifying and improving this text to answer the continuing needs of these cataloguing users in our changing environment. However, in order to reach beyond the traditional AACR community and have the standard recognised and used by others, we think an additional, more radical product is required. One that is available on the Web, and that can be easily customised by whichever community needs instant content guidelines.[64]

In April 2005, the CoP and JSC announced a further change in approach that would shed the constraints of the AACR structure, move to a more complete alignment with the FRBR model, and aim to operate fully in the digital environment. The new standard was named RDA, Resource Description and Access, a new standard designed for the digital world.

5.   RDA: Resource Description and Access

5.1   RDA, the successor of AACR2

RDA, Resource Description and Access, will replace AACR2. It is a new standard that builds on the strengths of AACR2, but it also supersedes AACR2, in the sense of moving beyond AACR2.

One of the most obvious signals of a new perspective is the removal of "Anglo-American" from the standard's name. The aim is to shed the Anglo-American bias and to "internationalize" the standard, making it easy to implement and use in countries around the world.

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[63] Library of Congress. *AACR3. Part I. Constituency Review of December 2004 Draft: LC Response.* (5JSC/AACR3/I/LC response, March 25, 2005): 1.
http://www.collectionscanada.gc.ca/jsc/docs/5aacr3-part1-lcresp.pdf

[64] British Library. *AACR3. Part I. Constituency Review of December 2004 Draft: British Library Response.* (5JSC/AACR3/BL response, 31 March 2005): 1.
http://www.collectionscanada.gc.ca/jsc/docs/5aacr3-part1-blresp.pdf

From the Library of Congress's proposal for internationalization (5JSC/LC/5/Rev):

> One of the concerns expressed at the 1997 International Conference on the Principles and Future Development of AACR in Toronto was that the focus of *AACR2* on the Anglo-American community caused problems when implementing it in an international context.
> …
> The context of *AACR2* is English language, latin script, Western-style arabic numerals, and Gregorian/Julian calendar. The goal is to make *RDA* open to use by any community with a context other than English language, other than latin script, other than Western-style arabic numerals, and/or other than Gregorian/Julian calendar. [65]

The changes themselves are not major changes, but they signal a shift in perspective, demonstrating an awareness that AACR2 is used in countries around the world.

Another way in which the scope of RDA has been broadened can be seen in the goal to make it a standard that is not just for libraries. One of the goals in the *Strategic Plan for RDA, 2005-2009*, is to "Be usable primarily within the library community, but be capable of adaptation to meet the specific needs of other communities." [66] This is an important change in perspective because it acknowledges the reality that users do not care which information silo they are searching. Libraries are one among several communities that create and share metadata: there are also archives, museums, publishers, digitization projects, other metadata communities operating in the semantic web environment, etc. The possibility of sharing a metadata standard among different communities opens the possibility of improving the user experience and improving the results of searches.

Sharing a common metadata standard also promotes the re-use of metadata.[67] If the different communities share the same standard, one

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[65] Library of Congress. *RDA Part 1 Internationalization.* (5JSC/LC/5/Rev, June 21, 2006): 1. http://www.collectionscanada.gc.ca/jsc/docs/5lc5rev.pdf

[66] Joint Steering Committee. *Strategic Plan for RDA, 2005-2009,* long term goal no. 1.

[67] For example, this comment in the recently released JISC report: *Infrastructure planning and data curation: a comparative study of international approaches to enabling the sharing of research data*:
"The ability to link to international repositories and different types of resources depends crucially on the interoperability of metadata schemas used within and across domains. Agreement on metadata schemas and protocols for information exchange is one of the key outcomes of the international services in development." Raivo Ruusalepp. *Infrastructure planning and data*

can use existing metadata, putting effort into adding more data elements, instead of rerecording or changing metadata that was previously recorded. RDA's approach to transcription follows the principle of representation: "The data describing a resource should reflect the resource's representation of itself." In following this principle, RDA eliminates the requirement to abbreviate in transcribed elements such as the edition element or the name of publisher element. It also provides an option to leave capitalization, punctuation, etc. as received on incoming metadata. RDA guidelines create favourable conditions for the efficient re-use of metadata.

One of the most significant differences between AACR2 and RDA is the decision to make RDA a content standard: a standard that addresses the recording of well-formed metadata, but is silent on the encoding and display of metadata. Thus RDA instructs how to record titles, dates of publication, but it does not tie itself to any single communication format or encoding schema, nor does it tie itself to any particular way to display the data. In terms of guidance, RDA does include appendices that provide mappings for data encoding and options for data presentation. The appendices prepared for the first release of RDA are particularly focused on the encoding and display conventions that the library world has traditionally used. But it is important to note that this information appears in the appendices, not in the main body of the standard. By making RDA a content standard, there are two important advantages: RDA is a standard with the potential to be used by many different metadata communities; RDA can be used with newly emerging encoding or display practices and standards, and it does not become obsolete when existing encoding and display standards and practices are superseded.

RDA is also designed and developed as "a standard for the digital world". This phrase was deliberately chosen because it summarizes three different aspects of "a standard for the digital world". As mentioned above, RDA is not tied to particular encoding or display conventions. It addresses the recording of well-formed metadata that serves the user's needs. Thus, as a content standard, it can be used in many different environments and with newly emerging encoding and communication schema.

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curation: a comparative study of international approaches to enabling the sharing of research data. (Version 1.6, Nov. 30, 2008): 91
http://www.dcc.ac.uk/docs/publications/reports/Data_Sharing_Report.pdf

RDA metadata is also not tied to a particular "record" format, thus it can be stored and used in different database structures. For the first release of RDA, the editor, Tom Delsey, prepared a document that demonstrates how RDA data can be used in three different database scenarios.[68] Scenario 2 and 3 describe database implementations that are currently in use. There are differences in the degree of linking between records, but both scenarios are built on the use of bibliographic records and authority records to transmit data. Scenario 2, with the links between authority and bibliographic records, and the use of holdings records, corresponds to the database structure that is currently most widely used. Scenario 3 is a simpler database structure, without links between bibliographic and authority records. The document demonstrates that RDA data can readily be stored and used in the database structures that are already available and in use in the library community.

Scenario 1 points to an example of a database structure of the future: "a relational or object-oriented database structure that mirrors the FRBR and FRAD conceptual models". The description of this implementation scenario is important because it demonstrates that RDA data is not tied to one particular database structure, but has the potential to be used with newly emerging structures. In the *Strategic Plan for RDA*, one goal is compatibility with existing database structures, and another goal is to be readily adaptable to newly emerging database structures.[69] Thus, "RDA, a standard for the digital world", also means a standard that can take advantage of new developments in database structure for encoding, storing, communicating and harvesting metadata.

Another aspect of the standard that sets it apart from its predecessor is that it was not written to be used as a linear, static document, as a traditional book or manual. Rather, the standard was designed to be used as a web tool. The web tool is designed with functionality that permits easy navigation and many different approaches to the instructions. It is not simply a document that is on the web. It is a structured document, with tools for navigation and search. As a web tool, it also includes functionality to encourage a logical decision process and a purposeful progression through the instructions. The web tool will be discussed in more detail at the end of the paper. Here,

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[68] Tom Delsey. *RDA Database Implementation Scenarios* (5JSC/Editor/2, 14 January 2007) http://www.collectionscanada.gc.ca/jsc/docs/5editor2.pdf
[69] Joint Steering Committee. *Strategic Plan for RDA, 2005-2009*, long term goal no. 2.

the web tool is mentioned as another meaning of "RDA, a standard for the digital world."

 A very important part of RDA's role as "a standard for the digital world" is its key goal to "provide a consistent, flexible and extensible framework for both the technical and content description of all types of resources and all types of content." Thus, RDA can be used to describe traditional resources, but it must also be able to describe new types of resources, whatever the content or media type. To accomplish this goal, it has to include an extensible framework that covers known types of resources, and can also be easily extended to record metadata about future types of resources, types of resources that have yet to be invented or developed. This aspect of RDA also responds to the content versus carrier issue and will be discussed in more detail to demonstrate how it resolves issues related to alternative formats and multimedia resources.

If one had to pick a single aspect that makes RDA different from AACR2, it must be the alignment with the FRBR and FRAD conceptual models. It is this alignment that is the key to understanding RDA's new approach to resource description and access and from which most of the changes originate. To summarize, one can think of RDA as a **r**adically **d**ifferent **a**pproach to resource description and access. The source of this radically different approach is the way RDA is built on the theoretical framework expressed in the FRBR and FRAD conceptual models. This theoretical framework acts as the road map for the standard. The conceptual models provide a sound framework for the analysis of problems in AACR2, and continue to act as a reference point against which to test the validity and logical consistency of new ideas, approaches and instructions.

5.2   FRBR in RDA

When one looks at the structure of RDA, one is immediately aware of the influence of the FRBR and FRAD conceptual models. The first four sections of RDA focus on the description of attributes, and sections 5 to 10 focus on the description of relationships.[70]

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[70] References to the text of RDA are to the text in the full draft, released in November 2008, for constituency review. http://www.rdaonline.org/constituencyreview/

Recording attributes
Section 1.   Recording attributes of manifestation and item
Section 2.   Recording attributes of work and expression
Section 3.   Recording attributes of person, family, and corporate body
Section 4.   Recording attributes of concept, object, event, and place

Recording relationships
Section 5.   Recording primary relationships between work, expression,
              manifestation, and item
Section 6.   Recording relationships to persons, families, and corporate bodies
Section 7.   Recording relationships to concepts, objects, events, and places
              associated with a work
Section 8.   Recording relationships between works, expressions,
              manifestations, and items
Section 9.   Recording relationships between persons, families, and corporate
              bodies
Section 10.   Recording relationships between concepts, objects, events, and
              places

Figure 5. RDA contents at the section level.

Looking at the way that the sections are organized, one can see that that the sections are separated according to the FRBR entities. The parts that map to the group 3 entities, subjects, are mostly placeholders, and are included in the structure of RDA in order to have a complete mapping between FRBR and RDA. The placeholders are areas that may be developed in the future.

If one looks at the structure within sections, there is more evidence of the alignment with FRBR. Looking at Section 1, the section is devoted to recording attributes of manifestation and item. The chapter structure within each section is then aligned with the user tasks. Each chapter in RDA gives instructions for the recording of metadata that corresponds to one particular user task:

Section 1.   Recording attributes of manifestation and item

Chapter 1.   General guidelines
Chapter 2.   Identifying manifestations and items   *FRBR task = Identify*
Chapter 3.   Describing carriers   *FRBR task = Select*
Chapter 4.   Providing acquisition and access information *FRBR task = Obtain*

Figure 6. Contents of Section 1 of RDA; chapters 2-4 are each aligned with one FRBR user task.

Each section begins with a chapter of general guidelines, and the general guidelines always include a section called *Functional Objectives and Principles.* The functional objectives relate the instructions of the section back to the user tasks, reinforcing the focus on the user and on how the user will utilize the data that is recorded according to the instructions in that section.

1.2 Functional Objectives and Principles

The data describing a manifestation or item should enable the user to:

a) *find* manifestations and items that correspond to the user's stated search criteria

b) *identify* the resource described (i.e., to confirm that the resource described corresponds to the resource sought, or to distinguish between two or more resources with similar characteristics)

c) *select* a resource that is appropriate to the user's requirements with respect to the physical characteristics of the carrier and the formatting and encoding of information stored on the carrier

d) *obtain* a resource (i.e., acquire a resource through purchase, loan, etc., or access a resource electronically through an online connection to a remote computer).

