Multiple Interpretations: Implications of FRBR as a Boundary Object

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IFLA's Functional Requirements for Bibliographic Records (FRBR) is a model of the bibliographic universe. Any brief, critical review of the FRBR literature quickly shows that there is no clear consensus on the nature of the FRBR Group 1 entities. This situation becomes more complicated when one looks at theoretical attempts to operationalize FRBR by researchers and practitioners with different motivations and experience: each has its own flavor. Given the recognition that these different understandings are unlikely to be unified or reconciled, this paper performs an exploratory analysis of FRBR using technological frames and boundary objects as theoretical lenses to reveal implications for future research and practice.

FRBR

The Functional Requirements for Bibliographic Records (FRBR) is a "conceptual model of the bibliographic universe" (IFLA 1998). The FRBR Group 1 entity types are *work*, *expression*, *manifestation*, and *item*. *Works* are characterized as "a distinct intellectual or artistic creation", *expressions* as "the intellectual or artistic realization of a work in the form of alphanumeric, musical, or choreographic notation..." (a particular text for instance), *manifestations* as "the physical embodiment of an expression" (an edition for instance), and *items* as "a single exemplar of a manifestation". Appropriate attributes are assigned to each entity, for instance a *work* might have a genre, an *expression* a language, a *manifestation* a typeface, and an *item* a condition. According to the standard FRBR interpretation: *works*, *expressions*, and *manifestations* are abstract objects, *items* are concrete physical things.

One of the major goals of the IFLA working group that developed FRBR "… was to produce a framework that would provide a clear, precisely stated, and commonly shared understanding of what it is that the bibliographic record aims to provide information about, and what it is that we expect the record to achieve in terms of answering user needs" (IFLA 1998). It is not controversial to read "commonly shared understanding" to mean that the FRBR authors were hoping that the entities they defined in FRBR would have a single interpretation that was immediately understandable by all library science readers. When FRBR first came out, it got rave reviews, precisely because many people felt it clarified matters greatly. However, a closer reading of the literature indicates that library science readers who come from different parts of the community have interpretations of FRBR entities that are, at times, radically different, and possibly incommensurable. This was not entirely unforeseen: since the time of Dewey and Cutter, library standards developers have recognized the need for individuals in local institutions to customize the standards to local needs. This intellectual work is typically off-loaded entirely to the local institutions, and FRBR is no exception. For example, FRBR states: "The concept of what constitutes a work and where the line of demarcation lies between one work and another may in fact be viewed differently from one culture to another. Consequently the bibliographic conventions established by various cultures or national groups may differ in terms of the criteria they use for determining the boundaries between one work and another" (IFLA 1998). This can be problematic when consortia attempt to share metadata created at different individual institutions; or when, in the case of FRBR, different local institutions each try to develop their own cataloging software that theoretically should produce data export formats that are harvestable and interoperable.

The purpose of this poster is neither to nitpick FRBR nor to challenge its validity. Rather, this poster uses FRBR as an interesting manifestation of the problem of multiple interpretations. While some may debate whether individual humans necessarily interpret conceptual or abstract objects differently, it is clear that, in practice, individuals *do* differ in their interpretations. Thus, the question is, how do we handle it in our efforts at conceptual modeling? This poster suggests that certain sociological theories such as Star's theory of boundary objects may prove especially useful, and presents some *prima facie* implications for both cataloging practice and conceptual modeling from a preliminary application of boundary object theory to FRBR.

Multiple Interpretations of the FRBR Conceptual Model

A brief review of the literature indicates that there is no clear consensus on the nature of the FRBR Group 1 entities (e.g., Yee 1998; Renear, Phillippe, Lawton & Dubin 2003). Furthermore, stakeholders from different communities of practice within library and information science (LIS) often use different interpretive frameworks for understanding the FRBR conceptual model. This is best illustrated by applying Orlikowski & Gash's (1994) theory of technological frames[1] to selected writings of researchers and practitioners. Two examples follow (see Figure 1).

Jones (2005) uses a pragmatic, systems-oriented approach to understanding FRBR, based on his experience cataloging serials. For Jones, the *work* level construct, for example, is a construction into which the materials to be cataloged must fit, and he is particularly concerned as to how the dynamic nature of serial publications will have to be twisted to fit into cataloging rules developed from FRBR. He sees the amount of extra work for the cataloger as a primary criterion for the evaluation of FRBR as a model. Thus,

because Jones considers *work* as a systems-level construct, it becomes important only when actualized by being implemented in cataloging rules. His concern with the FRBR model regards how its simplicity may constrain the utility of any actualization derived from it. Thus, his technological frame focuses on cataloging practice as mediated by cataloging technology and the functionality that these technologies can provide both the user and the cataloger.

