The IFLA Functional Requirements for Bibliographic Records

International Standards for Universal Bibliographic Control

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The formal charge for the IFLA study involving international bibliography standards was to delineate the functions that are performed by the bibliographic record with respect to various media, applications, and user needs. The method used was the entity relationship analysis technique. Three groups of entities that are the key objects of interest to users of bibliographic records were defined. The primary group contains four entities: work, expression, manifestation, and item. The second group includes entities responsible for the intellectual or artistic content, production, or ownership of entities in the first group. The third group includes entities that represent concepts, objects, events, and places. In the study we identified the attributes associated with each entity and the relationships that are most important to users. The attributes and relationships were mapped to the functional requirements for bibliographic records that were defined in terms of four user tasks: to find, identify, select, and obtain. Basic requirements for national bibliographic records were recommended based on the entity analysis. The recommendations of the study are compared with two standards, AACR and the Dublin Core, to place them into pragmatic context. The results of the study are being used in the review of the complete set of ISBDs as the initial benchmark in determining data elements for each format.

Within the past few years, several major international efforts focused on the extent and nature of bibliographic control and access. This international attention underscores the continuing and expanded need for cooperative bibliographic control—both visionary and economical. The first effort I want to mention is the International Conference on the Principles and Future Direction of AACR held in Toronto, Canada, in October 1997. At this conference, librarians sought to examine the future international viability and direction of the Anglo-American Cataloguing Rules and how the rules might be revised given the rapidly changing environments in bibliographic access, emerging and changing formats, and human resource issues. Another important development has been the emergence of what is called the Dublin Core and its standard metadata for electronic resources that are accessible in a networked environment, such as the Internet. This standard for metadata represents a core bibliographic description whose elements can be used to find, identify, select, and obtain resources. The last significant international development that I will mention, and the topic of this article, was the approval and

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publication of a long-awaited report of a multiyear IFLA study that focused on international bibliographic standards. This report recommends a set of standards for the components of a bibliographic record based upon the functions it performs through its essential bibliographic entities and the relationships important to those entities within a record and to other records. Based upon the results of the study, the report recommends how the bibliographic record should assist the user within the bibliographic universe and what minimum data and relationships should be required for a basic national bibliographic record.

During the summer of 1998 I attended a thought-provoking IFLA-sponsored regional seminar held at the National Library in Vilnius, Lithuania. The seminar topic was international bibliographic control issues, and it was primarily intended for librarians in the Baltic countries of Lithuania, Latvia, and Estonia. In addition to the Baltic speakers, "external" speakers came from the United Kingdom, Finland, Norway, the United States, and Croatia. Many papers were given, including "Digital Indigestion—Is There a Cure?" "Authority Control in an International Context in the New Environment," and "Traditional Communication Formats Versus SGML; Metadata; Dublin Core." Other papers were given on such topics as UNIMARC, Project BIBLINK in the Netherlands, OCLC's Project Use MARCON, and the IFLA functional requirements study. I was impressed by the clear interest of the participants in using international bibliographic standards and their obvious understanding that standards are essential for cooperative sharing of bibliographic data for resource sharing, cataloging, and authority work.

What do these examples of international standards development mean in terms of the international cataloguing community? The need for quality bibliographic control continues to be of prime importance. The international information world has geometrically grown and has become more diverse, more convoluted, and more confusing. Those of us involved in international standards development must continue our efforts to assist those desperately wanting to access this world in an orderly, comprehensive, and logical fashion and thereby ensuring their success in identifying and obtaining those resources of interest.

With this backdrop to my article, I will first review briefly the formal study charge for this IFLA study involving international bibliographic standards. The scope and method used for this study will then be described as well as its conclusions and recommendations for a national bibliographic record. In order to place the report's recommendations into pragmatic context, I will next compare them with two standards—AACR, an international cataloging code, and the Dublin Core, a rapidly emerging international standard for new electronic technologies. The conclusion will include a brief discussion of some of the next steps that the IFLA Section on Cataloguing's Standing Committee is taking based upon this study's recommendations and its general method. Please note that various parts of this article discussing the IFLA study come directly from or are paraphrased from the study group's final report (IFLA Study Group on the Functional Requirements for Bibliographic Records 1998).