The very organization and structure of RDA constantly reflects how the FRBR conceptual model underpins RDA. The language of the instructions in RDA uses the concepts and terminology of the FRBR model. For example, instead of instructions about "physical description", RDA instructions address the description of carriers. Instead of "uniform titles", RDA distinguishes between recording a preferred title of a work and the preferred title of an expression. Alignment with the FRBR model has brought more precision to the language of the instructions. There have been criticisms that the language of RDA does not reflect the plain English which is a stated goal. However, the language of RDA strives first to reflect the correct theoretical understanding, and not to muddy concepts behind the instructions. This results in some instructions that appear bulky and complex. Where possible, the goal is to use plain English, and to simplify language, but not at the cost of confusing important theoretical distinctions. RDA also aims to move away from the language of the card catalogue, and thus terms such as "heading" are replaced with terms that are more appropriate to an online environment, such as "access points."

One might wonder with this radical reorientation of the standard if there are any ways in which one can see a link to the predecessor,

AACR2. With the new terminology, the alignment with the FRBR model, and the relationship of instructions to user tasks, every word has been rewritten. But, despite this transformation, there are many aspects of AACR2 that continue. The data recorded when following RDA instructions is not very different from the data recorded according to AACR2. There are some areas that are very different, such as the recording of content, media and carrier types, or recording authors for works of shared responsibility. But instructions on recording a simple title or date of publication are not fundamentally changed. The words used are different, the relationship of the instructions to each other is different, the theoretical context is different, but one still records data that continues to be important to the user.

If one compares the wording of a frequently used instruction as recorded in AACR2 and in RDA (full draft, Nov. 2008), one can see that the intent of the instruction remains the same, though the vocabulary and context have changed:

AACR2
21 Choice of Access Points
   21.30J2. Variant title.
   If considered necessary for access, make an added entry for any version of the title (e.g., cover title …) that is significantly different from the title proper.

RDA
2.3 Title
   2.3.6.3 Recording Variant Titles
   Record variant titles that are considered to be important for identification or access applying the basic instructions on recording titles given under 2.3.1

RDA also continues many strengths of AACR2. Both were developed in line with internationally accepted cataloguing principles, for AACR2, the Paris Principles, for RDA, the Statement of International Cataloguing Principles. Both encourage following common usage when not transcribing information, and aim to incorporate commonly held customs and conventions for citing works and recording authorship. The first release of RDA is seen as a starting point and continued development is envisioned, following the model of AACR2's successful amendment and development process.

RDA is the result of a thorough deconstruction of AACR2 and a rebuilding into a new standard. RDA uses many of the old building blocks, but rearranges them in a new structure and context that is

based on a sound and explicitly delineated theoretical framework, and thus quite different from AACR2.

5.3   RDA's approach to content and carrier

When the decision was made in April 2005 to completely align the standard with FRBR and name it RDA, there was already consensus that a new approach was needed to record media and content types to replace the general material designations of AACR2. There were still uncertainties about the exact framework to use and about the terminology. The Joint Steering Committee appointed a working group to identify and define terms for types of content and types of media, the GMD/SMD Working Group.

During the same period of time, there were meetings between representatives of the organizations responsible for RDA and ONIX. ONIX, which stands for *Online Information Exchange* is "the international standard for representing and communicating book industry product information in electronic form." [71] It is published and maintained by EDItEUR. The aim of the collaboration between the organizations was:

> … to develop a framework for categorizing resources in all media that will support the needs of both libraries and the publishing industry and will facilitate the transfer and use of resource description data across the two communities.[72]

The final reports from both groups were forwarded to the RDA editor, and aspects from each were drawn into the new document prepared by the RDA editor. This new document, *Categorization of content and carrier,* (5JSC/RDA/Part A/Categorization), proposed a categorization using three related elements for content, media and carrier types. This categorization became the basis for the framework that is now part of RDA.

Types of content, media and carrier

RDA replaces the GMDs and the classes of material with a new framework that consists of three elements: content type, media type, and carrier type. The information that the GMDs communicated was

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[71] EDItEUR. "ONIX for Books." ONIX website. http://www.editeur.org/onix.html
[72] *RDA/ONIX Initiative Update.* (27 September 2006).
http://www.collectionscanada.gc.ca/jsc/rdaonixann.html

useful information. Also the visibility of the GMD acted as an early warning signal to help the user differentiate between resources and select the most appropriate one. The problem with the GMDs was the inconsistent categorization. The terms used as GMDs represented attributes at the level of work, expression and manifestation. Since the GMD was inserted into the middle of the title and statement of responsibility area, its intrusion was minimized by using one single term. RDA acknowledges the importance of this information for the user, whether as a way to discover resources, or to limit searches. In the process of aligning with the FRBR model, RDA rigorously sorts out the data that is recorded, identifying the relationship between the data and the FRBR entity (or relationship) that is being described. Information that used to be conveyed through the general and specific material designations is now extended into a three-level framework, and this framework can provide a large number of combinations of data to cover current and future types of resources.

Developing the list of terms to be used in each element was a long task, and as can be seen in the history of RDA's development, was a process that received input and feedback from many sources. An appropriate list of terms means that each term must be appropriate for the element and its corresponding entity; the terms must be sufficiently differentiated one from another, and yet, together, they must cover all possible types without leaving gaps; the terms must all be at the same level of abstraction.

Content type

Content type is an expression-level attribute. The definition of content type demonstrates the correlation with the FRBR entity, expression:

> Content type reflects the fundamental form of communication in which the content is expressed and the human sense through which it is intended to be perceived. For content expressed in the form of an image or images, content type also reflects the number of spatial dimensions in which the content is intended to be perceived and the perceived presence or absence of movement. (RDA 6.10, Nov. 2008 draft)

Since the first explorations for a framework of terms by the Format Variation Working Group, there has been a need to return to the basic human senses and use them as the starting point for the categorization, deducting the fundamental forms of communication that are possible. In contrast, the GMDs had a very different

beginning, in 1974, as summarized by Jean Weihs who, with Ben Tucker, gave shape to the first list of GMDs:

> Our first decision was to develop a generic list of media designations that would minimize the disruption to library catalogues. This meant that the list of terms would be practical rather than theoretical or philosophical … General terms for designations should be selected to discourage a proliferation of terms when the technology of a particular type of material changed, but not so general as to be meaningless (e.g., record, film). Trade names must be avoided (e.g., microcard), and the terms must be in the singular to denote type of material rather than quantity.[73]

One can see the early decision to move the terminology away from the level of the manifestation to a more abstract level. But, to prevent disruption, terms in use in AACR1 were absorbed, and there was no rigorous model of the bibliographic universe against which to check the level of abstraction for the GMD terms.

RDA's definition of content type may seem a little philosophical, but it sets the scope for this element at a particular level of abstraction. This means that the terminology chosen must be terminology that is appropriate at this level. A difference in the content type signals a different expression. Thus, it must be terminology that keeps manifestations that are the same expression within the same category of content type, and manifestations that belong to different expressions, in different categories of content type.

The vocabulary used for content type:

    cartographic dataset
    cartographic image
    cartographic moving image
    cartographic tactile image
    cartographic tactile three-dimensional form
    cartographic three-dimensional form
    computer dataset
    computer program
    notated movement
    notated music
    performed music
    sounds
    spoken word

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[73] Jean Weihs. "A Somewhat Personal History of Non-book Cataloguing." *Cataloging &Classification Quarterly* 31, no. 3/4 (2001): 177.

still image
tactile image
tactile music
tactile notated movement
tactile text
tactile three-dimensional form
text
three-dimensional form
three-dimensional moving image
two-dimensional moving image
other
unspecified

Looking at the list, even without the definitions, it is striking to see content categorized by the form in which it is expressed and perceived. The terms used in content type capture the essence of the communication process.

A categorization that takes into account the sense that the user must exercise in order to access the content means that the categorization creates a distinction at a level that can very useful for someone with a disability associated with one of the senses. It is interesting to note the difference between the way AACR2 and RDA categorizes braille. In the early days of AACR2, "braille" was not even included in the list of GMDs. From the few instructions in chapter 2, one might consider a book in braille, instead of in print, as simply a difference at the level of manifestation. Yet, even though a print book and a braille book both use a notation system, they are expressed quite differently. One uses alphanumeric notation and the other uses tactile notation. They require the reader to use different senses. The differences between the two are quite significant. They may communicate the same content, but they are decidedly different forms of expression. Braille was later added to the list of GMDs. Braille is a type of tactile notation, and even though it is the most predominant, it is not the only type. It is also a type of notation that is not limited to language materials, but can also be used for notated music. The simple addition of "braille" to the list of GMDs was a stop-gap measure that did little to alleviate the broader problems about the level of specificity of GMD terms or the appropriate level of abstraction. There was also an attempt to address the extensibility of GMDs when a provision was made to add qualifiers to the GMDs for materials intended for the visually impaired:

> For materials for the visually impaired, add *(large print)* or *(tactile)*, when appropriate, to any term in list 2. Add *(braille)*, when appropriate, to any term in list 2 other than *braille* or *text*.
> … [cartographic material (tactile)]
> … [music (braille)]
> … [text (large print)]   (AACR2R 1.1C1)

This instruction added to AACR2 attempts seems to bring attention to the importance of communicating information about tactile forms of communication, but then it groups together "large print" and "tactile" or "braille", as if they were distinctions at the same level. On the one hand, more information can be communicated, but, on the other hand, there was further confusion of categories. Large print is a manifestation level distinction. Both regular print and large print books use alpha-numeric notation. The font size is different, and font size or type size is an attribute of the carrier; it distinguishes manifestations, not expressions.

Audiobooks use a different form of expression from either braille books or print books. The form of expression is spoken word instead of alpha-numeric or tactile notation. Audiobooks can be delivered on many different carriers, and when delivered as an electronic resource, can include a document type definition that permits non-sequential navigation. But at the level of content type, the significant aspect is that it is content delivered as spoken word, perceived through the sense of hearing.

By having the FRBR model as a reference point, against which to test the categories, RDA presents a set of vocabulary to use for content types that is consistent, with all the terms at a similar level of abstraction. By adding "other" and "unspecified", it aims to cover all possible types, so that something can always be recorded in this element. Content type is considered a core element, an element that should not be omitted, no matter how simplified the description.

Media type

The definition of media type is very succinct:

> Media type reflects the general type of intermediation device required to view, play, run, etc., the content of a resource." (RDA 3.2.1.1, Nov. 2008 draft)

It is an attribute of the carrier, and an attribute that distinguishes manifestations. The terms are at a lower level of abstraction, compared to the terms used for content types.

The vocabulary used for media type:

> audio
> computer
> microform
> microscopic
> projected
> stereographic
> unmediated
> video
> other
> unspecified

Media type is not a core element, though recording it is encouraged because it allows for better data retrieval and data sorting. It is more challenging to retrieve on the absence of data, rather than on the presence of data. The categories may appear redundant, and are not necessarily needed for display. For example, the term "unmediated" may be puzzling. Why record "unmediated"? Looking at just the one element in isolation, perhaps it is redundant. But media type functions as a part of a larger framework. These media type terms should be seen as categories within the larger framework of the three elements: content, media, and carrier types. It is the framework created through the three elements that allows the full description of all types of resources, and also permits sorting and navigation through large retrieval sets, based on the controlled vocabulary used in these elements.

