Abstract

FRBR is a model with great potential for our catalogues and bibliographic databases, especially for organizing and displaying search results, improving navigation, and establishing relationships. Although it has been around for more than a decade, there have only been a few partial implementations made so far, probably also due to the complexity of the model. In the paper, two current uses of FRBR are presented and shortly discussed. Based on the deficient use and exploitation of FRBR in these implementations, the authors suggest information visualization as a promising technique for better displaying the structures and relationships in FRBR. They present the potentials and drawbacks of information visualization and introduce some ideas on how a user could see and interact with a visualized display.

Keywords: FRBR, user interfaces, information visualization, online catalogues

1.0. Introduction

More than ten years have passed since the Functional Requirements for Bibliographic Records (FRBR) have been published. This conceptual model, which described how our bibliographic databases could be structured and what functions they should fulfil (Gonzales, 2005) has been an important topic in the library community ever since. Although it has been studied extensively how to best use its potentials, there have only been a few partial implementations of FRBR. Dickey (2008) writes that the "admitted weakness" of the FRBR theory is that it still remains basically a theory with only a few working systems.

So far, most of research has focused on finding ways to apply the FRBR model in cataloguing, transforming the current bibliographic records, and using existing formats to work with FRBR. Although these issues are still a work in progress, we wish to dedicate this paper to another important perspective of the FRBR implementation: the display of FRBRized catalogues to users. As Tillet (2005) argues, we need to know how to take best advantage of the FRBR concepts as we construct the future information system designs. The importance of user interface specifications such as navigation and presentation of results has already been emphasised in the past (Žumer, 2002; 2005), but has not really been given a lot of attention, probably due to more basic problems that needed to be solved first in order to enable the implementation of FRBR.
2.0. Why FRBR?

Again and again we come back to the question why FRBR is so important. There are some (e.g. Beall, 2006) that believe FRBR has not proven to be successful during these ten years and are amazed at how it has managed to stay in the spotlight for so long. But FRBR has the potential to change our catalogues; it can especially contribute by organizing search results, improving navigation and display of information to users. Tillett (2005) writes that one of the basic beauties of FRBR is that it reminds us of the key objectives of a catalogue, such as enabling finding and collocating bibliographic records. FRBR establishes relationships between records and helps to bring together all versions of a distinct intellectual work that exist in a collection, all expressions of a work and all manifestations of an expression. By collocating and displaying bibliographic families in smaller and meaningful clusters, the structural foundation of FRBR should make the display more understandable, helping users to navigate search result, identify relationships, and easily access all works and expressions derived from and centring around a specific intellectual creation. This would give users a somewhat different view of a bibliographic database (Bennett et al., 2003) as they would be able to see items in the context of a catalogue. Riva (2007) also points out this explorative power of FRBR, where users are presented with opportunities they did not imagine, but have, once seen, recognized them as relevant.

2.1. Examples of FRBR displays

Different reports reveal that so far developers have not particularly dealt with how to best present the results; they have mostly added the FRBR as an additional function that did not really make much of a difference in the way the results were presented to the user. McGrath & Bisko (2008) observe that FRBR-inspired catalogues have so far only grouped records into work sets and have therefore not implemented the complete model or fulfilled the potential of the FRBR. Figures 1-4 present some of these current implementations of FRBR or better said “FRBR inspired features”. We can see that the results are grouped at the work level and only after choosing the appropriate work the user is given a detailed list of results, which is, as in all other catalogues, just a linear list of manifestations. The expression level is not explicitly presented, but in some cases (e.g., Flemish Central Catalogue3 – Figure 3) we are offered the option to refine results by some expression level attributes such as language or performer. Looking for other FRBR features, we can also find a presentation of a subject relationship (this work is a subject of another work – Figure 3) and a link between a musical work and all the manifestations where it appears.

So what are we missing in these presentations? FRBR is all about providing users with structure and relationships. As Aronsson (2007) writes, presenting our results in flat lists of hits where each hit is basically a catalogue card shows how limited our imagination can be. It would be interesting to see users’ reaction to a more structured visual display of the results. Just looking at the Flemish catalogue, we can imagine a graphical presentation of the FRBR structure and relationships substituting the current word cloud. To implement FRBR in a larger extent, the resulting display should also offer more “relationships” links (successor, abridgement, arrangement, whole-part, etc.).

Now seems to be a good time to start thinking about other ways to present collocation, relationships, and other structures in our catalogues. We believe that exploration of different possible displays is important if we really want to exploit the full potential of FRBRized catalogues, which leads us to look at the possibilities of using information visualization techniques.

3 The catalogue is available at: http://zoeken.bibliotheek.be/
Figure 1: FRBRization in Fiction Finder work record displays all manifestations of the work in an unstructured list.

Figure 2: The Flemish Central Catalogue, which runs on Aquabrowser platform, collocates records by work, alerting the user when there are more editions within the result (we will not argue here on the accuracy of the implementation as we are interested mainly in the way libraries present the FRBR structure and relationships).
Figure 3: The Flemish Central Catalogue offers users to look at all the editions presented in a linear list or to use the faceted navigation and refine the results by expression, manifestation or even item level attributes. It even connects the work with the works about it.