Study Charge

Serious issues related to universal bibliographic control, primarily involving escalating costs of cataloging and authority control as well as the interest of maintaining quality, are not new. However, they are even more apparent now than they were ten years ago—particularly to the users of information resources and the creators of bibliographic systems. This IFLA study arose from a 1990 IFLA seminar on bibliographic control held in Stockholm, Sweden, and from the corresponding interests of the Conference of Directors of National Libraries to commission a study to define the functional requirements for bibliographic records.

In response to these developments, the IFLA Section on Cataloguing and the Division of Bibliographic Control approved strategies for a study expressed in a document entitled "Terms of Reference for a Study of the Functional Requirements for Bibliographic Records" (IFLA Standing Committee of the Section of Cataloguing 1992). The study's final working group consisted of six members and four consultants. The consultants were responsible for directing the study and were the primary authors of the various draft reports and the final report.

As stated in the "Terms of Reference," the purpose of this study was to delineate in clearly defined terms the functions that are performed by the bibliographic record with respect to various media, applications, and user needs. The study was to cover the full range of functions for the bibliographic record in its widest sense—that is, a record that encompasses not only descriptive elements, but access points (such as name, title, subject, etc.), other "organizing" elements (such as classification, etc.), and annotations. The functional requirements should pertain to all media and formats commonly represented in bibliographic databases and the defined functions of the record should be derived from the full range of uses that might be made of the record. Also of primary importance was the application of those functional requirements with the development and revision of cataloging standards, guidelines, and codes and the measurement of their effectiveness.

The Terms of Reference further specified that the working group should develop a framework that identified and clearly defined the entities of interest to users of biblio-

graphic records, the attributes of each entity (or what are its parts or elements), and the types of relationships that can operate between entities. The framework would serve as the basis for identifying and placing value on the specific attributes and relationships required to support the various tasks that users perform when using bibliographic records. In other words, the study group was asked to carefully identify entities, dissect them, and place value on each entity as well as the entity's component parts. This was a method never before used on this international scale.

Based upon the resulting conclusions, the study group was charged to propose a basic level of functionality and data requirements for records created by national bibliographic agencies. The criteria for deciding this functionality and basic data requirements would be drawn directly from the study results. The group hoped that this set of recommendations could meet many of the central concerns expressed at the 1990 Stockholm seminar and the Conference of Directors of National Libraries—namely a core-level standard for bibliographic records that could facilitate international sharing of bibliographic records. If approved and used by national bibliographic agencies, this standard could then assist in reducing duplication of efforts and drive down the rising costs of cataloging through greater cooperative cataloging arrangements. Furthermore, such a standard could promote better universal bibliographic control, a central goal for the IFLA Division of Bibliographic Control.

As part of the process, the study group wrote a draft report based upon its examination of potential data elements of bibliographic records in the context of the potential uses of those records. Following a worldwide review of the draft report, the study group incorporated, as feasible, the majority of all commentary into its final report. The final report was approved by the Standing Committee of the IFLA Section on Cataloguing at the 1997 IFLA conference, and K. G. Saur published it as volume 19 of its *UBCIM Publication—New Series.*

Study Method and Results

The study's framework was built on the ways data contained in bibliographic records are used through a variety of user tasks, namely to find, identify, select, and obtain. While the study is described as being based on user needs it did not involve studies of how actual users approach and make use of bibliographic records. Rather, functions that any one or more potential users might perform were examined carefully. In other words, the study group endeavored to define exactly what information a user might expect to find in a bibliographic record and how that information might be used.

Another key element of the study group was the recognition that bibliographic records are used by a broad spectrum of users within and outside traditional library settings. The study group also took into account the wide range of applications in which bibliographic records are used—such as information retrieval, purchasing, cataloging, circulation, interlibrary loan, preservation, and reference. As a result, the study group recognized the broad use for bibliographic information and the importance to users of both content and form of the materials described in bibliographic records.