Carrier types

Carrier type is also a manifestation-level attribute. The definition of carrier type is closely intertwined with media type, but is more concrete and specific than media type:

> Carrier type reflects the format of the storage medium and housing of a carrier in combination with the type of intermediation device required to view, play, run, etc., the content of a resource. (RDA 3.3.1.1, Nov. 2008 draft)

The carrier types are subdivided according to their media type:

Audio carriers
 audio cartridge
 audio cylinder
 audio disc
 sound-track reel
 audio roll
 audiocassette
 audiotape reel

Computer carriers
 computer card
 computer chip cartridge
 computer disc
 computer disc cartridge
 computer tape cartridge
 computer tape cassette
 computer tape reel
 online resource

Microform carriers
 aperture card
 microfiche
 microfiche cassette
 microfilm cartridge
 microfilm cassette
 microfilm reel
 microfilm slip
 microopaque

Microscopic carriers
 microscope slide

Projected image carriers
 film cartridge
 film cassette
 film reel
 filmslip
 filmstrip
 filmstrip cartridge
 overhead transparency
 slide

Stereographic carriers
 stereograph card
 stereograph disc

Unmediated carriers

card
flipchart
roll
sheet
volume

Video carriers
video cartridge
videocassette
videotape reel

other
unspecified

The list for the carrier types contains many familiar terms, terms that were used as specific material designations in AACR2. The element for carrier type is a different, separate element from the extent element. Thus, using RDA, the cataloguer is instructed to record a term as the carrier type, and the term is recorded using the precise vocabulary listed in 3.3.1.1. The terms are used in the singular, and with no further extensions or additions. The terms in the carrier type element are used as part of the framework for describing the type of resource. All three elements use controlled vocabulary. It is the use of precise terms (or the possibility of using codes instead) that will enable precision in searching.

The carrier type is not the same as the attribute for extent. In AACR2, the specific material designations (SMDs) formed part of the statement of extent. Thus, the terms could appear in the singular or plural, and sometimes with additions, such as "ms." for manuscript. RDA uses two different elements, one to record carrier type, using precise, controlled vocabulary, and another element, extent, to record the extent, using carrier types when appropriate, in the singular or plural as applicable, and also offering the possibility of using other terms:

> 3.4.1.5 Other Terms Used to Designate the Type of Unit
> Use a term in common usage (including a trade name, if applicable) to designate the type of unit
> > a) if the carrier is in a newly developed format that is not yet covered in the list under 3.3.1.2
> > b) if none of the terms listed under 3.3.1.2 is appropriate
> > *or*
> > c) as an alternative to a term listed under 3.3.1.2 , if preferred by the agency preparing the description.

One records carrier type in the element for carrier type according to strict guidelines, and there is the possibility to use a broader range of terms when recording the extent.

When RDA instructs the cataloguer to record the content and carrier type, the instruction includes this sentence: "Record as many terms as are applicable to the resource being described." Then the cataloguer is offered the alternative to record only the type that applies to the predominant part. The alternative permits continuity with practices already in place. But it is important to note that it is presented as an alternative, not as the main instruction. Where AACR2 forced the cataloguer to choose a predominant part, RDA opens up the description to include as many types as are applicable. When cataloguing a music CD, the resource will have one content type, performed music, but it is possible to record two media types: audio, computer; and two carrier types: audio disc and computer disc.

One might ask: "How does one record metadata about technical and content aspects when the community may not have agreed what to call a new type of resource?" It is important to remember that the cataloguer is instructed to record metadata about the type of content, media and carrier. RDA does not instruct on the use or display of the metadata. If the metadata is recorded, it can then be mapped to display in different ways. For example, if the metadata is recorded as content type=text, media type=unmediated, carrier type=volume, this could map to show the type of resource as "Book". Or it could be mapped to display an icon of a book. Likewise, if the metadata recorded were content type=moving image, media type=video, carrier type=online resource, it could map to show the type of resource as "streaming video". Not all communities will have to use the same labels. The terminology used to display the information can vary between different communities, so one community may want to take those three types and map it to display as "streaming video", and another to display it as "streaming media." A community could decide that only certain types or combination of types would display to the user. The types can also be mapped to a corresponding set of terminology in another language.[74] The underlying principle is

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[74] For example, librarians from the Deutsche Nationalbibliothek have been experimenting with introducing multi-lingual vocabularies in the NSDL metadata registry, identifying German language equivalents for content type vocabulary,mapping the terms to the English language vocabulary, and presenting both terms as equivalent properties or terms to be used for the same concept. http://metadataregistry.org/concept/list/sort/pref_label/type/asc/vocabulary_id/45.html http://metadataregistry.org/blog/2009/03/09/multiple-languages-and-rda/

consistency in recording the metadata and flexibility in displaying it. Another aspect of flexibility is the ease of making changes over time. One can map to a set of terminology and this terminology could be changed at a later date without changing the original metadata, just changing the mappings between the type and the display terminology. Tom Delsey made this point in the 2006 categorization document (5JSC/RDA/Part A/Categorization):

> Although the terms are designed to reflect common usage, it is recognized that usage varies from one community to another and changes over time. The terms used in the drafts should be treated simply as "labels" to designate the categories.
> … The instructions do not prescribe how the categories are to be displayed. The intent is to provide agencies using RDA flexibility to adapt displays to the needs and preferences of their user communities. Agencies may choose to be selective in which elements they display, and may display them either as separate elements or in combination. They may also choose to display the categories using different terms than those that are listed … The only requirement is that the elements be recorded so that they map directly to the categories as they are defined.[75]

The three elements of content, media and carrier types bring a logically consistent approach to the description of content and carrier. There is a clear and conscious distinction between the content type and the media/carrier types. By having a framework, one can record metadata about the type of resource even before the community has agreed upon a term to call it.

5.4   Recording Attributes and Relationships

RDA's new approach to the description of technical and content aspects of resources has a major impact on the multiple formats issue. There are other aspects of RDA that are not as directly connected to the resolution of the multiple formats issue, but do have an indirect effect, in terms of recording appropriate and useful metadata and improving access to resources, including alternative formats and multimedia resources.

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[75] Tom Delsey. *Categorization of Content and Carrier* (5JSC/RDA/Part A/Categorization, August 4, 2006): 4. http://www.collectionscanada.gc.ca/jsc/docs/5rda-parta-categorization.pdf

5.4.1 Recording attributes

RDA has a different structure from AACR2. The organization of the sections, and of the chapters within the sections, displays a conceptual alignment with the FRBR and FRAD models. In addition, RDA is a content standard, and not a display standard. In contrast, AACR2 instructed the cataloguer how to record the data, and also how to display the data. Each chapter was organized according to the ISBD areas. AACR2 rules referred to areas, and to elements that belonged to a specific area. RDA has an organization that corresponds to FRBR entities and user tasks. RDA refers to "elements" and each element stands on its own. RDA emphasizes the recording of independent, separate units of bibliographic information. It moves away from the concatenation of different units of information into one long string. Segmentation of data into independent elements allows greater flexibility for the display of data, and also in refining searches. It opens up the possibility of using any data element as a means to assist the user to navigate to the appropriate resource.

Many of the data elements in RDA correspond to information that was recorded in AACR2. However, AACR2 had less granularity in terms of recording the data. Different types of information were recorded in the same place. If one looks at the element "other physical details", part of the physical description area, there is a range of distinct units of information that can be recorded here, from information about illustrative content when describing a book, to details about base material, applied material, projection speed, track configuration, etc. It is difficult to use AACR2's "other physical details" as a fruitful way to improve searching, because there are too many different types of information all recorded in the same place. RDA segments the data into separate data elements. Thus, when one looks at chapter 3, Describing carriers, RDA includes a large set of data elements, each identified separately. Different kinds of data are recorded in appropriate elements that are unambiguously defined and identified. RDA creates the potential to use this data for searching and data display. A search interface has only to take advantage of these clearly labelled and differentiated data elements in order to be able to bring a higher level of precision to searches.

There are times when RDA seems to have slightly redundant data elements. The cataloguer is instructed to record similar data in different elements. One example was mentioned above, where carrier type and extent are separate elements, but appear to overlap. The

carrier type term is recorded in the element for carrier type within the parameters of a strictly controlled vocabulary, in order to permit this element to function as part of the framework for technical and content description. It ensures precision when searching or filtering results. The carrier type is also recorded in the element for extent, but here the cataloguer uses the carrier type term in conjunction with numbers, to indicate extent, in the singular or the plural, and also has the option to use other terms in common usage. The two data elements do not really overlap because each has different scope and purpose. They each support the user task of identifying and selecting the appropriate work, but in different ways.

Looking at the carrier type terms, these terms are still fairly general. They apply to the carrier; they are appropriate as a manifestation level attribute. They permit the user to narrow the search to a particular carrier type. They allow the user to identify the type of resource in more detail than the GMDs and SMDs of AACR2. However, there may be additional pieces of information that are of critical importance to the user. For example, terms such as "computer disc" or "online resource" may lead the user towards a relevant subset, but may still not be sufficient for the user to determine if the resource is accessible. The other data elements that describe the carrier, while not part of the framework for identifying technical and content types, are also available for searching, because they are recorded as independent data elements, and these data elements are unambiguously identified. In AACR2, many important pieces of information were buried either in concatenated strings of data, or in elements such as general notes that could not be rigorously identified and separated out for the purpose of navigation or data display.

For example, RDA includes a data element called encoding format (3.19.3). The cataloguer is encouraged to record the encoding format if it is important for identification or selection. DAISY is a good example of information that makes a significant difference to the user and should be recorded. Encoding format is also an element where the cataloguer is first presented with a preferred list of terms from which to choose, for example, DAISY, DVD audio, MP3, Excel, JPEG, XML, DVD-R. Standardized terminology improves the precision and accuracy of searches, and RDA encourages the cataloguer to pick a term from the list. The cataloguer is not limited to the listed terms: "If none of the terms listed above is appropriate or sufficiently specific, use a term designating the encoding format as concisely as possible." In addition, the cataloguer is also encouraged to record the version of the format:

"Record the version of the format if it affects or restricts the use of the resource." The example given is: DAISY 3.0.

There are several data elements with which to record other significant information about electronic resources, such as file type (3.19.2), file size (3.19.5), regional encoding (3.19.4), to name just a few. RDA provides the same broad range of data elements to record projection characteristics, video characteristics, sound characteristics, etc. RDA also includes a separate element to record equipment and system requirements (3.20). RDA does not limit the number of data elements that can be used. Thus, one can fully describe all aspects of the resource, recording all the information required for identification and selection.

RDA considers the "tactile" dimension of a resource as an aspect of its content. A tactile resource is a different form of expression from an audiobook or a printed book. There are provisions for recording a full range of tactile content types, from cartographic tactile image to tactile music. The content type is then coupled with the media and carrier type to give more precise information. Tactile content is delivered on media and carrier types that are also used to deliver other content types. A braille book will have the content type "tactile text", media will be "unmediated", and the carrier will be "volume". More detailed information is recorded in other data elements. RDA includes separate data elements for recording the production method for tactile resources (3.9.3.), and for the layout of tactile text (3.11.4). Since the content may be tactile music, there is also a data element to record the layout of tactile musical notation (3.11.3). There is a data element for the form of tactile notation (7.13.4), to record the form of tactile notation used to express the content, such as braille code, mathematics braille code or tactile musical notation. Here, one can also record the level of contraction, such as uncontracted or grade 2, etc.

Audiobooks are similar to tactile resources. Spoken word is an important distinguishing characteristic at the level of content type, but the media and carrier types are the same as those used to deliver other content types. Spoken word content is delivered on media and carrier types that are also used to deliver other categories of auditory content, such as sound and performed music.

