In the name of God

The Functionality of Bibliographic Records of IRANMARC Based on Functional Requirements for Bibliographic Records (FRBR) for Monographs

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Abstract:

Objective: *This research seeks to explain the functionality of IRANMARC bibliographic records of National Bibliography of Iran (NBI) based on Functional Requirement for Bibliographic Records (FRBR) model for monographs.*

Methodology: *The methodology of the research is analytical survey. The study's population consist of 384 records. Data collection method is direct observation using a checklist. In order to collect data needed for the research all bibliographic elements for monographs corresponding to the attributes of FRBR were controlled with the check list.*

Findings: *Results indicate that most of the bibliographic records' functionality of NBI based on the FRBR model relates to the user task "find", with 78.62%, and the least functionality relates to the user task "select", with 63.73%. Mostly, the functionality of bibliographic records of NBI based on FRBR model relates to manifestation level, with 81.28%. The rate of accordance of the bibliographic records of IRANMARC with the recommended attributes by FRBR model is 87.5%. Although the rate of accordance of IRANMARC fields with attributes*

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of FRBR was 87.5%, the rate of value assigned to fields in bibliographic records of NBI based on attributes of the FRBR model was 57.61%.

Keywords: *Bibliographic records, Entities, Functionality, Functional Requirements for Bibliographic Records (FRBR), IRANMARC, Monographs, User Tasks*

Introduction

Library catalogues develop to make information resources available at libraries and information centers easily and quickly accessible. To reach these purposes it is necessary that catalogues support some functions. In other words, when a user interacts with the library catalogue and its records, it is expected that he/she can find, identify, select and obtain desired content objects. These functions are supported by bibliographic records using bibliographic elements and their values. Bibliographic elements can be based on different metadata standards. They provide for different functions of catalogues by describing content objects and making relationships between them.

Designing a model for determining functions of the catalogues on a user-oriented approach was considered in the 1990s. The result was the *Functional Requirements for Bibliographic Records* (FRBR) model developed by IFLA.

Catalogues implementing the FRBR model represent bibliographic information in an enhanced way for end users, providing them with structured access to related objects and collocating them in bibliographic hierarchies.

These features, together with the development of information interaction help to add value to library catalogues as knowledge products

Implementation of the FRBR model in library catalogues depends on the efforts of metadata standards designers regarding the attributes defined by the model as well as of library specialists for extracting values of attributes from descriptions of information objects.

The National Library and Archives of I.R of Iran (NLAI) is the largest library in Iran holding over 7 million information items. It undertakes the task of developing strategies for the library community in the country. In NLAI, bibliographic databases (including books, non-books, periodicals and documents, etc.) and also authority databases (including subject, names, corporate bodies, etc.) are produced according to ISAD, AACR2 and MARC standards.

The IRANMARC committee was established in 1998 in NLAI. The format is a localized version of UNIMARC, developed in 2002 with bibliographic, authorities and holding formats. Stored records in bibliographic, authority and holding databases of NLAI have been produced based on IRANMARC.

The present paper will assess the functionality of IRANMARC bibliographic records (with emphasis on monographs) regarding the FRBR model; the extent to which stored values in the record elements of bibliographic database of NLAI support the functions considered in the FRBR model. Finally, it will present some suggestions for implementing this model in the National Bibliography of Iran (NBI).

Objectives

The research aims to explain the functionality of IRANMARC bibliographic records of NBI regarding the FRBR model, by answering the following questions:

1. What is the functionality of the bibliographic records for monographs in NBI compared with the FRBR model?
2. What is the rate of accordance of IRANMARC fields with the attributes of the FRBR model?
3. What is the rate of accordance of analyzed IRANMARC bibliographic records with the attributes of the FRBR model?

Methodology

The methodology of the research is analytical survey. There are 463597 full bibliographic records for monographs in NBI of which 384 records were selected via simple random sampling through Cochran's formula and Morgan's table. Data collection methods were direct observation using a checklist.

The FRBR model determines four functions for bibliographic records (metadata): to find, identify, select and obtain. To support these functions some attributes and relationships were suggested by the model. In other words to fulfill the four functions there should exist some attributes (elements) and also the possibility of special relationships between bibliographic records.