The study group defined a bibliographic record as the aggregate of data that is associated with entities—often but not exclusively described in library catalogs and national bibliographies. The group defined the functional requirements for bibliographic records as being those generic tasks that are performed by users when searching and making use of national bibliographies, library catalogs, bibliographic databases, Internet, etc. They are as follows:

- using the data to find materials that correspond to the user's stated research criteria;
- using the data retrieved to identify an entity;
- using the data to select an entity that is appropriate to the user's needs; and
- using the data to acquire or obtain the entity described.

The consultants used the entity relationship analysis technique as their method, and began their study by isolating the entities that are the key objects of interest to users of bibliographic records. Three groups were defined.

The first and primary group contains four entities:

a. Work: the distinct intellectual or artistic creation. This is an abstract entity that enables us to give a name and draw relationships to the abstract intellectual or artistic creation. When we speak of *David Copperfield* by Charles Dickens as a work, we are not referring to a specific edition or text, rather the intellectual creation.
b. Expression: the intellectual or artistic realization of a work. It encompasses the specific words, sentences, paragraphs, etc., that result from the realization or expression of a work and provides distinction in intellectual content between one realization and another of the same work. For example, a French translation of the original English text of Shakespeare's *Richard III* and the original text represent two expressions of the same work.
c. Manifestation: the physical embodiment of an expression of work. In other words, the expression that is issued or published. It represents a wide range of all

the physical objects that bear the same characteristics, in respect both to intellectual content and physical form such as manuscripts, videotapes, journals, etc. The manifestation permits us to describe the shared characteristics. For example, within a library's catalog there could be two manifestations of *The New Yorker*—the print edition and the microform edition.

d. Item: a single exemplar of a manifestation. It is in many instances a single physical object. This is the physical object you have or have access to in your actual or virtual collection. An example might be two copies of the same book, with only one having the author's autograph.

The second group includes entities responsible for the intellectual or artistic content, the production, or ownership of entities in the first group (e.g., persons and corporate bodies). Examples of these entities are George Gershwin, UNESCO, and Cambridge University.

The third group includes entities that represent concepts (such as metaphysics), objects (such as the subject the Eiffel Tower), events (IFLA 1996 Conference in Istanbul, Turkey), and places (Barcelona, Spain). In this study, entities in the third group as well as those in the first two groups may form the subject of a work.

The study group then identified the characteristics or attributes associated with each entity and the relationships between entities that are most important to users. The attributes provide the means by which users formulate queries and interpret responses when seeking information about a particular entity. The attributes were expressed as a user might view them. As their starting point, the consultants used internationally defined attributes found in International Standard Bibliographic Descriptions (ISBDs) and the Guidelines for Authority and Reference Entries (GARE). Figure 1 presents two examples of entities with their possible attributes: a manifestation and a person.

The study group then described logical relationships among the various entities and then defined the relationships associated with the four primary entities (work, expression, manifestation, and item) that operate between designated instances of entities. For example, a manifestation-to-manifestation relationship could involve a microform reproduction of a print edition or it could represent the third volume of a historical three-volume set, with each volume having a unique title as well as a collective title.

In order to assess the relative value of each of the attributes and relationships associated with the various entities, the study group next focused on the importance of each attribute or relationship to the user's efforts to find, identify, select, or obtain a particular entity or group of entities. In doing so, the study group recognized that bibliographic records are used by many different types of users who collectively are interested in a wide range of applications and all types and forms of materials and media. The group also drew on a wide range of sources and identified data pertaining to a broad spectrum of media such as text, cartographic material, audiovisual, film, and digital recording modes.

