



New display models of bibliographic data and resources: cataloguing/resource description and search results

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«Conversations about catalogues indicate that the boundaries of this terrain are currently in a state of flux» (La Barre).

This paper finds its origin in the study of the cataloguing tradition, the Italian one and the Anglo-American one, both with a strangely similar route that goes through the catalogue cards, the International Standard Bibliographic Description adoption and the Functional Requirements for Bibliographic Records principles. The study of the rules applicability, as a method, has always taken into account their possible data display into web environment as a fundamental part of the cataloguing work itself, also considering the data entry in cataloguing phases as a communicative activity, since it is deeply bound to the data display.



1 An unmediated cataloguing communication

In a short period of time, catalogues have moved their display on the Web, also passing quickly from being locally to being web scale consultable. The catalogue cards are unknown for the majority of our youngest users, but they still exist in the libraries. Where catalogue cards are still in use, their research in alphabetical order not mediated by any software can result something new at the beginning. Probably they are already considered examples of historical catalogues, digitalized as manuscripts.¹ This is a descriptive, plain cataloguing with no hidden data for users. The communication between cataloguer and user is totally unmediated by any software or by any code and users could even read the doubts or the mistakes of a cataloguer handwritten or typewritten on the card.

Another important element is that the cards order was fixed, only changing for new library acquisitions. This fixity means a fix sequence among records and data as a communicative model that in a few years has been completely broken up and deconstructed, *de facto*.

¹It is worth to indicate two Italian projects of digitalization of card catalogues. The historical catalogue of the Biblioteca Panizzi of Reggio Emilia, containing the ancient and the modern card catalogues digitalized, <http://cataloghi.comune.re.it/Cataloghi/html/Schede/index.php>; and the digitalization project of historical catalogues of Italian libraries carried out by the Ministry of Cultural Heritage, <http://cataloghistorici.bdi.sbn.it/index.php>.

2 The “ISBD centered” cataloguing communication

Since 1974 International Standard Bibliographic Description (ISBD) has been a model for bibliographic description for every kind of catalogue. ISBD is also a model of bibliographic data communication, which allows to identify the function of the elements regardless of the language comprehension of their meaning, only through their position in sentences and punctuation (for a reflection on role and functions of ISBD in cataloguing see also Guerrini and Bianchini).

ISBD structure can be considered a knowledge pattern. As scholars of semantic web know, any kind of data needs communicative frames and patterns to be meaningful. ISBD structure wasn't born for semantic web, but its syntactic relationships express the function of its elements. The knowledge pattern is theoretically considered as a unit of meaning for the semantic web, a multidimensional model able to capture its descriptive, informational, situational, social, and formal characters. According to Aldo Gangemi, only triples and graphs or complicated ontology schemata are at the moment research objects. Knowledge patterns instead should be the primary research object to focus on for web semantic studies, since they reflect the intuition of frames on the semantic web and provide the structure needed for representing the different context dimensions (the reference is to the paper presented by A. Gangemi at the conference “Noetica versus informatica”, Rome, November 19-20, 2013, to be published; see also Gangemi and Presutti; Gangemi).

Anyway, ISBD communicative structure has in fact been already replaced by communication models considered easier for non-expert users, based on the use of descriptors, tags, of bibliographic elements that explicitly state their function.

In Italy the online catalogue of the National Central Library of

Florence still adopts the ISBD format of record visualization as the first option of data display, but it can be considered a single case in the scenery of online catalogues.

3 Catalogues, from sentences to phrases

With the coming of the World Wide Web the Integrated Library Systems have provided cataloguing modules and web interfaces aimed to show catalogue records and library holdings for off-site research, the so called Online Public Access Catalogue. Here it would be possible to refer to many examples, as the University of Harvard's HOLLIS Classic catalogue,² in order to reflect on how in a natural way the Integrated Library Systems (ILS) have broken the ISBD knowledge pattern. Displaying a catalogue record it is clear that the areas and their elements are described by tags recalling and stating their function to users. In this context ISBD still indicates the minimum number of elements of the description, but not the elements order, that can be different from the ISBD areas order and hence defined by the catalogue administrator. Some fields of the ILS catalogue record give access to heading lists, giving rise to the first forms of navigation among data. The ILS data display for the second-generation catalogue has subdivided the ISBD sentences in multiple elements clearly described by tags for end users, every tag stating evidently the element function. The latest display model is the preferred one for the online catalogues because it is considered

²Searching the Harvard Library Portal, <http://library.harvard.edu>, it is possible to select the Hollis Classic catalogue, implemented through an Integrated Library System. It contains entries for many, but not all, materials in formats other than books and journals owned by the Harvard University Libraries (e.g., manuscripts, maps, visual media, microforms and government documents). HOLLIS Classic also contains service features which let users check their library record for checked out or requested materials, track their search history, renew circulating materials.

more comprehensible for non-expert users; the ISBD display option is generally a secondary one (for a definition and a classification of second-generation catalogues, see Barton and Mak). In the second generation catalogues realized through the ILS the relationship cataloguer-user is definitively mediated by the software and by the MARC formats: not every cataloguing element is shown to end users. The huge amount of coded fields and the authority files allow the navigation among data and the retrieval of the catalogue records and holdings, so leading users to the right result but remaining invisible.