So in this research attributes and relationships presented by the model initially considered as basis. But evaluation of relationships was impossible because of the following reasons:

- Expansion of relationships
- A comprehensive research needs to be done for determining Linking devices
- The model is not compatible that much with new online catalogues

Authors of this research decided to assess values of fields (elements) in records of NBI based on the FRBR recommended attributes for monographs. Therefore presented tables in the 6th chapter of the FRBR model (IFLA, 1997) were considered as the basis for the checklist. The tables included attributes and functions in all levels of four bibliographic entities and also the value of each attribute in three levels (high, medium, low). Attributes which correspond to fields of IRANMARC holdings format were omitted from the checklist.

The attributes present in the model are so general that this was another problem that the authors encountered during the research. To solve this problem considered attributes of the

model were developed based on RDA elements. This standard proved to be more applicable since it was developed on the basis of FRBR model and its elements were more compatible with online catalogues. These elements were extracted from the FRBR-RDA mapping table published on RDA's official website (Danskin, 2009).

In order to collect needed data for the research all bibliographic elements for monographs corresponding to the attributes of the FRBR were controlled with the check list.

Literature review:

A comprehensive literature review was conducted with emphasis on researches from 1998 to the present with particular focus on case studies, research projects and research papers that discussed Functional Requirements for Bibliographic Records model. The FRBR model is the research result of the IFLA Study Group on the FRBR using entity-relationship (ER) modeling to build up a conceptual model for bibliographic records. The model, approved by the Standing Committee of the IFLA Section on Cataloguing in 1997, is composed of four entities (work, expression, manifestation and item) and their associative relationships (primary, responsibility and subject).

Investigations on the applicability of the FRBR model started as early as 1998. Day (1998) conducted a research on the comparison of Dublin core, FRBR model, and common information system in terms of data modeling. He offered a comparative table of FRBR entity with proposed attributes and Dublin core elements. He also emphasized six types of relations from the FRBR model including created by, embodied in, exemplified by, has a subject, realized by, and realized through relationships.

Hickey, et al. (2002) initiated a series of experiments on the FRBR model, in order to explore the implications of the FRBR model and practical difficulties in system implementation. OCLC selected 1,000 bibliographic records from WorldCat database as an examination on the FRBR model; findings indicated that the FRBR model, which is full of relationships between entities, was useful for de-duplication task of bibliographic records. This report also showed that cost was very high for cataloguing tasks based on the FRBR model.

T. Delsey conducted a survey on Functional analysis of the MARC 21 bibliographic and holdings formats in 2002, offering several revisions to the FRBR model. In his report, Delsey suggested that eight entities related to work should be added into the FRBR model, and they were task, project, program, work unit, contract, grant, program, and curriculum. Also three entities related to item were suggested such as action, authority, and position. Furthermore Delsey created a "record metadata" entity, which included attributes and relationships associated with record, segment, field, and data element.

Murtomaa & Hegna (2002) employed the FRBR model as a basis to analyze the relationships of bibliographic records based on MARC records in the Finnish and Norwegian national bibliographies, and BIBSYS. In terms of data mining, they offered two suggestions to cataloguing as: "The meaning of the authority data and of the language codes should be stressed. With help of authority files we can give our customers the possibility to navigate in the bibliographic universe. With help of language codes we can identify the manifestation as translation. The role of the functions became more and more important. The function statement in the main or added entry field would be very helpful. The search systems and

the design of hit lists could make good use of the function statements. In addition our users could benefit from the function statement in their bibliographical navigation. The functions should not be optional".

Ya-ning Chen and Shu-jiun Chen (2004) presented a case study of the National Palace Museum (NPM) in Taipei to examine the feasibility of the FRBR model. Based on the examination of case study at the NPM, the FRBR model was proven to be a useful and fundamental framework for metadata analysis and implementation. Findings showed that the FRBR model was helpful in identifying proper metadata elements organization and their distribution over the FRBR entities. The model was more suitable for media-centric and association-rich contents. However, in order to refine the FRBR model as a common framework for metadata, it would also require supportive mechanisms for management responsibility relationships for the workflow consideration and refine the distinction between work and expression entity.