Manifestation
(this list of attributes includes typical examples—the report includes a more complete list of potential attributes)

- title of the manifestation (there could be more than one—title page, cover title, and/or a spine title)
- statement of responsibility (this appears on the manifestation and often is a person or organization)
- edition/issue designation (examples are large-print edition or Braille edition)
- place of publication/distribution (a city such as London or Toronto)
- publisher/distributor (usually an organization such as the commercial publisher Reed Elsevier)
- date of publication/distribution (normally the year of release)
- series statement (the statement can have a numbering and there could be more than one series statement)
- extent of the carrier (quantification—number of pages, volumes, discs, etc.)
- physical medium (type of material from which a carrier is produced)
- dimensions of carrier (size)
- manifestation identifier (ISBN or ISSN number)
- source for acquisitions/access authorization (source of purchasing or access—for example, remote access through the Internet)

Person

- name of person (name by which a person is known)
- dates of person (usually birth and/or death dates)
- title of person (word or phrase describing rank, nobility, or term of address)
- other designation associated with the person (usually a phrase or abbreviation indicating succession with a family or dynasty)

Figure 1. Entity/Attribute Examples

The study group then mapped the attributes and relationships to the four user tasks: to find, identify, select, and obtain. In doing so, the attributes and relationships were rated as to the importance to each user task. This was a thorough effort and was the basis of the recommendations for the essential components of a national bibliographic record. It is important to note that at a national or institutional level, these values could change dramatically due to the mission of any given collection of resources. Furthermore, decisions regarding the importance of a given attribute, such as title for a work, expression, and manifestations, varied as to the find, identify, and select functions. However, in all cases when the value for a given attribute, such as title, was rated as high or moderate for any function, that attribute was deemed a required component of a national bibliographic record.

The study group also examined a wide variety of potential relationships among entities within the context of find, identify, select, and obtain for possible inclusion in the national bibliographic record. As with attributes, if a relationship type had a high value for one or more functions, it was deemed as a necessary relationship to document in the national bibliographic record. An example of such a required relationship is that between an expression and another expression when one expression represents a dependent part of a whole/part relationship (e.g., a volume with a unique title that is published as part of a series). The results for the find and identify functions were rated as high values, and the select function was rated as a low value. Because of the high values for the find and identify functions, the study group recommends that the national level bibliographic record reflect this whole/part relationship.

Basic Requirements for National Bibliographic Records

Based on careful entity analysis, the study group recommended in its report that the basic national bibliographic record should assist the user to do the following:

- Find all manifestations embodying:
  - the works for which a given person or corporate body is responsible
  - the various expressions of a given work
  - works on a given subject
  - works in a given series
- Find a particular manifestation:
  - when the name(s) of the person(s) and/or corporate body(ies) responsible for the work(s) embodied in the manifestation is (are) known
  - when the title of the manifestation is known
  - when the manifestation identifier is known
- Identify a work
- Identify an expression of a work
- Select a work
- Select an expression
- Select a manifestation
- Obtain a manifestation

The report concludes by listing the proposed minimum data requirements, all of which had high user values, for a basic national bibliographic record for all identified formats. The list is arranged in two broad groupings: descriptive and organizing elements. For illustrative purposes, I have provided in figures 2 and 3 the recommended descriptive and organizing elements for the basic national bibliographic record for books and electronic resources accessible through a networked environment such as the Internet. I did not include those elements that are required only under unique or special circumstances.

Title and Statement of Responsibility Area

- title proper (including number/name of part)
- statement(s) of responsibility identifying the individual(s) and/or group(s) with principle responsibility for the content

Edition Area

- edition statement
- additional edition statement

Publication, Distribution, Etc. Area

- place of publication, distribution, etc.
- name of publisher, distributor, etc.
- date of publication, distribution, etc.

Physical Description Area

- specific material designation

Series Area

- title proper of series

Notes Area (Required)

- note on distinguishing characteristic of the expression
- note on use/access restrictions
- standard number

Figure 2. Descriptive Elements for Books

Name Headings

- Name heading(s) for person(s) and/or corporate body(ies) with principal responsibility for both the work(s) and expression(s)

Title Headings

- title heading(s) for the work(s)

Series Headings

- heading for the series

Subject Headings/Classification Numbers

- subject heading(s) and/or classification number(s) for the principal subject(s) of the work(s)

Figure 3. Organizing Elements for Books

How revolutionary are these data requirements? How does this standard differ from other international standards for a book's core description? I chose to compare the IFLA standard with the first level of description from the *Anglo-American Cataloguing Rules* (AACR2) (*Anglo-American Cataloguing Rules* 1988). The IFLA standard parallels the

AACR2 elements except in two instances—the IFLA standard also expects a place of publication and a series statement (if present on the manifestation). I believe that the study largely validates, from a theoretical basis, the first level of AACR2 description and it suggests adding these two elements to the AACR2 standard.