The aspect of "large print" is a manifestation level attribute. In FRBR, it is called type size, and in RDA, it is called font size (3.13). The

instruction on recording font size encourages the use of one of the listed terms: giant print, large print. It includes the option of specifying the dimension of the type, measured in points. The example given is: giant print (36 point). Again, the cataloguer is allowed to use another term if the two listed terms are not appropriate or sufficiently specific. However, the wording of the instruction encourages the use of a standardized term, since the use of a standardized term will enhance the ability to narrow down and select the appropriate resource.

The data recorded in RDA is often similar to the data recorded using AACR2. However, RDA instructions always point to how the data is likely to be used. RDA encourages the recording of all elements that may be of use in the identification and selection of the appropriate resource. RDA is also very different in the potential it creates to use all data elements much more extensively, by segmenting the data, and associating data elements with FRBR entities. The FRBR model clearly indicated the relationships between attributes and the fulfillment of user tasks. All attributes that assist the user must be clearly spelled out as distinct data elements. The distinct data elements allow for improved searching and display of information.

RDA has also moved away from descriptive practices that might hinder a user's ability to understand the data that was recorded. Thus, Latin abbreviations, such as S.l., s.n., and et al. are abandoned and the cataloguer is instructed to use short descriptive phrases, such as "Place of publication not identified."

An additional aspect of the section on recording attributes in RDA also relates to the online environment. This aspect is not about resource discovery, but about the re-use of metadata. The introductory chapter of RDA includes a section on the objectives and principles that have guided the design of RDA. One of the fundamental principles is the principle of representation. The influence of this principle can be seen in the instructions on transcription. Like AACR2, certain data should still be transcribed. RDA takes this a step further. For example, the instruction for recording the edition statement makes no mention of abbreviations: "Transcribe an edition statement as it appears on the source of information." (2.5.1.4) Thus, if "3rd ed." is on the title page, I transcribe: 3rd ed.; if "Third edition" appears on the title page, I transcribe: Third edition. AACR2 combined transcription with the space limitations of the catalogue card. RDA sheds these limitations, and also puts itself more in line with the possibility of re-using metadata. In

1.7.1, General guidelines on transcription, RDA includes this alternative:

> If data is derived from a digital source of information using an automated scanning, copying, or downloading process (e.g., by harvesting embedded metadata or automatically generating metadata), transcribe the element as it appears on the source of information, without modification.

RDA was developed as a standard for use in the online environment, and one of the realities of the online environment is the capability to re-use metadata. RDA purposefully includes instructions to support the re-use of metadata.

5.4.2 Recording relationships

RDA puts a strong emphasis on the importance of recording relationships. Bibliographic relationships are the key to navigating through large catalogues and databases, and to the clear display of search results. This section will just touch on a few topics that may be of particular interest to those who catalogue resources for users with print disabilities.

RDA places no limits on the number of access points for a work. It eliminates the "rule of three". RDA takes as the default instruction that one records all the names of persons, families and corporate bodies that are responsible for the work, expression or manifestation. It offers the option to omit names if there are more than three, but does not make this instruction the basic instruction (2.41.5) Likewise, there are no restrictions on the number of access points that can be recorded. RDA even goes a step further: when creating the preferred access point for a collaborative work, there is an alternative instruction where one can include all the names of the creators as part of the preferred access point:

> Include in the preferred access point representing the work the preferred access points for all creators named in resources embodying the work or in reference sources (in the order in which they are named in those sources), formulated according to the guidelines and instructions given under **9.1.1 , 10.10.1 ,** or **11.12.1 ,** as applicable.

> *Example*:
>
> > Gumbley, Warren, 1962– ; Johns, Dilys; Law, Garry. Management of wetland archaeological sites in New Zealand

Resource described: Management of wetland archaeological sites in New Zealand / Warren Gumbley, Dilys Johns, and Garry Law

RDA encourages the recording of relationships, and it also provides a controlled vocabulary to designate the types of relationships. AACR2 records do record many relationships, but the nature of the relationship must often be ascertained by reading the record. To use information about the bibliographic relationships in an online environment, it is important to add data about the nature of the relationship. Promoting the use of a controlled vocabulary means that this information is present, and it is present in a recognizable form, so that it can be picked up by automated processes and used for navigation and data display.

RDA has three appendices of relationship designators:

Appendix I:	Relationships between a resource and persons, families and corporate bodies associated with the resource
Appendix J:	Relationships works, expressions, manifestations and items
Appendix K:	Relationships between persons, families and corporate bodies

The relationship designators, especially the designators in appendices I and J, can be very useful when trying to distinguish between resources. The relationship designators are organized according to FRBR entity, to facilitate choosing the appropriate term. Appendix K is particularly useful when working with authority data.

The designators listed in Appendix I are intended to be recorded in conjunction with the access point for the person, family or corporate body. If one looks at the terms used in Appendix I, there are the expected terms for the creator of a work, such as author, composer, cartographer. There are also terms for other types of relationships to the work, such as production company, issuing body. There are designators at the expression level: persons, families or corporate body who have contributed to the creation of an expression, such as abridger, editor, recording engineer, translator, transcriber, performer. This last term, performer, can also be specified more narrowly as actor, commentator, narrator, speaker, teacher. There are also persons, families or corporate bodies whose contribution may be at the manifestation level, by having a role in manufacturing or publishing of the manifestation: braille embosser, lithographer, broadcaster. In

addition, there are the item level relationship designators, terms that are currently frequently used in the cataloguing of rare and special collections, such as former owner, illuminator, inscriber.

One can easily imagine someone wanting an audiobook with a particular narrator, or a DAISY digital talking book produced by a particular corporate body, etc. The relationship designators improve access to the resource by providing an additional way to sort through results and cluster results. Thus an actor may appear in many films, may have written an autobiography, and may have illustrated children's books. But the user wants only the resources where that actor was the narrator for an audiobook. In current catalogues, there is no clustering according to the type of relationship. The name is somehow associated with the resource, and there is no way to way to discern the relationship without reading the record. Relationship designators will improve access for all users, including those with print disabilities.

The relationship designators in appendix J can be used in many ways, including in conjunction with access points. Most of the designators focus on the relationships between works and expressions. But there are also terms at the manifestation and item levels. The terms are organized both according to FRBR entities and according to the type of relationship: derivative, descriptive, whole-part, accompanying, and sequential. The terms are also given in two matching but different forms to indicate the direction of the relationship. Thus, one can record work A is a "dramatization of" work B, and one can also record that work B has been "dramatized as" work A. Some examples of these relationship designators are: abridgment of, translation of, electronic reproduction of, digital transfer of, etc. The use of controlled vocabulary means that automated processes can be programmed to pick up this vocabulary and cluster resources, possibly with the addition of labels, so that the user can quickly grasp how the resources are related.

RDA encourages the recording of sufficient data, and reinforces the association between data elements and FRBR entities. It also encourages the construction of preferred access points to identify works and expressions. Chapter 25 in AACR2 did address access points for works, and also made some small and uneven attempts to identify expressions, in 25.5, Additions to uniform titles. The FRBR model identifies the role of the expression entity and demonstrates that it is an important entity for the user. Cataloguing with AACR2, data was

recorded about attributes that we now identify as attributes of the expression, but it largely ignored expression at the level of access points, except for translations, and some additions to sacred scripture uniform titles. RDA includes instructions for the construction of access points to represent both a work and a particular expression of a work. "If it is considered important for identification to name the particular expression, construct a preferred access point representing the expression as instructed under 6.27.3." At 6.27.3, RDA instructs how to construct this access point: by extending the preferred access point for a work, and adding, as applicable:

a) a term indicating content type (see **6.9**)
b) the date of the expression (see **6.10**)
c) a term indicating the language of the expression (see **6.11**)
and/or
d) a term indicating another distinguishing characteristic of the expression **6.13**

RDA opens up the choice of additions to the preferred access point for the work, so the cataloguer is not limited to giving access to only type of expression, the translations. The cataloguer is now able to construct preferred access points that will collocate all the expressions of a work, and will also distinguish between the expressions. One of the examples given in RDA particularly illustrates the importance of this guideline for works available in alternative formats:

Brunhoff, Jean de, 1899–1937. Babar en famille. English. Spoken word

Resource described: Babar and his children. *An audio recording of an English translation of the children's story* (6.27.3)

The preferred access point relays a lot of information to the user. In this case, the user knows the relationship to the original work, knows that it is a translation into English, and knows that the form of expression is spoken word. The preferred access point for an expression is also a powerful tool for the collocation of results. It brings together all the manifestations that embody the work, but it also organizes the result set according to the different expressions. Thus the results retrieved by the user, even without new advanced search interfaces, are clearly understandable, and easily navigable.

6.   Potential impact for resource discovery and data display: experiments with FRBR-ization

RDA encourages the recording of sufficient metadata and parses the data into data elements. RDA does not dictate how the metadata is displayed, nor how the search engine will use various elements to refine a search and drill down to the appropriate resource. But the use of RDA is intended to support and strengthen this new generation of navigation and of data display.

Many researchers and vendors have started to investigate and promote "FRBR-ized" displays of data. "FRBR-ization" means an application of the FRBR conceptual model in a real environment. Most current FRBR-izations use data in AACR/MARC records and apply some of the FRBR concepts to improve displays. A full FRBR-ization will require sufficient metadata recorded about the work, expression and manifestation level attributes, and a sufficient parsing of data into separate elements to permit manipulation of data for use in designing better navigation and better data displays. However, even with the available pre-RDA data, it is encouraging to see how an awareness of FRBR can already lead to better data displays.

Carlyle and Sumerlin summarize one of the major obstacles confronting users of current catalogues:

> Many current catalog searches result in displays composed of lists of hundreds or even thousands of records. These lists do little to shed light on the nature and characteristics of the records retrieved. In addition, it is likely they inhibit a user's ability to identify relevant records. Displays that organize retrieved record sets into intelligible categories may communicate search results more quickly and effectively to users than current catalog displays that consist of long lists of brief record summaries.[76]

Carlyle and Sumerlin also point to a possible solution, better clustering of results in order to present a meaningful display to the user. The effective organization of information hinges on collocating those resources that share a similar attribute and also making clear the differences between them.

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[76] Allyson Carlyle and Joel Summerlin, "Transforming Catalog Displays: Record Clustering for Works of
Fiction." *Cataloging & Classification Quarterly*,33, no. 3 (2002): 14.
http://dx.doi.org/10.1300/J104v33n03_02

> The essential and defining objective of a system for organizing
> information, then, is to bring essentially like information together and to
> differentiate what is not exactly alike.[77]

Unfortunately, many current OPACs do not fulfill this objective well and
return long lists of unintelligible results. Or in Patrick Le Boeuf's words:

> The wonderful syndetic structure of printed catalogs has yielded to
> databases that are barely more than collections of unrelated monads.[78]

When the Format Variation Working Group was appointed, one of its
first tasks was to explore the viability of expression-level cataloguing.
As part of the background to inform this work, members of the Group
analyzed sets of existing MARC records to see if the data recorded in
each field and subfield was consistently describing an attribute at the
level of work, expression, manifestation or item. They discovered
many areas of ambiguity and overlap.