Li-Yuan Chen & Chao-Chen Chen (2008) implemented an FRBR model to organize master's and doctoral theses available at the National Central Library of Taiwan (NCL) and assessed its feasibility. They employed the FRBR model to analyze entities and relationships for the theses including 941 records as sample, designed an algorithm, and set up a system for trial runs. Results of the study showed that the FRBR model was better than traditional cataloguing and indexing methods. The study built the FRBR model for the theses to provide the user with better and faster services in accessing the theses collection in the NCL of Taiwan .The study found that FRBR model is not enough the relations for theses. And then, the research enhanced two relations for the FRBR model of the theses.

Kim & Moon (2010) investigated the characteristics of Korean books by analyzing their "work types" based on the Functional Requirements for Bibliographic Records (FRBR) model. A total of 1,000 Korean books were randomly chosen from the Korean National Bibliography (KNB) 2008 and the frequency of each work type was investigated. Of these, 16.9 percent (single works, 2.7 percent and multiple works, 14.2 percent) were found to be multiple manifestations. The usefulness of the FRBR model was found to be limited to some complex works and can be improved by applying its work types in an extended way. Finding of this study indicated that the FRBR model was more useful when a work had more complex bibliographic relations. Yet, items with various work types (e.g. translations, revisions, adaptations, reproductions and interpretations) were limited to some classical works. Also the utility of the FRBR model will be greater if the work concept of the FRBR model is modified and applied and if critiques, continuing resources and other types of resources were included.

Evaluation of the researches in the field of the FRBR model showed that researchers focused on the importance of the model and also identifying the extent to which bibliographic information of the kinds of resources best map into the FRBR model. None of the researches had the same approach as the present research. In this research values assigned to fields of IRANMARC will be evaluated. At the end, some suggestions will be presented to enrich values of bibliographic records and provide an opportunity for NLAI to implement the FRBR model on OPAC.

Findings:

1. **What is the functionality of the bibliographic records for monographs in NBI in respect to the FRBR model?**

User task	Entities of FRBR model	Average of bibliographic records ' values	Expected average based on FRBR	Percentage of Functionality
Find	Work	12.27	15	81.8
	Expression	9	13	69.23
	Manifestation	10.18	12	84.83
	Item	0	0	0
	Total Average	10.48	13.33	-
Identify	Work	11.23	15	74.87
	Expression	19.50	30	65
	Manifestation	20.35	29	70.17
	Item	0	2	0
	Total Average	12.77	19	-
Select	Work	11.30	18	62.78
	Expression	20.97	35	59.91
	Manifestation	18.08	26	69.54
	Item	0	0	0
	Total Average	16.78	26.33	-
Obtain	Work	0	0	0
	Expression	0	0	0
	Manifestation	23.97	31	77.32
	Item	0	0	0
	Total Average	23.97	31	-

Figure 1. The functionality of the bibliographic records for monographs in NBI regarding the FRBR model on user tasks, entities and percentage of functionality

Figure 1 indicates that the highest and lowest support of functionality in the user task "find" belong to the manifestation level, with 84/83%, and the expression level, with 69/23%.

In the user task of "identify", the highest and lowest support of functionality belong to work level, with 74/87%, and the item level, with 0%.

The highest and lowest support of functionality in the user task "select" belong to the manifestation level, with 69/54%, and the expression level, with 59/91%.

Support to the functionality in user task "obtain" is 77/32% (NBI supports user task of "obtain" at the manifestation level and other user tasks are supported by fields of the holding format).