The basic level national bibliographic record also contains standards relating organizing data elements that correspond to relevant descriptive elements such as authors and series as well as subject access.

Descriptive and Organizing Elements for Electronic Resources

One pertinent question that was raised in the study discussions at the 1997 IFLA conference was whether or not the recommendations were flexible enough to deal with "emerging" materials, particularly electronic ones. In preparing this article I thought it would be of interest to see how these basic data elements might describe manifestations of works accessible through the Internet. But with what current standards, if they exist, might I test or compare them? One emerging international standard for this type of networked material is the Dublin Core, which has been developed to describe what I will call electronic Internet manifestations through the use of metadata. The Dublin Core was "intended to facilitate discovery of electronic resources" and "originally conceived for author-generated description of Web resources" (*Dublin Core Metadata* 1997). Its concept has been expanded to meet networked access needs in a more organized context for libraries and museums. Dublin Core metadata are often referred to as a bibliographic description whose elements may be used to find, identify, select, and obtain networked resources available through the Internet. Currently the Dublin Core includes fifteen data elements: title; creator (author); publisher; other contributor; date; resource type; format; resource identifier; source; language; coverage; rights management; and subject and keywords (Lynch 1998). These elements describe a broad variety of information objects and are designed to provide a core or basic form of description. The Dublin Core documentation also discusses the critical issue of relationships to other works, expressions and manifestations, much in the same way as the IFLA standard does.

However, in brief, what are the differences between these two standards? In comparing the two standards for description and organizing elements, I included those IFLA data elements defined as important or significant to the medium. I found that fourteen of the fifteen Dublin Core elements were "loosely" in common with the IFLA data elements. Only one Dublin Core element is missing in the IFLA standard, the specific element of resource type, which represents a textual description of the content of the resource or content description in the case of visual resources (e.g., poem, dictionary, or musical recording). While the IFLA study group recognized its importance to the selection function as an attribute of an expression, it had given it a low core value. In the future, as the pertinent IFLA standards such as the ISBDs are reviewed in terms of format specificity, the inclusion of this element might represent a potential revision.

Areas for Further Study

Several important studies are now underway by the Standing Committee of the IFLA Section on Cataloguing in which the results of this study are being used. This study was designed to direct future focus on the ongoing needs and challenges of international bibliographic control. The report's conclusions and recommendations were deliberately general in nature and were not meant to provide detailed applications for specific media or for the various methods of accessing and displaying bibliographic records. In particular, the study group believed further examination would be necessary by the international cataloging community, particularly with the definition of seriality and as well as the dynamic nature of electronic formats and their universes.

One significant set of studies is the review of the complete set of ISBDs using the results of the study as the initial benchmark in determining appropriate data elements for each format. The Section on Cataloguing is close to completing its review of the ISBD for serials, which takes into account electronic serials, metadata, and, as mentioned earlier, the notion of seriality itself. Other ISBDs under review are those covering audiovisual, nonbook, and cartographic materials. Beyond the ISBDs, other international and national standards might benefit from the type of analysis this model supports.

The study might also represent an initial step toward the creation of a fully developed international conceptual data model for all bibliographic entities. The study did not cover the relationship of bibliographic records to authority control nor did it define what should be the minimal requirements for authority control by national bibliographic agencies. This is the next important step towards a full conceptual data model, and the IFLA Section on Cataloguing has underway a similar study on authority control data. A working group is defining the functional requirements and numbering needs for authority records. Furthermore, the section is promoting the method of the functional requirements study in library schools.

In conclusion, the actual recommendations for the basic requirements for a national bibliographic record were formally presented and accepted at the 1998 International

Conference on National Bibliographic Services in Copenhagen, Denmark. These requirements now represent an essential component of future international cooperative sharing of catalog data.

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