> However, most participants expressed some surprise at the difficulty of the
> exercise, especially given that most examples were known expression
> sets (i.e. there was no question that all of the manifestations represented
> the same expression) ... As a result of this exercise, the Group affirmed what
> has been observed by many … : while in many cases it is possible for a
> cataloger to identify easily when several manifestations represent the same
> intellectual content (i.e. the same expression), the bibliographic data does not
> always "behave" in a way that is conducive to constructing a bibliographic
> record for an expression that would include predictable data elements. [79]

The *Functional Analysis of the MARC 21 Bibliographic and Holdings
Formats* [80] mapped the correlations between MARC and FRBR. The
mappings also demonstrated that there were areas of ambiguity and
overlap. Some MARC elements do not map to anything in the FRBR
model, such as MARC elements for record processing. Some FRBR
attributes do not map unambiguously into MARC, or may be recorded
in non-specific textual fields, such as general notes. The MARBI
discussion paper 2002-DP08, *Dealing with FRBR Expressions in MARC*

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[77] Elaine Svenonius. *The Intellectual Foundation of Information Organization* (Cambridge, Mass. :
MIT Press, 2000): 11.
[78] Patrick Le Bœuf. "FRBR: Hype or Cure-All?" *Cataloging & Classification Quarterly* 39, no. 3/4
(2005): 4.

[79] JSC Format Variation Working Group. *Interim Report, October 8, 2001*. (4JSC/Chair/71/Chair
follow-up, 9 October 2001): 6-7. http://www.collectionscanada.gc.ca/jsc/docs/forvarwg3.pdf
[80] Network Development and MARC Standards Office, Library of Congress. *Functional Analysis
of the MARC21 Bibliographic and Holdings Formats.* (April 6, 2006).
http://www.loc.gov/marc/marc-functional-analysis/functional-analysis.html

21, points out that half of the expression-level attributes in FRBR do not have a specific MARC 21 field to contain them.[81] Attributes of different entities are sometimes mixed or concatenated in one MARC data field. Strings of data in the same field that carry information about more than one entity make it harder to manipulate the data for use in creating meaningful clusters.

Ed O'Neill, a research scientist at OCLC, conducted a study to evaluate whether the bibliographic information in WorldCat MARC records was sufficient to identify FRBR entities and to allow a FRBR-ized display of search results. He chose a single work, *The Expedition of Humphry Clinker* by Tobias Smollett.[82] He concluded that works can be reliably identified based on current information in bibliographic records, but expressions cannot be reliably identified because information is often missing:

> The FRBR model provides a powerful means to improve the organization of bibliographic items, particularly for large works such as *Humphry Clinker* where there is no way to navigate easily within the work. *Works* are a valuable concept and provide a means by which to aggregate bibliographic units and simplify database organization and retrieval. It appears that works can be reliably identified from existing bibliographic records. Identifying *expressions*, however, is far more problematic. In the example of *Humphry Clinker*, the set of expressions created from the existing bibliographic records is very different from the set based on the physical examination of the books themselves ... Existing bibliographic records simply do not contain sufficient information to consistently associate the records with expressions.[83]

The available data has limitations. Current FRBR-izations of MARC record catalogues can only achieve partial success. Yet, even with the limitation of imperfectly recorded data, the application of FRBR concepts immediately improves the results for users.

OCLC has been a front-runner in experimenting with possible, current applications of the FRBR model. They have launched a very successful

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[81] JSC Format Variation Working Group. *Discussion Paper no. 2002-DP08: Dealing with FRBR Expressions in MARC 21.* http://www.loc.gov/marc/marbi/2002/2002-dp08.html

[82] Edward T. O'Neill. "FRBR: Functional Requirements for Bibliographic Records: Application of the Entity-Relationship Model to *Humphry Clinker*." *Library Resources & Technical Services* 46, no. 4 (October 2002): 150-159.
http://www.ala.org/ala/mgrps/divs/alcts/resources/lrts/archive/46n4.pdf
Also available at the OCLC research archive:
http://www.oclc.org/research/publications/archive/2002/oneill_frbr22.pdf

[83] Ibid, 25.

service called xISBN. This service builds on the relationship between manifestations of the same expression. Each manifestation of a book has its own identifier number, its own ISBN. Users may need one particular manifestation, but often they are searching for a copy of a particular expression. In a pre-RDA application of the FRBR model, OCLC uses an algorithm to pull together related ISBNs.

> The xISBN Web service supplies ISBNs and other information associated with an individual intellectual work that is represented in WorldCat. Submit an ISBN to this service, and it returns a list of related ISBNs and selected metadata … , rather than requiring an end user to traverse multiple records that represent many different manifestations of a book—including printings, hardback or paperback editions or even filmed versions—"FRBRized" WorldCat information allows that user to review a core record that lists all manifestations.[84]

RDA will encourage the recording of sufficient metadata so that one can cluster manifestations of the same expression. At this point, MARC records have a varying amount of data with which to work, and thus clustering by expression has uneven results. The xISBN service adds an additional amount of clustering by pulling together manifestations of the same "intellectual work". It does not claim to sort out expressions of the same work. Since ISBNs are assigned to books, it does in effect cluster together all the expressions in the form of alpha-numeric notation.

OCLC has also applied some FRBR-ization to WorldCat, in its display of metadata for works with many manifestations. Again, with imperfect metadata, the clustering misses titles that should be in the set, but it demonstrates how the principle of understanding the relationships between the group 1 entities can improve the user experience. Thus, if I search "Robinson Crusoe", I retrieve results that are fairly well grouped:

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[84] OCLC. *xISBN (Web Service).* http://xisbn.worldcat.org/xisbnadmin/index.htm

Figure 7. Screenshot from OCLC WorldCat illustrating results when searching for "Robinson Crusoe."

Under the first title, the user is given the option to "View all editions and formats". This will then lead to a hit list of over three thousand "editions". These are a mixture of different expressions and manifestations. There are different forms of expression: alpha-numeric notation, tactile notation and spoken word. There are different languages of expression: 62 languages. There are different manifestations of each expression, with different media and different carriers. The hit list itself is not clustered, but WorldCat offers facets in the left pane. The facets are based on the AACR2 classes of material, augmented by additional MARC coded information. Thus, one can pull out a subset of the 11 braille titles:

Showing all editions for 'Robinson Crusoe' > 'Braille'   Published Date (Newest First) ▼

Displaying Editions **1 – 7** out of **7**

Select All Clear All Save to: [New List] ▼ Save

	Title / Author	Type	Language	Date / Edition	Publication
☐ 1.	**Robinson Crusoe** by Daniel Defoe	Braille book : Fiction	English	1994	Washington, D.C. : National Braille Press Inc.
☐ 2.	**Robinson Crusoe** by Daniel Defoe	Braille book : Fiction	English	1992	New York : Knopf
☐ 3.	**Robinson Crusoe** by Daniel Defoe	Braille book : Fiction	English	1992	Newark, N.J. : New Jersey Commission for the Blind and Visually Impaired
☐ 4.	**Robinson Crusoe** by Daniel Defoe	Braille book : Fiction	English	1967	Louisville, KY : American Printing House for the Blind
☐ 5.	**Robinson Crusoe** by Daniel Defoe	Braille book : Fiction	English	1964	New York : Scholastic
☐ 6.	**The life and strange surprising adventures of Robinson Crusoe** by Daniel Defoe; E Boyd Smith	Braille book : Fiction : Juvenile audience	English	1909	Boston, Houghton Mifflin
☐ 7.	**Robinson Crusoe** by Daniel Defoe	Braille book	English		London : Royal National Institute for the Blind

Figure 8. Screenshot from OCLC WorldCat illustrating search for "Robinson Crusoe"; results for "all editions and formats" further refined by using the facet "braille."

OCLC has worked with the existing metadata. It is encouraging to see how the display of metadata can be improved by applying FRBR concepts even within the current AACR2 and MARC21 environment. The displays are limited by the coding in the records. The coding for content and carrier is based on the AACR2 classes of material, thus the categories or facets display an unevenness of differentiation and similarity. For example, braille and large print appear as equal subsets of "book", even though they are different expressions. The set under "book" is not necessarily content in alphanumeric notation, but can include tactile notation and spoken word expressions. One can limit by sound recording or Internet resource, but not both simultaneously, thus making it more difficult to zero in on a set of audiobooks in computer media. Also, insufficient data means that not all records cluster in the right place. Thus, there is one large retrieval set for the search "Robinson Crusoe", but further down the hit list is another set of 31 records that should have been part of the first set. However, even with these limitations, any attempt to highlight the relationships between the manifestations, and to cluster the results using the FRBR conceptual model dramatically improves the user's search experience.

OCLC has also experimented with a subset of metadata for works of fiction in a prototype database called FictionFinder.[85] FictionFinder uses FRBR concepts to shape the display of data, and to cluster results to enable easier navigation. With the WorldCat cluster, WorldCat showed a manifestation level record, and pointed to the existence of other editions with the button labelled: "View all editions and formats". FictionFinder uses a work-level display as the entry point into the cluster:

Robinson Crusoe.
Defoe, Daniel, 1661?-1731

2363 editions, in 62 languages, held by 33076 libraries

Summary:	During one of his several adventurous voyages in the 1600s, an Englishman becomes the sole survivor of a shipwreck and lives for nearly thirty years on a deserted island.
Genres:	Adventure fiction | Robinsonades | Romans à clef | Adventure stories | Sea stories | Historical Fiction
Characters:	Crusoe, Robinson (Fictitious character)
Settings:	England | Foreign countries | Pacific Ocean | Scotland | 1600 - 1699 | 1700 - 1799 | 1800 - 1899 | 1831 | 1870 - 1950 | 1939 - 1945 | Atlantic Ocean | England — London [+] | Since 1950 | South America
Subjects:	Survival after airplane accidents, shipwrecks, etc | Castaways | Shipwrecks | Islands | Adventure and adventurers | Chapbooks, English | Solitude | Naufragios — Novela [+] | Spanish language | [More]
Wrote As:	Johnson, Charles
Audience:	Kids General Special

Editions	Genres	Characters	Settings	Subjects

Narrow by Languages: All (2363)   Narrow by Format: Show All

	Title / Author	OCLC #	Date	Language	Format	Aud.	Libraries ▾
1.	Robinson Crusoe / Daniel Defoe ; an authoritative text, backgrounds and sources, criticism, edited by Michael Shinagel	01516741	1975	English	Book	General	
2.	Robinson Crusoe / by Daniel Defoe ; with illustrations by N.C. Wyeth	09683035	1983	English	Book	Kids	
3.	The life and strange surprizing adventures of Robinson Crusoe of York, mariner Daniel Defoe ; edited with an introduction and notes by J. Donald Crowley	47010709	1998	English	eBooks	General	
4.	Robinson Crusoe. With illustrations of the story by Thomas Stothard, together with a foreword by Arthur D. Howden Smith	05465008	1946	English	Book	General	
5.	Robinson Crusoe / by Daniel Defoe ; illustrated by Julek Heller	39001243	1998	English	Book	Kids	
6.	The life and adventures of Robinson Crusoe. Illustrated by Roger Duvoisin; introduction by May Lamberton Becker	01423467	1946	English	Book	Kids	
7.	The life and strange surprising adventures of Robinson Crusoe of York, mariner: edited with an introduction by J. Donald Crowley	00993935	1972	English	Book	General	
8.	Robinson Crusoe / with illus. by N.C. Wyeth	06301856	1957	English	Book	General	
9.	The life and strange surprising adventures of Robinson Crusoe, by Daniel Defoe, illustrated by Lynd Ward	04440199	1946	English	Book	Kids	
10.	Robinson Crusoe : Daniel Defoe ; edited by Michael Shinagel	27429363	1994	English	Book	General	
11.	Robinson Crusoe by Daniel Defoe	49293345	1996	English	eBooks	General	
12.	Robinson Crusoe / Daniel Defoe ; illustrated by N.C. Wyeth	49283980	2003	English	Book	Kids	
13.	Robinson Crusoe by Daniel Defoe	57028449	1998	English	Book	General	

Figure 9. Screenshot from OCLC FictionFinder illustrating work-level display for *Robinson Crusoe.*

Again, it allows one to limit the search by language or format, and so achieves a partial improvement in navigation and display. The clustering works well at the work level, but it remains difficult to show the user which expressions are available, and to demonstrate clearly which manifestations belong to the same expression.