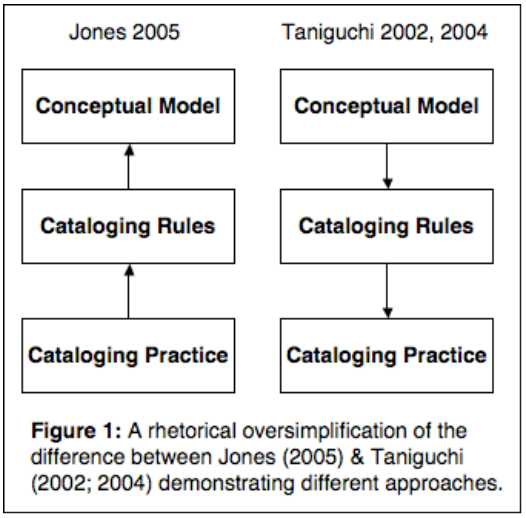

Figure 1: A rhetorical oversimplification of the difference between Jones (2005) & Taniguchi (2002; 2004) demonstrating different approaches.

Taniguchi (2002; 2004), on the other hand, sees FRBR as but one of several conceptual models, each of which has different strengths, some of which are (to some degree) interchangeable. He articulates a personal model which he feels is better, but finds the more important questions to be, (1) how are the concepts in the conceptual model translated into cataloging rules and practices, and (2) what will be the primary construct of the conceptual model which those rules, and thus cataloging activity, will be constructed around. Once these are established, he sees the major problems as solved. While on the surface, Taniguchi may appear similar to Jones in his concerns, the difference is that, for Taniguchi, the conceptual model constructs are the important things to focus on: if the conceptual model is correct, and the correct level of focus is developed, then the translation activity should be a relatively straightforward process (for which he proposes a mechanism in Taniguchi 2004). Thus, his technological frame is the mechanism for translating the conceptual model into cataloging rules and practices. Since this technology is straight forwardly applied to a conceptual model, getting the model right becomes most important.

Each of these examples suggest a fundamentally different approach not only to interpreting FRBR, but also to how FRBR should be further developed so that it is more useful to practitioners. This is important because FRBR is intended to enable practice, not just to be an abstract theoretical model of the bibliographic universe. Thus practitioner concerns will have primacy when FRBR is extended.

Implications from analyzing FRBR as a Boundary Object

The fact that there exist different technological frames for different communities of practice, and that LIS is able to use FRBR to discuss issues in cataloging, indicates that FRBR functions (at least to some degree) as a boundary object (Star & Griesemer 1989). This is expected from Bowker & Star's (1999) classification theory, given that FRBR serves as a standard both for communication, and for coordinating action. What this means, however, is that boundary object theory can suggest areas for future research into FRBR, as well as implications for how to move forward when FRBR is applied to practice.

Bowker & Star (1999) demonstrate that classification systems are always subject to continuing negotiations surrounding their structure, interpretation, and organization. It is rare to find a classification system that is fixed, which is still in use; such negotiations are an integral part of any actively used standard. FRBR is no exception to this rule. Not only is it one of the most recent conceptual models in an effort that began with Cutter and continued with Lubetzky, but FRBR itself is being extended by the development of FRBRoo out of harmonization efforts with CIDOC CRM (2008; see Figure 2). Even if FRBRoo stabilizes, and Jones's (2005) concerns regarding serials are met, this continual process of evolution and negotiation is unlikely to end.

The major implication of this is that "FRBR-compliant" cataloging systems that are developed should have extremely flexible information architectures that can support *changes* in our cataloging practices, not just current practice. To do this, we should be moving the locus of control of our software systems into the hands of our technical services librarians, i.e. via open source software (OSS) models, so that our librarians have the ability to adapt the software to changing standards and practices. If we hire programmers instead of buying software licenses, we can distribute the development efforts between institutions by having our programmers contribute source code changes they make back to the development community. At the University of Illinois at Urbana Champaign, both the main library's IDEALS project's use of DSpace, and the library school's use of Moodle have already implemented this model with significant success: the software is gradually becoming more and more suited to local institutional needs. If, as a profession, we were to use this model to develop production-scale cataloging systems, even if it means integrating multiple software packages (e.g., Koha with Liferay), we might end up with a model that costs the same as our current vendor-based models, but provides significantly better software functionality than currently available commercial cataloging systems.