User task	Average of bibliographic records ' values	Expected average based on FRBR	Percentage of functionality
Find	10.48	13.33	78.62
Identify	12.77	19	67.21
Select	16.78	26.33	63.73
Obtain	23.97	31	77.32

Figure 2. The functionality of the bibliographic records for monographs in NBI regarding the user tasks of the FRBR model

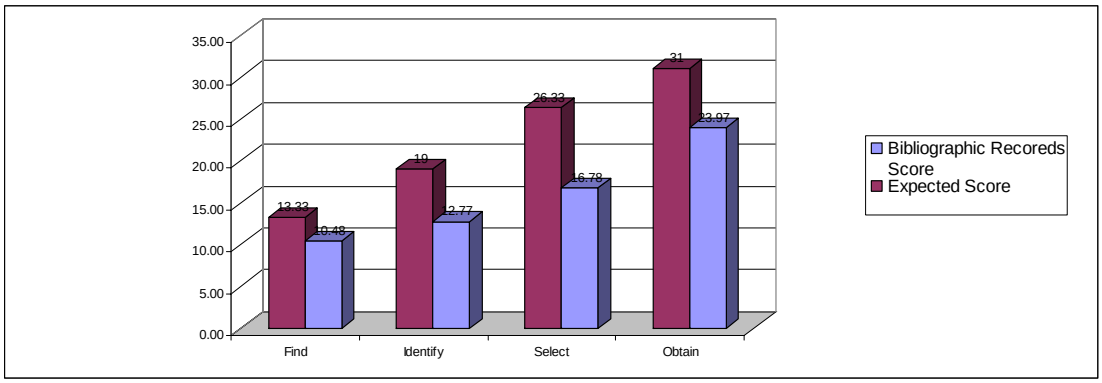

Chart 1. Expected average score of FRBR and average bibliographic records' score

Figure 1 and Chart 1 indicate that, regarding the FRBR model, the highest level of functionality of NBI bibliographic records relates to user task "find", with 78.62%, and the lowest level of functionality relates to user task "select", with 63.73%.

Entity	Average of bibliographic records ' values	Expected average based on FRBR	Percentage of functionality
Work	11.6	16	72.5
Expression	16.49	26	63.42
Manifestation	18.15	22.33	81.28
Item	0	2	0

Figure 3. The functionality of the bibliographic records for monographs in NBI regarding the entities of the FRBR model

Figure 3 shows that the highest level of functionality of bibliographic records of NBI relates to manifestation, with 81.28%, while item has 0%.

2. What is the rate of accordance of IRANMARC fields with the attributes of the FRBR model?

Analysis shows that from 32 attributes recommended by the FRBR model 28 are available at IRANMARC and UNIMARC. In other words, the rate of accordance of the IRANMARC bibliographic records with the model attributes is 87.5%.

3. What is the rate of accordance of analyzed IRANMARC bibliographic records with the attributes of the FRBR model?

No	Entity	Attributes	Rate of Accordance (percentage)
1	work	Title of work	100
2		Form of work	0
3		Date of work	100
4		Other distinguishing characteristic	17.1
5		Intended audience	6.74
6		Date of expression	100
7		Language of expression	100
8		Other distinguishing characteristic	0
9		Extent of the expression	100
10		Summarization of content	4.92
11		Critical response to the expression	0
12		Use restrictions on the expression	100
13	Manifestation	Title of manifestation	100
14		Statement of responsibility	100
15		Edition/ issue designation	23.05
16		Place of publication/ distribution	100
17		Publisher/distributer	100
18		Date of publication/ distribution	100
19		Series statement	48.45
20		Extent of the carrier	100
21		Dimension of the carrier	27.46
22		Manifestation identifier	89.38
23		Source for acquisition access authorization	0
24		Terms of availability	95.85
25		Access restrictions on the manifestation	100
26		Type face (printed book)	0
27		Type size (printed book)	0
28	Item	Fingerprint	0
۲۹		Total Average	57.61

Figure 4. Rate of accordance of the IRANMARC bibliographic records with the recommended attributes of the FRBR model

From the data in Figure 4, the rate of bibliographic fields in records of NBI that correspond to the attributes of FRBR is 57.61%.