4 On the Web: relevance as communication criterion

Continuing with Harvard's libraries, we can notice that beside HOLLIS Classic there is another research possibility: HOLLIS.³ The same library but with a new catalogue interface. Hollis can be classified among the next-generation catalogues, a new kind of interface of the catalogue for end-users in the Google era. Since the Eric Lease Morgan's principles delimiting the definition of a next generation catalogue in 2006 and in 2007 (Lease Morgan), products like AquaBrowser, Primo and VuFind have been developed for libraries by vendors or by the open products environment. Morgan created a mailing list on the topic of the next generation of library online catalogues, thence through the discussion that ensued he defined four attributes for that topic: it is not a catalogue; it avoids multiple databases; it is bent on providing services against search results; it is built using things open. Actually they are not catalogues or

³Harvard Library Portal, «HOLLIS searches the Harvard Library for books and some tables of contents, dissertations, journals (not articles), audio/video, images, music scores, maps, digital materials, manuscripts and archives».

cataloguing modules, but tools defined to structure search differently. In Harvard's HOLLIS the single search box goes towards the users habits, but the relevance ranking of results here declared is not the same as the Google one. Firstly users here can only search the Harvard collections, secondly library systems haven't got the Google relevance algorithm. Anyway Harvard's users, first-year students but also scholar community, probably want to search mainly the Harvard collections when using HOLLIS. Nevertheless the user choice of the newest version of the catalogue can be related to other factors. A study conducted for OCLC in 2009 reports a disconnection between the librarian perception of catalogue quality and the user one. Users tend to prefer the web environment for their search and above all they look for catalogue records enriched through tables of contents, summaries and images. The OCLC study so encourages librarians to pay more attention also to the library's delivery services together with the accuracy of metadata, taking care of adding data that improve the users experience (Calhoun et al.).

Systems like HOLLIS give direct access to full texts owned by the library, while faceted search capabilities and enhanced visual displays enrich the search chances, according to the distinctive features of this new library search tools (Nagy). Thinking about the communicative approach of systems like HOLLIS, we have to notice that the records are mainly sorted by relevance, as first display option, while title and author options are secondary choices. This means that the catalogue records order is not mediated by librarians, but by the relevance criteria assigned by the software. Furthermore the faceted navigation model pulls out elements catalogued through metadata and exposes them listed in panels to refine or recombine the search results. Consequently the possibility of recombine and refine the results are almost infinite while the cataloguer suggestions are limited. Users create search lists, cataloguers insert metadata as

precisely as possible (Calhoun et al.).

5 Navigation among data: the entity-relationship model

In 1998 the first publication of Functional Requirements for Bibliographic Records marks a change detectable in subsequent years in the possible ways of organizing databases rather than in cataloguing. The new Italian cataloguing rules, REICAT, and Resource Description and Access have finally adopted FRBR principles, even partially. FRBR has proved its influence on the world of library systems causing two very different results in data display systems: the first forms of groupings of similar records shown in result lists; new navigation systems among data catalogued according to FRBR principles. OCLC WorldCat and PRIMO by ExLibris show a first form of clustering of similar catalogue records inspired by FRBR. They are not cataloguing modules, but display interfaces of next generation catalogues, according to Morgan's principles. Taking WorldCat as an example, searching a famous work usually present in a catalogue in many editions and formats, as Shakespeare's *Romeo and Juliet*, the result is a list of groups of similar records enclosed in panels. Each panel is expandable and shows every single manifestation. Examining carefully different groups of records it is possible to confirm that different panels contain manifestations and expressions of the same work. They are divided in different groups because manifestation titles are even slightly different or because the records have different formats, but they could converge into a single group since they represent the same work. As these catalogue interfaces select and order data through MARC fields, it is possible to assert that if any record, any manifestation of the same work conveyed the

uniform title of the related work they could all be linked in a single group. In fact, the uniform title may be used by such systems as the primary criterion for groupings records (Petrucciani). That stated another question arises. The result list in systems like WorldCat shows records divided in panels and groups, while the records display seems flat, with low possibilities of navigability among different panels. With a similar display structure deep changes in cataloguing methods probably wouldn't be appreciable. ExLibris Primo displays catalogue records also groupings similar records in panels, where do exist several manifestations having reference to the same work.⁴ The manifestations grouped in the same panel as related resources seemingly share features as the same author, format, the same words in the title field and the same words in the uniform title field (where existing). Working differently with uniform titles in cataloguing phases could give raise to more specific groups of related resources. Nevertheless in this case too we can notice that records are grouped together but do not create a navigable model as the FRBR conceptual model provides for. Therefore again it has to evaluate if it is useful to go deeply in cataloguing according to FRBR conceptual model having a flat structure of data display (Dempsey).