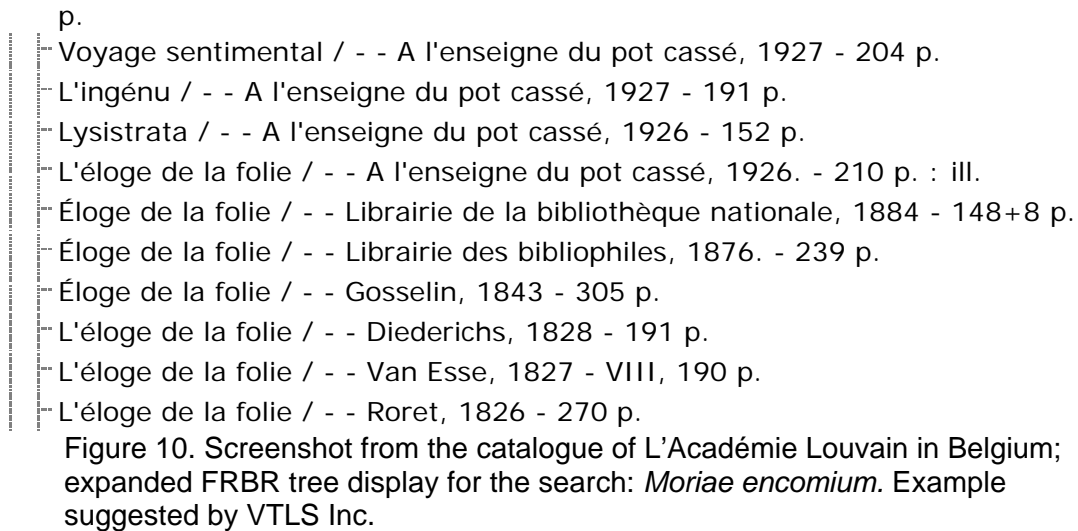[85] OCLC Research. *FictionFinder Prototype.* Beta version. http://fictionfinder.oclc.org/

There has been some exploration of the applicability of FRBR by several integrated library system vendors. VTLS is a pioneer in this area The VTLS library management system called Virtua has the capability to return results in more rigorous clusters, using a database structure of separate, linked work, expression and manifestation level records. The catalogue has a feature that allows the user to open up a "FRBR tree". This display groups together expressions of the same manifestation:

Expansion of the FRBR tree for the title *Moriae encomium* in the catalogue of L'Académie Louvain in Belgium[86]:

- **Moriae encomium - Erasmus Roterodamus, Desiderius, 1469-1536**
  - Books - Dutch -
    - De lof der zotheid / - - Wereldbibliotheek, 1973. - 182 p. ; 21 cm.
    - Moriae encomium, dat is De lof der zotheid / - - Manteau, 1971 - VII, 331 p. : ill. ; 19 cm.
    - De lof der zotheid / - - Wereldbibliotheek, 1969 - 184 p. : ill.
    - De lof der zotheid / - - De Nederlandsche boekhandel, 1947 - 176 p.
  - Books - English -
    - The praise of folly / - - 1913 - XXIII, 188 p. ; 19 cm.
  - Books - French -
    - Éloge de la folie / - - Castor astral, 1991 - XI, 204 p. ill.
    - Éloge de la folie / - - Tarbrag, 1958? - 208 p.
    - Éloge de la folie / - - Club français du livre, 1957 - 243, [1] p.: ill.
    - L'éloge de la folie / - - Garnier, 1953. - XII-189 p.
    - Éloge de la folie / - - Ed. de Cluny, 1947 - XXVIII, 169 p. : ill.
    - L'éloge de la folie / - - Terres latines, 1945 - 135 p. : ill.
    - Éloge de la folie / - - Office de publicité, 1943. - 84 p.
    - Éloge de la folie / - - Ed. du Rond-point, 1942 - 199 p.
    - L'éloge de la folie / - - Garnier, 1937. - XII, 327 p.
    - L'éloge de la folie / - - A l'enseigne du pot cassé, 1933 - 204 p. ; 18 cm.
    - L'éloge de la folie / - - A l'enseigne du pot cassé, 1930 - 226 p. : ill.
    - Jacques le fataliste et son maître / - - A l'enseigne du pot cassé, 1929 - 2 v.
    - Les affinités électives / - - A l'enseigne du pot cassé, 1929 - 2 v.
    - Mademoiselle de Scudéry et Salvator Rosa / - - A l'enseigne du pot cassé, 1929 - 216 p.
    - Aventures de Lazarille de Tormès / - - A l'enseigne du pot cassé, 1929 - 252

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[86] Display from BORéAL, the catalogue of Bibliothèque on-line Réseau de l'Académie Louvain http://boreal.academielouvain.be ; search example taken from the VTLS Virtua PowerPoint presentation: VTLS Inc. *Enriched user searching: FRBR as the next dimension in meaningful information retrieval.* (2008). http://www.vtls.com/media/en-US/presentations/Virtua_Enriched_User_Searching.ppt

p.

- Voyage sentimental / - - A l'enseigne du pot cassé, 1927 - 204 p.
- L'ingénu / - - A l'enseigne du pot cassé, 1927 - 191 p.
- Lysistrata / - - A l'enseigne du pot cassé, 1926 - 152 p.
- L'éloge de la folie / - - A l'enseigne du pot cassé, 1926. - 210 p. : ill.
- Éloge de la folie / - - Librairie de la bibliothèque nationale, 1884 - 148+8 p.
- Éloge de la folie / - - Librairie des bibliophiles, 1876. - 239 p.
- Éloge de la folie / - - Gosselin, 1843 - 305 p.
- L'éloge de la folie / - - Diederichs, 1828 - 191 p.
- L'éloge de la folie / - - Van Esse, 1827 - VIII, 190 p.
- L'éloge de la folie / - - Roret, 1826 - 270 p.

Figure 10. Screenshot from the catalogue of L'Académie Louvain in Belgium; expanded FRBR tree display for the search: *Moriae encomium.* Example suggested by VTLS Inc.

Network Development and MARC Standards Office for the report*Displays for Multiple Versions from MARC 21 and FRBR.*

Based on the *Functional Analysis of the MARC 21 Bibliographic and Holdings Formats,* and extending this analysis, the Network Development and MARC Standards Office at the Library of Congress explored how a FRBR-ized display might affect multiple versions.[87] The examples are mock-ups but they demonstrate a way to communicate information about the relationships between manifestations by using a hierarchical clustering to distinguish between works, and between expressions. Since the examples are mock-ups, they do not have to rely on existing data in bibliographic records. Instead, they can focus attention on the advantages of recording sufficient metadata to enable unambiguous and meaningful displays of bibliographic data. They point to the quality of clustering that RDA data aims to support.

Possible Hierarchical Display   **Level**

Ondaatje, Michael, 1943?
The English patient.   [Work]
Text - English   [Expression]
   The English patient / Michael Ondaatje.   [Manifestation]
      Imprint: Thorndike Press ; Chivers Press, 1997.
      Physical description: 455 p. (large print) :
                  ill. ; 23 cm.
      ISBN: 0786211512 (U.S. hd. : alk. paper)

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[87] Network Development and MARC Standards Office, Library of Congress. *Displays for Multiple Versions from MARC 21 and FRBR.* (Washington, D.C.: Library of Congress, 2002). (Based on the study originally written by Tom Delsey.)
http://www.loc.gov/marc/marc-functional-analysis/multiple-versions.html

ISBN: 0754010457 (U.K. hd.)
ISBN: 075402024X (U.K. pbk.)
The English patient / by Michael Ondaatje.   [Manifestation]
   Edition: 1st Vintage International ed.
   Imprint: Vintage Books, 1993.
   Physical description: 305 p. ; 21 cm.
   ISBN: 0679745203

Sound recording - English   [Expression]
The English patient / by Michael Ondaatje.   [Manifestation]
   Imprint: Macmillan Audio Books, p1997.
   Physical description: 2 sound cassettes
         (ca. 4 hrs.) : analog.
   ISBN: 0333675568
   Publisher's number: MAB 15 Macmillan Audio Books

Related Works

The English patient.   [Work]
  Motion picture - English   [Expression]
   The English patient / Miramax Films presents a   [Manifestations
   Saul Zaentz Production ; an Anthony Minghella Film.   (two combined)]
     Imprint: Miramax Home Entertainment, [1998]
      Physical description: 1 videodisc (162 min.) :
            bsd., col. ; 4 ¾ in.
     ISBN: 1558908307
     Publisher's number: 14175 Miramax
    Imprint: Miramax Home Entertainment, c1997.
      Physical description: 2 laserdiscs (162 min.):
            sd., col. ; 12in.
   The English patient / produced J&M Entertainment ;   [Manifestation]
   Miramax films ; directed by Anthony Minghella.
     Imprint: 1996.
      Physical description: 18 reels of 18 on 9 : sd.,
           col. ; 35 mm. ref print.
Minghella, Anthony.   [Work]
The English patient.
  Text - English   [Expression]
   The English patient / Anthony Minghella ;   [Manifestation]
   based on the novel by Michael Ondaatje ; introduction by
   Michael Ondaatje.
    Edition: 1st ed.
    Imprint: Hyperion Miramax Books, c1996.
    Physical description: xviii, 189 p. : ill. ; 21 cm.
    ISBN: 078688245X

Figure 11. Illustration of a possible hierarchical display for a work, its expressions
and manifestations, and related works, and the expressions and manifestations
of related works. Illustration prepared by the Network Development and MARC
Standards Office, Library of Congress.

There are many other experiments with FRBR-ization.[88] The ones described here were a few chosen to illustrate the advantages of applying FRBR concepts, even in a pre-RDA environment.

The aim of a FRBR-ized display of bibliographic information is to present the user with a meaningful display of results, where the user can quickly and easily decipher the relationships between the resources.

> Ideally, a display clustering a large number of items would present clusters that clarify the nature of items retrieved and would be composed of manageable numbers of items.[89]

The user may approach the task of searching from many different angles. They may approach the catalogue knowing that they want the content of a work, in an expression which they can understand. Or they may approach the catalogue looking for a genre and a particular carrier type. By encoding attributes in separate elements, each attribute can be used as a part of the search, and this search is especially precise when data recorded in that element must conform to a set of controlled vocabulary.

Current FRBR-izations demonstrate definite improvements in resource discovery and data display. These FRBR-izations are partially successful, but cannot achieve full success because the data on which they rely is imperfect.

> Current bibliographic records … are neither complete nor consistent. In addition, much important information is recorded as unstructured text, mostly as notes, and is either not appropriate or very difficult for computer processing.[90]

The instructions in RDA ensure that well-formed metadata is recorded. This metadata supports meaningful displays, meaningful clustering of results and effective navigation through large sets of results. Considering the successful improvements using imperfect data, it is promising to think about the next level of improvements when FRBR-izations use data that is intended to support FRBR-ized search and display, such as data recorded according to RDA.

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[88] Bibliography includes references to descriptions of other FRBRization experiments.

[89] Carlyle and Sumerlin, "Transforming Catalog Displays", 21.

[90] Maja Zumer. "FRBR: The End of the Road or a New Beginning?" *Bulletin of the American Society for Information Science & Technology* 33, no. 6 (2007): 28.