For a boundary object to be most useful, it needs to serve as a mechanism for translation between *all* the different communities of practice who are using the boundary object. According to boundary object theory (Star & Griesemer 1989; Bowker & Star 1999), a successful boundary object allows groups with different understandings of the object to still communicate and coordinate action despite different goals. FRBR does appear to function to some degree as a translation mechanism between different communities of practice, especially with more traditional materials with physical containers, e.g.: books, videotapes, and CDs. However, as FRBR itself states: "The aim of the study was to produce a framework that would provide a clear, precisely stated, and commonly shared understanding of what it is that the bibliographic record aims to provide information about…" (IFLA 1998). It is less clear that this

has occurred despite positive initial responses. There exist interpretations of FRBR which are fundamentally different in nature and thus do not translate. For example, the manner in which Renear & Dubin (2007) would apply FRBR to the digital world is not commensurate with how many librarians interpret FRBR in their daily work activities. Whereas Renear & Dubin (2007) believe the *item*-level construct must be a physical object (i.e., portions of a hard drive) for librarians to have an accurate account of what happens in computer systems; in practice, most institutional repositories (IRs) treat either files or collections of files as their *item*-level constructs; Johnston (2009) suggests a usage for resolving URIs appropriately that is similar to IR librarians. This is particularly interesting because both Renear & Dubin and IR librarians approach FRBR, to some degree, from a preservation point of view; both have technical motivations for their choices of item-level representation; and most importantly, both have chosen interpretations of FRBR that are largely consistent with the documentation[2] and wholly consistent with the spirit of the documentation. Yet their interpretations are fundamentally inconsistent with one another (see Floyd & Renear 2007 for reasons why). Clearly there is a need for additional research on these issues: How does FRBR function or fail to function as a boundary object in both the international library community and in wider communities? How can fundamentally inconsistent interpretations of FRBR be reconciled (e.g., via adding entities to the FRBR model)? If they are unreconcilable, can we at least translate between implementations of each interpretation?

Current research on the reconciliation of fundamentally inconsistent interpretations of FRBR is incomplete. However, some recent work suggests ways in which we might move forward. First, we likely will need to develop more refined ontologies for representing our conceptual models. Renear & Dubin (2007; Renear 2006) have been examining the ontological structure of FRBR, and have developed an account of this structure that is particularly suited for incorporating multiple points of view. In their account, they argue that *expressions*, *manifestations*, and *items* are roles that other, more fundamental entities can play. "In each case the actual instantiation of the role relationship by an entity is brought about by contingent social circumstances" (Renear & Dubin 2007, 10). Thus, a *symbol sequence* can play the role of an *expression*, a *physical form* can play the role of a *manifestation*, and a *physical object* can play the role of an *item*, if these non-Group-1 entities are socially established in that role. The power of this approach is that entities such as "files" can be socially established as items because they fulfill the role requirements of an *item* (see Floyd & Renear 2007 for why this may be desirable). However, there is still work to be done in refining this model, because (1) it does not deal with the *work* entity, an entity whose nature is unclear (compare: Levinson 1991; Yee 1998; Svenonius 2000; IFLA 1998); and (2) it is currently based on a philosophical realist worldview and thus cannot accept a file as playing a role without an account of the fundamental nature of a file, say as a cascade of social facts (Searle 1995; Renear & Dubin 2007). It is also likely that Renear & Dubin's (2007) refinement is but one of many such refinements the FRBR framework will need.

Second, as Renear & Dubin (2007) suggest in their concluding remarks, we will likely need multiple ontologies which are closely related, but which are optimized for different purposes and are designed in such a way that there are clear translations between them (though in some cases with information loss). Some, known as *ideal form* models, will be useful primarily for ontologists and cataloging theorists to develop more robust models of the bibliographic universe. It is likely, however, that the complexities required to make ideal form models robust will be unnecessary for systems developers and cataloging practitioners to concern themselves with. Therefore, simplified versions of these models, known as *implementable form* models, will need to be developed which are more appropriate for practitioners to follow. The benefit of this approach is that the simplifications we make in our models will be explicit. Therefore, if we discover that our practical models are oversimplified, we will know how to reintroduce complexity in a smooth and efficient manner.