Figure 4: The Flemish Central Catalogue also offers FRBR functionality for musical materials, where a composition or a song is presented as a work. For each song or composition, the catalogue lists the albums where it appears.
3.0. Information visualization

Information visualization communicates and presents abstract data, information, and knowledge through a graphic display, thus making it easier for users to perceive, understand, comprehend, and discover knowledge within the data. In information retrieval, Song (2000) describes information visualization as a segment of the user interface which brings a visual searching structure and presentation of relationships between entities. In information retrieval, information visualization therefore not only presents the information graphically, but also enables users to retrieve information by clicking on visualization. Visualization also has the potential to provide users with useful overview, giving them more understanding of the overall structure and contents of the collection or the search results (and that is exactly the feature we could use in FRBRized catalogues).

Many scientists argue that visual presentation supports human cognition and enables us to process the data quicker and recognize patterns and structures such as clusters, trends, and relations (Shneiderman, 2002). However, these characteristics all apply only to well-made visualizations; a visualization that does not consider the laws of human perception can do more harm than good as it requires more time for processing and therefore hinders the very thing it was made to help.

3.1. What is the problem with visualization?

Reading on information visualization, we can see certain potential within the FRBR context, but there are, however, also some possible problems. Despite the obvious potential for information seeking, information visualization has so far not really proven to be better than textual retrieval. Information visualization is a broad topic and can not be discussed in detail here (some issues can be found in Mercun & Zumer, 2008), but we do argue that information visualization should be further explored in the context of FRBR. What happened in the past was that researchers and developers in the field of information visualization were so absorbed in what could be done, that they did not put enough attention to what should actually be done (Kules, 2006). This has often led to vast visualizations that failed to improve information seeking and retrieval. Kules (2006) suggests that a combination of text and visual presentation might in general prove to be a better solution.

Information visualization is a complex process as it translates textual data onto a spatial dimension. Thinking about how to apply information visualization to FRBR, we are faced with some dilemmas. Firstly, there are a number of visualization techniques and choosing the right one is not an easy task. Selecting and constructing a visual concept, we first need to decide upon what structure and organization to use, which entities, attributes, and relationships to display, how to mirror the data onto the structure, and last but not least, how to make the solution as intuitive as possible, so that anyone could easily use it. Within FRBR, we should also ask ourselves what will users search for and what will they want to see in the results? Would they be more interested to see the work, the expression, or the manifestation level? In what context? We also need to consider the differences between various types of materials (books, music, video…), as users may look for different things within each material type.
3.2. Playing with ideas

The basic structure of group 1 entities is a hierarchical top down tree structure (Figure 5), but we sometimes forget that there is more to FRBR than that (see Figure 6). We should take into account relationships and aggregate works where a manifestation consists of multiple works or multiple expressions of a work. Considering this we can see that the structure starts turning from hierarchical into a network.

In information visualization, there is a distinction between techniques for hierarchical and techniques for network presentation of results. Figure 7 shows an example for each of these two techniques, which we see as possible candidates for FRBR implementation. To really present what FRBR is all about, a combination of tree and network structure might be the best option: the tree technique would embed the work-expression-manifestation structure and the network technique would bring in the relationships. Using techniques such as zooming, distortion, and expanding outline technique (see Heo & Hirtle, 2001), a user would either get a broad overview of the work or zoom in the part he/she was interested in, making it bigger and in the centre of attention. By holding on a particular point and moving the mouse, the user would change the perspective he/she was looking at and by clicking on a node, he/she would enter a new query, resulting in a different result set in the middle of the screen and a new visualization that would use the chosen entity or attribute as the central point. The network structure could be incorporated into the tree display or it might be offered in a separate tab. As visualizations cannot hold much textual data, they would be most useful as navigational tools and not as the central source of information.

Of course this is just one possible scenario, using the more complex and dynamic visualization techniques. A more elementary use of the suggested example would probably be a more feasible option. Using the display structures as shown in Figure 5 and Figure 6 would also enable a step forward from the current flat lists. With this kind of visualization, users would be able to more easily and quickly recognize the differences between various expressions and manifestations, helping them decide what they needed.

![Figure 5: A typical hierarchical presentation of FRBR model.](image-url)
4.0. Conclusion

FRBR has built upon works and ideas from the traditional library and some have even proclaimed it to present an end of an era (Denton, 2007). Using FRBR in our catalogues and other bibliographic databases is believed to be very valuable for users’ information seeking process, but unfortunately the implementation has not been as quick as we have hoped for. Although there is work being done on the synchronization with our current cataloguing practice, it is high time we start thinking about the ways to best use and exploit FRBRized structures in our catalogues. As FRBR proposes a more complex representation of the bibliographic universe, the task of displaying it is not an easy one. The idea of information visualization supports the presentation of structures and relationships, giving users an overview and better understanding of the content and we believe that thinking within the framework of information visualization and using it as the basis for our further exploration of the topic is a move in the right direction.
References