7. Using RDA

7.1 RDA as an online tool

RDA, as befits a standard for the digital age, was developed "as a resource description standard that is optimised for use as an online tool." [91] This was one of the goals in the Strategic Plan. The text of RDA was written and developed with this goal in mind. Thus, it was not written as a flat file, as a linear book or manual. It was written as the text for an online tool. RDA, as an online tool, has two aspects: the content of the standard and additional functionality because it is an online tool. [92] The transition from drafting the standard to using the standard will be facilitated by its release as an online web tool.

RDA, the online tool, has the features expected from an online product, such as browse and search and moving through the text using hyperlinks. The search feature allows both a simple and an advanced search. The search is executed on the content of the standard, and returns relevancy ranked results.[93] It also permits one to make bookmarks and notes and to save these to a personal profile. The online tool allows for three different levels of profiles, so that one can save a search or a bookmark at the level of the individual, at the level of a department, or at a third broader level, such as the institution or consortium level.

Accompanying the text of the standard, the JSC has also prepared supporting documents in the appendices that assist the cataloguer to use RDA: examples and mappings. These documents become even more helpful when used in an online, linked environment. Appendix M consists of a set of complete examples. The examples show the RDA element, a link to the RDA instruction and a demonstration of the metadata that should be recorded following the RDA instruction. The examples also illustrate how the data can be encoded; appendix M shows the examples encoded using MARC21. There are also 2

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[91] Joint Steering Committee. *Strategic Plan for RDA, 2005-2009,* long term goal no. 3.

[92] The description of the functionality of the tool is based on the author's conversations with Nanette Naught, the designer of the software, and on information from presentations about the online tool. At the time of writing, the interactive demo of the tool was still being developed.

[93] The relevancy is based not simply on the frequency of occurrence of a word or phrase, but is calculated based on the weight assigned to different types of occurrences, e.g. the occurrence of a word in a section heading has more weight than in an example.

appendices that illustrate "record syntaxes", appendix D for descriptive data, and appendix E for authority data. Since RDA is a content standard, it can be used with different encoding schema and the data can be displayed in different ways. These two appendices demonstrate how the data can be presented and encoded. Appendix D demonstrates how RDA data can be displayed using ISBD specifications, and it also maps RDA elements to one of two encoding schema: the MARC21 format. The appendix includes a placeholder for the mapping to the RDA application profile using the Dublin Core schema.

For the 2008 review of the full draft, the JSC created an additional type of document: a workflow document. A workflow is a step-by-step procedure that moves the cataloguer through the logical decision process required to describe and give access to one particular type of resource. As the model for a workflow, the JSC chose to document the procedure for a book. The workflow begins by reminding the cataloguer of the decisions that must be made before one starts, then moves to step 1, choosing the preferred source of information, then to step 2, transcribing the title proper, and on through the decisions and steps required to prepare the complete bibliographic record. At each step, there is a brief summary of the task, and references back to the full instructions. The workflow is a very useful way to slice through the full content of the standard and pull together references to all the relevant instructions for a particular type of resource.

Examples, mappings and workflows help the cataloguer to make the transition from the theoretical framework and newly worded instructions to the concrete evidence of the metadata that will be recorded using RDA. The online tool also offers the opportunity to use the model of the examples and the workflows as a starting point to create new examples and new workflows. A library can develop workflows for its staff, incorporating its local decisions about options and its own procedures as steps added to the basic workflow. An institution can develop workflows and examples for special types of resources that are part of its collections.

The ability to incorporate customizations into the online tool allows a library to integrate policy and standard into one tool. Staff no longer need to consult documents residing in two or three different places. This integration can encourage the consistent adherence to standards while at the same time also promoting efficiency in the application of local decisions.

7.2 "Social cataloguing": benefits for specialized cataloguing communities

RDA, the online tool, also opens up interesting possibilities for specialized cataloguing communities. Not only can a library or a department integrate their local policies and procedures into the online tool. They can also share examples and workflows with other libraries and institutions. One can create and save new examples and workflows within the profiles of the individual, the department or the institution. One can also import new ones from outside the institution, thus opening up the possibility of sharing these documents throughout a broader community of cataloguers.[94] Through this sharing functionality, one can have the standard, plus all the additional assistance that used to be made available in the manuals of specialized cataloguing communities. All the instructions can be integrated into the one online tool.

RDA, the online tool, opens up avenues of collaboration for specialized cataloguing communities. A lone cataloguer may be the only person at an institution who catalogues resources for users with print disabilities. If the community who catalogues DAISY books develops examples and workflows, the lone cataloguer can integrate these aids into their RDA profile, and easily follow both RDA, and the DAISY cataloguing community's pathways through RDA. The DAISY cataloguing community can decide to develop and publicize the existence of these examples and workflows, and thus encourage a standard application of RDA for DAISY books in the wider community. When the examples and workflows come from a reliable source, institutions will probably be quite eager to adopt and integrate these shared tools. This collaborative aspect of RDA benefits the cataloguers, and, in turn, benefits the users who will be searching a more uniform set of metadata.

7.3 Using RDA with encoding schema

In order to take immediate advantage of RDA's new approach to the description of content, media and carrier, one must be able to encode this data with currently used encoding schema. RDA was designed so

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[94] This import functionality is coupled with a gate-keeper functionality: an administrator approves documents before they are imported. An institution can screen which documents are integrated into their profile.

that it would not be tied to any one encoding standard. Work is underway to collaborate with encoding schema communities to ensure that RDA data can be fully encoded and supported when the standard is implemented.

The RDA/MARC Working Group was appointed to identify changes required to MARC21 so that MARC21 is compatible with RDA and accommodates all RDA data elements. The Working Group analyzed the mapping between RDA and MARC21, and identified areas of MARC21 that needed modification. The Group prepared discussion papers and then proposals based on the feedback to the discussion papers. The required changes are not extensive. One of the significant changes is the proposal for three new fields in the bibliographic format for type of content, type of media and type of carrier: fields 336, 337 and 338. These new fields have been approved.[95] The three RDA data elements that form the basis for the extensible framework for technical and content description will each have its own MARC field. The data will be well identified and segmented, allowing for better data manipulation and data display. Another example of better segmentation of data is the revision for field 502, the dissertation note.[96] Additional subfields have been approved for this field, corresponding to separate RDA elements for academic degree, granting institution and date the degree was granted. There are also some other changes: additional data elements for authority data, and adjustments to the lists of codes used in 007 of the bibliographic format.

RDA can also be encoded using other metadata schema. RDA is essentially a kind of metadata element set. However, just being a metadata element set is not sufficient for it to be fully operable in the semantic web and to fit into web architecture.

> … for certain elements, element sub-types, and sub-elements defined in the RDA element set, the RDA instructions reference "external" encoding schemes (e.g., the ISO encoding schemes for standard identifiers such as ISBNs and ISSNs). For certain other elements, element sub-types, and sub-elements, RDA provides instructions on recording value representations in a structured form that function, in effect, as "internal" encoding schemes. For example, the controlled lists of values for

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[95] *MARC Proposal No. 2009-01/2: New Content Designation for RDA Element: Content Type, Media Type, Carrier Type.* http://www.loc.gov/marc/marbi/2009/2009-01-2.html
[96] *MARC Proposal No. 2008-05/4: Enhancing field 502 (Dissertation note) of the MARC 21 Bibliographic format.* http://www.loc.gov/marc/marbi/2008/2008-05-4.html

elements such as Media type, Carrier type, and Content type function as vocabulary encoding schemes for those elements. At this stage [2007], however, none of the controlled lists of values specified in RDA have been formally registered as vocabulary encoding schemes.[97]

The DCMI/RDA Task Group was formed as a collaborative initiative between the Dublin Core Metadata Initiative and other Semantic Web communities and the RDA development community.[98] It will develop a RDA application profile for Dublin Core. For the application profile to be fully supported, the terms used in RDA need to be defined and disclosed. The Group is currently working on the identification and definition of the RDA element vocabulary, and then on disclosing this vocabulary using RDF/RDFS/SKOS. The starting point is the vocabulary used for content, media and carrier types.

8.   Conclusion: Impact of FRBR and RDA

8.1   Multiple formats issue

The cataloguing world has long wrestled with the problem of the book and its contents. Elaine Svenonius traces this distinction back to Anthony Panizzi, in the nineteenth century, and possibly as early as Thomas Hyde in 1674.[99] Seymour Lubetzky's words, from 1956, identify this challenge:

> The problem of cataloguing arises from the fact that … cataloguing must concern itself not only with the book in hand but also with the work contained in it … and …with the fact that the reader's information about the name of the author and the title of the book are not infrequently imperfect.[100]

FRBR, the conceptual model, articulates a view of the bibliographic universe that is more precisely defined and nuanced than previous views. FRBR continues and expands on the understanding that there is

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[97] *Encoding RDA Data.* Draft 2007-03-22.Background document for the RDA Data Model Meeting held at the British Library, April 30-May1, 2007.
http://dublincore.org/librarieswiki/DataModelMeeting
[98] The work of the DCMI/RDA Task Group is tracked on the DCMI/RDA Task Group Wiki:
http://dublincore.org/dcmirdataskgroup/
[99] Svenonius, *Intellectual Foundation of Information Organization,* 8.
[100] Seymour Lubetzky. "Some observations on revision of the cataloguing code." In *Seymour Lubetzky: writings on the classical art of cataloguing.* (Englewood, Colorado: Librarie Unlimited, 2001): 184.

a distinction between the book and its content. It clarifies the nature of the relationship between the book and its content.

The FRBR model brings a new understanding of bibliographic data by identifying the important entities in the bibliographic universe, the attributes of these entities and the realtionships between the entities. The problem of cataloguing is not simply the distinction between the book and its content. The categories of book and content have been made more precise and expanded into the four group 1 entities: work, expression, manifestation and item. The attributes of these entities and the relationships between them illuminate clearly the boundaries between content and carrier, and also open up the possibility of doing justice to both content and carrier when describing a resource.

The process of trying to align the existing cataloguing code, AACR2, with the concepts and modelling in FRBR resulted in a complete deconstruction of AACR2 and a rebuilding into a new standard, RDA. AACR2's approach, its organization and many of the individual rules were at odds with what had been learned from the FRBR model. In an effort to update AACR2 and prepare for the cataloguing of new types of publications, it became evident that amendments would not suffice and that a radically new approach was required.

There were several major issues that challenged the further development of AACR2. One of the most pressing problems was the multiple formats issue. The multiple formats issue, with its two aspects of alternative formats and multimedia resources, has its root in AACR2's inconsistent approach to content and carrier and inconsistent categorization of the classes of material. Alternative formats bring to the fore the unresolved problem of whether the content or the carrier should have primacy when describing a resource. Different approaches to the problem were unsatisfactory because they emphasized either the carrier or the content, to the detriment of the other. Resources consisting of multiple types of content and/or carriers were also not well served by AACR2 rules. AACR2 has a bias towards choosing one characteristic as having primacy. Such an approach may give the cataloguer a way to approach the description of the resource, but it does not necessarily allow for a full description of the resource, where all characteristics are equally well described.

The development of a new approach to content and carrier was a long and difficult task. The AACR cataloguing community went through years of working through problems associated with the primacy of the

carrier and the boundaries between content and carrier, testing new ways to resolve issues and then going back to reframe solutions. These years of experimenting and debating did eventually lead to an approach around which consensus could be built. Achieving consensus was facilitated by the use of the FRBR conceptual model as the framework on which to build a new approach.