The use of FRBR model to build up a new navigation system among data represents a different case. Here the underlying concept is not only the activity of grouping data by sorting criteria, but mainly to bring changes in cataloguing methods. The library consortium of four Belgian Universities «Académie Louvain» has been experimenting a FRBR implementation of the traditional catalogue since 2006 (The catalogue of the Académie Louvain is realized through the software VIRTUA from VTLIS, which allows the choice of classical or FRBR cataloguing. See Kalf). Cataloguing based on

⁴The examples examined have been taken from the Primo implementation at the British Library, http://explore.bl.uk/primo_library/libweb/action/search.do?dscnt=1&dstmp=1397406216872&vid=BLVU1&fromLogin=true.

FRBR criteria is reserved to classical works existing in the database in many versions and items. The search of a title produces a list in this order: work record, expression records and manifestation records. The data are encoded using MARC field and all the semantic entrances are connected only to the work level. The display model is a tree graph, which represents also a navigation model among data. Every title selected from the list of results leads to the tree graph and to the single record description, while at the same time the nodes of the graph are all expandable and navigable. In this case a cataloguing method based on FRBR criteria does originate a navigation model, where the tree organization of the display allows users to maintain a visual map of the data they are scrolling through. T. J. Dickey indicates precisely the tree organization as one of the possible technical solutions to actually changing the database structure of a catalogue according to FRBR (Dickey). The Catalogue Boreal experience requires such an evident effort in cataloguing phase that wondering if it was useful the answer could be affirmative, because the result is a navigation model that creates a network among data. In the case of Boreal, cataloguing creates paths throughout the data, leading users from works to items and *vice versa*.

6 Bibliographic data on the Web, with or without rules?

The word catalogue is not theoretically linkable to the new kind of tools that we can ascribe to the Jason Vaughan's definition of web-scale discovery tools (Vaughan). They interrogate catalogues and also aggregate information taken from local and nonlocal silos with a new technique, as they harvest metadata from library resources even if not owned, through negotiated arrangements. The metadata

harvested are then compiled into a single centralized index that constitutes the basis for a quick search. The newest discovery services integrate the search across all product provided by an institution as well as other existing content pre-harvested and indexed, although not accessible through the library. Web-scale discoveries allow a contemporary search through the metadata and through the full text owned, hence the results are sorted by relevance. As for the case of next-generation catalogue, the relevance criterion is not easily perceptible, but certainly the frequency of use of resources can influence their ranking in result lists. Users interact in many ways with such tools. Searching, selecting and downloading resources they influence the relevance criteria of the discovery system; moreover social technologies combined with discovery tools encourage users to interact and participate with the library. The use and the opinions of library end-users can change the display order of resources, creating new relevance criteria. The old catalogues are now websites allowing direct interaction among users and librarians in very different ways. A tangible result of this dynamic discovery system is the ever-changing list of search results: the same search in two consecutive days produces a different order of the same elements, especially in case of the most used resources. Therefore there are almost three main components that build up the discovery tool display criteria for a library. Librarians catalogue resources using metadata, then stored in silos as for instance the library catalogue and the institutional repository; they also indicate which local and remote silos have to be connected through the discovery system. Discovery vendors or suppliers decide relevance ranking criteria, always minimally negotiable with libraries; they also conduct a normalization of local or previously harvested metadata, usually with the aim to make uniform the display of data extracted from very different sources, so hiding the catalogue display, for example. Users interact with

discovery systems and influence the relevance criteria just searching, asking for and using resources; moreover, where possible, also writing their opinions. The search result lists in a discovery system seem to be a common work made by librarians, users and vendors, but is this the right way? From the fixity of the order of catalogue cards and of the first typology of ILS, libraries are moving to systems where it is not even possible to determine the order of the categories of content accessed through the library. Anyway, this kind of revolution has to be accepted and steered by librarianship, because its denial would mean to go against the new age that Luciano Floridi defines *hyperhistory*, which follows prehistory and history according to him. We live in a society totally dependent on Information and Communication Technologies that allow us to record, to transmit and manipulate information. As according to Floridi the emergence from its historical age represents one of the most significant steps taken by humanity for a very long time, new technologies for libraries should be considered as new opportunities (Floridi). It is not possible to assert that these discovery systems are governed by the rules of librarianship, or that are completely designed for the needs of the users. In fact, often the large amount of the results, the lack of a perceptible order, the illusion of always being able to get the full text of the resources listed may be a limit for users. Probably the leading sensation in this first phase of dissemination of discovery systems is that the rules of data visualization are dictated by the software vendors, improved or limited by technology, even if the possibilities of customization are various (Kortekaas). Accuracy and authority control in cataloguing phases of every kind of resource should be the only guarantee to navigate properly through a catalogue or a website and then successfully reach the right information. The identification of the authorized controlled form for all works would be a simple and not anachronistic goal to reach that would

probably survive to the normalization activity of metadata today conducted by web-scale discovery systems.

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ABSTRACT: The article analyzes the major changes of the display systems of bibliographic data occurred over the past 20 years. The catalogue is examined as a communication tool in relation with the new technologies that allow its understanding and use. The online catalogs accessible offsite, outside the library, have changed with the evolution of technology and of the Web. They stay beside and together with other kind of contents attainable through the library, while libraries are testing the centralization of access. New actors and cataloguing tradition are experiencing new communication systems, the librarianship is choosing if stay outside or inside this process.

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