Conclusion

Supporting the functions of the FRBR model will increase catalogues' usability and the satisfaction of users as well. Catalogues which use UNIMARC or developed standards based on UNIMARC as a metadata standard for bibliographic records are expected to support recommended functions of the model very well. It is obvious that the attributes (elements) as well as values assigned to them effect on the supporting user tasks. Evaluation of functionality of records for monographs in NBI based on the FRBR model showed that the maximum functionality of these records is user task "find" with 78.62%. This indicates that studied bibliographic records correspond broadly to the model in making content objects searchable. The lowest level of functionality found in these records relates to the user task "select" with 63.73%, which means that bibliographic records of NBI have the least functionality in selecting or rejecting content objects retrieved by users according to their needs.

In what concerns the FRBR entities, the highest and lowest support of functionality were respectively in manifestation and item levels i.e. bibliographic records of NBI support the physical embodiment of an expression of a work more than other entities.

Findings show that the extent to which fields of IRANMARC records describing monographs in NBI correspond to the entities of FRBR is 87.5%. This means that fields of IRANMARC support the model relatively well.

The survey showed that in UNIMARC and IRANMARC there are no equivalences for four attributes only: context for the work, title of the expression, form of expression and context for the expression. It is suggested that the Permanent UNIMARC Committee (PUC) plans to determine equivalences for such attributes. Although the rate of accordance of IRANMARC fields with the FRBR attributes was 87.5%, the rate of analyzed fields of NBI bibliographic records complying with attributes of FRBR was 57.61%. It means that some of the attributes of described content objects have no related values. And this decreases the functionality of records.

In order to increase functionality of bibliographic records of NBI based on the FRBR model it is recommended that NLAI cataloguers fulfill the values of the fields which have not been completed up to now. These fields are identified in figure 4.

Paying attention to this important factor will increase accessibility of content objects of NLAI. In other words, FRBR-based library catalogues will increase the satisfaction of users with the library catalogue which is a major goal of all libraries and information centers.

Suggestions for further research

- The functionality of bibliographic records of IRANMARC based on Functional Requirements for Bibliographic Records (FRBR) for audio-visual materials
- The functionality of bibliographic records of IRANMARC based on Functional Requirements for Bibliographic Records (FRBR) for serials
- The functionality of bibliographic records of IRANMARC based on Functional Requirements for Bibliographic Records (FRBR) for theses

References

Chen Li-Yuan & Chen Chao-Chen (2008). FRBR Implementation on a Thesis Collection in National Central Library of Taiwan: A Prototype Case Study. *Journal of Library and Information Science,* vol. 34, no.1 . pp. 4-14.

Chen, Ya-ning and Chen, Shu-jiun (2004). A metadata practice of the IFLA FRBR model: A case study for the National Palace Museum in Taipei. *Journal of Documentation*, vol. 60, no. 2. pp. 128-143.

Danskin, Alan (2009). *FRBR to RDA mapping*. Available at: http://www.rda-jsc.org/docs/5rda-frbrrdamapping.pdf (accessed 12 May 2012).

Day, M. (1998). *Data models for metadata: some issues for the Dublin core initiative* (draft). Available at: http://www.ukoln.ac.uk/metadata/data-models/draft-report.html (accessed 23 May 2012).

Delsey, T. (2002). *Functional analysis of the MARC 21 bibliographic and holdings formats*. Available at: http://www.loc.gov/marc/marc-functional-analysis/source/analysis.pdf (accessed 23 May2012).

Hickey, T.B., O'Neill, E.T. and Toves, J. (2002). *Experiment with the IFLA functional requirements for bibliographic records (FRBR).* Available at: http://www.dlib.org/dlib/september02/hickey/09hickey.html (accessed 23 May 2012).

International Federation of Library Associations and Institutions, *Functional Requirements for Bibliographic Records: Final Report* (September 1997; amended and corrected through February 2009). Available at http://www.ifla.org/files/cataloguing/frbr/frbr_2008.pdf (accessed 1 May 2012).

Jeong-Hyen, Kim & Ji-Hyun, Moon (2010). Korean books and FRBR: an investigation. *Program: electronic library and information systems,* vol. 44, no. 3. pp. 215-228.

Murtomaa, E., Hegna. K (2002). *Data mining MARC to find FRBR*. Available at: http://folk.uio.no/knuthe/dok/frbr/datamining.pdf (accessed 23 May 2012).