The FRBR model emerged out of the work of an international study group under the auspices of the IFLA (International Federation of Library Associations and Institutions). The model was drafted over many years and went through a period of world-wide review. Beginning immediately after its publication in 1998, the explanatory power of the model was acknowledged around the world as librarians and researchers began to apply the model and use it as the starting point for new research. Its broad base of acceptance was confirmed when it became a key part of the foundation for the new *Statement of International Cataloguing Principles.*

RDA was developed as a new metadata standard built on the theoretical framework expressed in the FRBR model (and the FRAD extension). Building on FRBR meant that there was a widely accepted theoretical framework to guide the development of the standard, and against which to test the standard and keep it logically consistent.

In terms of resolving the problems with alternative formats, FRBR provides the key in its modelling of the group 1 entities, work, expression, manifestation and item. By identifying four entities, analyzing their attributes and mapping their relationships to each other, FRBR offers a means to sort out the level of relatedness between resources. Elaine Svenonius' concise summary of the "defining objective" for the organization of information underlines that the key is the level of similarity and differences between resources: "to bring essentially like information together and to differentiate what is not exactly alike".[101] The history of the description of alternative resources has been plagued by the tension of emphasizing either the similarity or the difference. When one has to choose whether to emphasize similarity or difference, then the other aspect remains less visible.

The problem of alternative formats can be approached more successfully by applying concepts in the FRBR model. With the

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[101] Svenonius, *Intellectual Foundation of Information Organization,* 11.

modelling of the group 1 entities, there is a means to sort out levels of similarity and difference in more detail, and to record this information in unambiguous ways. Not all alternative formats differ from each other in the same way. Alternative formats can be divided into two types: 1) alternative formats where the content is expressed in a different form, i.e. different expressions of the same work; 2) alternative formats that are the same expression of the same work but are different manifestations. It is important to distinguish between the types of alternative formats, because the level of similarity or difference between the alternatives is information that can be of critical importance to the user when identifying and selecting the appropriate resource.

The RDA framework of content, media and carrier types clearly indicates the level of similarity and differences between resources. A difference in content type means a different expression. A difference in media and carrier type means a different manifestation. Content, media and carrier types are three among many attributes that distinguish between expressions and between manifestations. But they are especially significant and useful when looking at alternative formats. Alternative formats are resources that deliver the same content. Thus attributes such as author, title of the work, genre, etc., will be the same. Among the attributes that will differ, content, media and carrier types allow the user to find and select a version that they can use. If the user has difficulties with one of their senses, such as sight, then the user may be searching for a form of expression that uses hearing or touch. The difference in content type becomes of critical importance. If the user has access to a limited range of media options, then the media and carrier types become of critical importance.

In terms of content, the user needs to know the relationship of the resource to the original work. Thus, if the user searches for "Robinson Crusoe", the user needs to be able to grasp quickly the relationships between the resources in the result set. They need to be able to distinguish between the work, Defoe's Robinson Crusoe, and works that are related to it, but are different works. If the work is one that is embodied in many manifestations, such as Robinson Crusoe, then the user needs to be able to navigate through resources that are part of the same work family. It is here that we find alternative formats. Instead of facing a random accumulation of manifestations, a user should be able to navigate immediately to a form of expression that is accessible to them. Content type is an expression level attribute that

permits the identification and selection of resources according to the form of expression. The media and carrier types, manifestation level attributes, may also be important for identification and selection, if the user needs a particular form of expression, such as spoken word, and also needs a particular carrier type, such as audiocassette.

RDA's solution for alternative formats is to move away from the content versus carrier issue to a new approach that respects both the content and the carrier, and gives scope for a full description of both aspects. The close mapping between FRBR and RDA means that RDA descriptions will record attributes of all the group 1 entities, permitting all levels of similarities and differences to be recorded.

FRBR's modelling of the group 1 entities also provides an answer to the problem of describing resources with multiple characteristics. AACR2 was not designed to support the description of resources with multiple, equally predominant characteristics, and it did not adapt well when the need arose. Rule 0.24 of AACR2 assumes that the cataloguer will determine one predominant "physical form" and then use the chapter that corresponds to the class of material to which the resource belongs. Part 1 of AACR2 consists of chapters organized according to the different classes of material. The categorization is flawed because the differences between the classes are not consistent; the classes of material represent different levels of generality, some are content types, some are carrier types. The GMDs are also logically inconsistent categories, reflecting content, expression or carrier; in addition, one must select a single GMD. Even with the revision of rule 0.24, it remained difficult to bring out multiple characteristics because there was no indication of precedence when following rules from different chapters. And one still had to select a single GMD.

When the AACR2 classes of material and GMDs are examined from a FRBR perspective, one problem is immediately evident: the classes of material and the GMDs are inconsistent because the categories map to different entities. In both cases, the differences between the categories are not differences at the same level of abstraction. Part 1 of AACR2 is riddled with logical inconsistency. RDA abandons the "class of material" organization used in AACR2 and bases its organizational structure on the FRBR conceptual model. RDA shifts to the principle of having general instructions that apply to all types of resources, followed, where needed, by supplementary instructions for specific

types of resources.[102] The possibility of conflicting instructions is further eliminated by the categorization of attributes according to the four group 1 entities. Each entity has its own logical attributes.

RDA's solution is to move away from the need to determine a predominant aspect. Instead, RDA opens up the possibility of describing a simple resource or a complex resource equally well. The description of the resource will include all relevant attributes and relationships. The cataloguer will include attributes at work, expression, manifestation and item level. All aspects of the resource can be recorded.

Using RDA, one can record more than one content, media and carrier type. This permits the full description of a resource consisting of many carriers, or combined content types. It also permits the recording of data about content, media and carrier type for new resources before the community has decided on terminology. The types, included in the lists for content, media and carrier, act as a framework so that one can record data in new combinations as required by new resources.

RDA brings a new approach to the description of content, media and carrier. RDA moves away from the AACR2 restrictions and limitations in dealing with content and carrier. RDA includes an extensible framework for content and technical description, a framework that rests on a rigorous and logically consistent conceptual model. With the FRBR model as the theoretical foundation, RDA offers a way out of the multiple formats impasse. It enables the recording of all aspects of content and carrier, and it improves the collocation of resources, with more precise definition of the similarities and differences between these resources.

8.2   Improved descriptions and improved access

The impact of RDA also extends to other areas beyond the multiple formats issue. Alignment with the conceptual model began a process of rethinking the organization of the cataloguing standard, and also of rethinking the cataloguing process. FRBR looks at bibliographic data from the user's perspective. FRBR changes the focus of the cataloguing process. The focus is no longer on the cataloguer creating a single

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[102] Joint Steering Committee for Development of RDA. *RDA, Resource Description and Access: Objectives and Principles*. Draft version. (5JSC/RDA/Objectives and Principles/Rev/2, 28 October 2008): 2. http://www.collectionscanada.gc.ca/jsc/docs/5rda-objectivesrev2.pdf

record, but on the user seeking the record within the context of a large catalogue or database. Both activities continue to co-exist, but the defining viewpoint has changed.

The process of incorporating the FRBR model and the FRBR perspective on user tasks has resulted in a standard that aims to facilitate user access. This focus on the user appears in the functional objectives of each section of RDA but it is also evident throughout the standard, in the structure and in the instructions.

A user may approach a search in many different ways depending on their information need. A user will not necessarily always begin by identifying a work and then selecting the appropriate expression, and then the appropriate manifestation. To facilitate searching, RDA uses discrete data elements to record data, and identifies each data element uniquely and unambiguously. RDA moves away from long strings of data, especially from strings where information pertaining to different entities might be combined. The segmentation of data into discrete and unambiguous elements enables RDA metadata to be used in more versatile and flexible ways, for data retrieval, navigation and display.

Form of expression can be a vitally important characteristic for a user with a print disability. This attribute is an important part of the framework for technical and content description, with its prominent position as a content type. The content types reflect both the fundamental form of communication and the human sense through which it is intended to be perceived (6.10.1.1). Where necessary to maintain precision and to cover all possible content types, the list also includes some combined terms, such as text and tactile text, cartographic image and cartographic tactile image.

The possibility of describing all aspects of a resource is not limited to the content, media and carrier types. If a data element applies to the resource being described, then one can use it. By using separate data elements, any data element can also potentially be used to search and navigate. RDA has separate data elements for many attributes that can be helpful for the identification and selection of accessible resources for users with print disabilities, attributes such as font size, form of tactile notation, and encoding format.

Relationships between the entities play an important role in improving collocation and navigation. RDA has four sections devoted to the

recording of attributes and six sections devoted to the recording of relationships. Not only does RDA encourage the recording of relationships, it also introduces additional means to improve the precision of information about the relationships. AACR2 had an option to add a designation of function to the access point for a person, and it offered a small list from which to choose. In contrast, RDA encourages the use of relationship designators and has developed extensive lists that are included in the appendices. Recording the relationships is the first step, but the ability to use information requires that the precise nature of the relationship is also recorded. In a card environment, a user was expected to read or infer about the relationship. In an online environment, there is the potential to develop new ways to search, navigate and display data but such improvements are predicated on the availability of unambiguous and consistent data about the nature of the relationship.

In the instructions on the construction of access points, and preferred access points, RDA addresses preferred access points for works, and it also addresses preferred access points for expressions. The preferred access points for expressions extend the preferred access point for the work, with the addition of an element identifying the expression. The first listed element is content type. Thus, not only can one record content type in the description, one can also use content type as part of the preferred access point for the expression. This brings the content type to prominent visibility and supports the collocation of expressions. A number of alternative formats are resources that differ in the form of expression, such as an audiobook of *Hamlet* or a tactile text of *Robinson Crusoe*. The possibility of creating a precise access point for the expression enables the user to identify and select the appropriate resource with greater precision and speed.

RDA has also opened up the option to capture metadata and re-use it as is. Thus one can harvest embedded metadata, download or automatically generate metadata, re-use what is there and enrich it with additional descriptive elements or access points, instead of having to start from scratch.

RDA has been developed as a metadata standard for the digital world, and therefore able to take advantage of new developments in data capture, storage, retrieval and display. RDA was designed so that it would not be tied to any one encoding standard. Work is underway to collaborate with encoding schema communities to ensure that RDA

data can be fully encoded and supported when the standard is implemented.

It is important to remember that RDA is a content standard. It promotes the recording of well-formed metadata. RDA itself is silent on the encoding or display of the data. It creates the conditions for improved resource discovery and data display by supplying good metadata to support these tasks. It will provide some improvement using current encoding schema and current functionality for searching and data display. But to fully realize the benefits of recording data according to RDA, we should begin to envision a new generation of search engines and user interfaces that will thoroughly utilize all the RDA data elements.

It is now over ten years since the International Conference on the Principles and Future Development of AACR, and twenty years since the Multiple Versions Forum. The problems that were identified at these two events were fundamental and went right to the structure of AACR2. With the development of new types of resources, including resources that brought together content and media in new ways, and the growing number of works available in alternative formats, it became increasingly imperative to resolve the multiple formats issue.

The source of problems when looking at the multiple formats issue can be summarized by the tension between content and carrier: which one should be the defining factor for the description of a resource and access to it? RDA achieves the resolution of the multiple formats issue by moving away from this either/or question. RDA's answer is to affirm the importance and role of both the content and the carrier. RDA provides a solution to the multiple formats issue through its new approach to content, media and carrier. The new approach is based on the FRBR modelling of the group 1 entities.

The strength of RDA is that is built on the theoretical framework expressed in the FRBR conceptual model. Thus, RDA approaches description and access with a logically consistent framework underpinning it. RDA improves the description of resources and access to them, with its carefully defined data elements that record attributes and relationships. This improvement affects all resources. RDA adopts FRBR's focus on the user, and its instructions are given within the context of recording data in order to ensure that the user will find, identify, select and obtain the resource that meets his or her need.

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