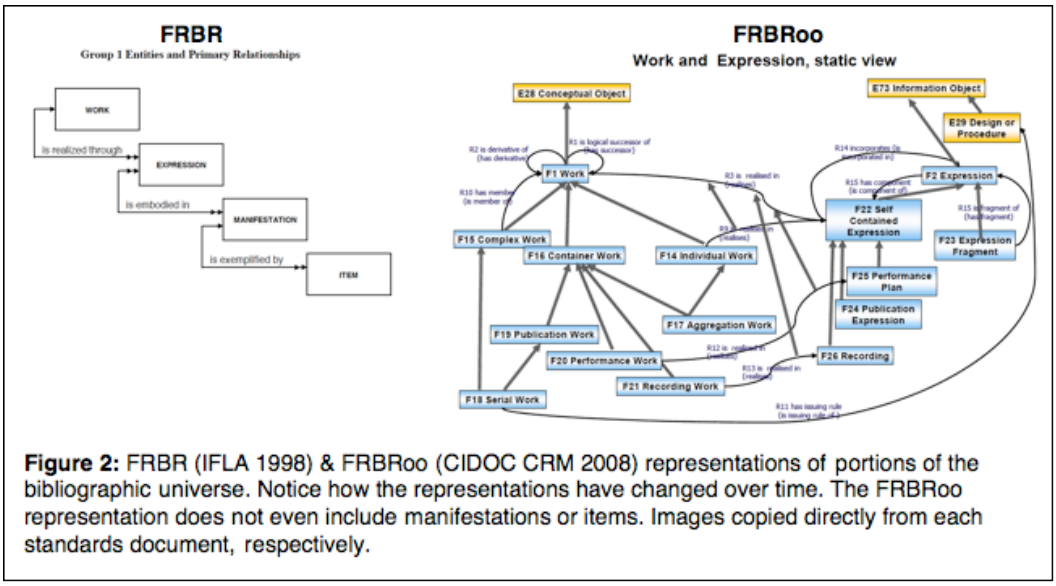

Figure 2: FRBR (IFLA 1998) & FRBRoo (CIDOC CRM 2008) representations of portions of the bibliographic universe. Notice how the representations have changed over time. The FRBRoo representation does not even include manifestations or items. Images copied directly from each standards document, respectively.

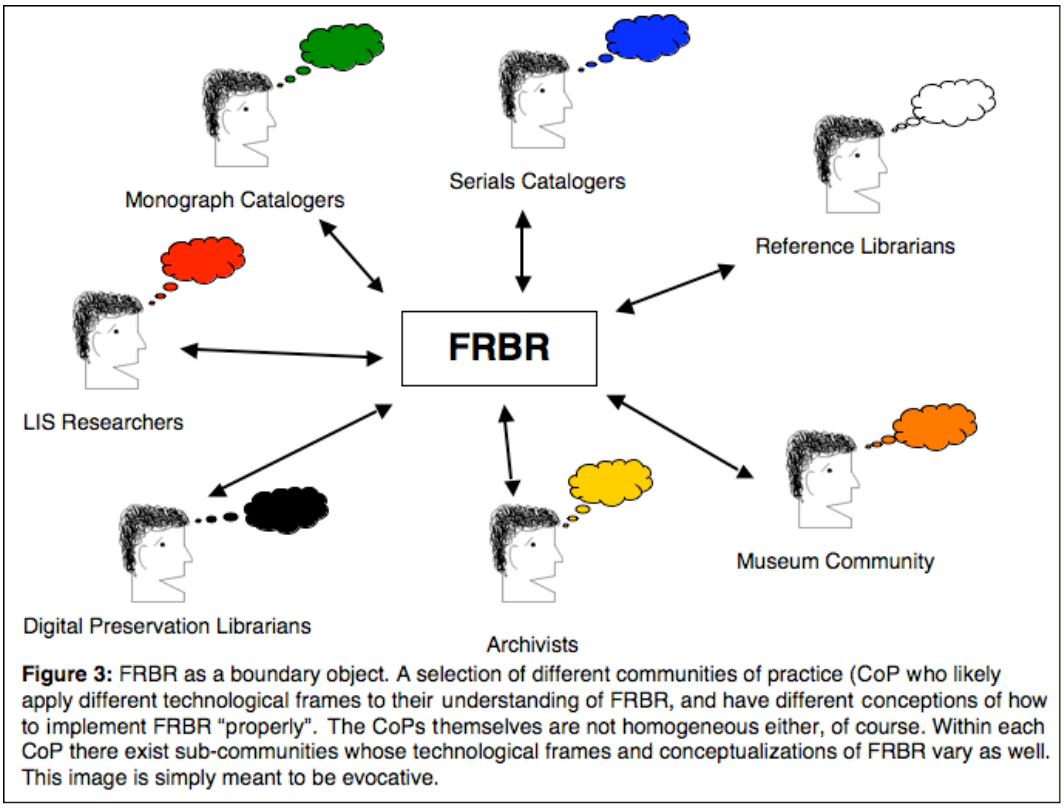

Figure 3: FRBR as a boundary object. A selection of different communities of practice (CoP who likely apply different technological frames to their understanding of FRBR, and have different conceptions of how to implement FRBR "properly". The CoPs themselves are not homogeneous either, of course. Within each CoP there exist sub-communities whose technological frames and conceptualizations of FRBR vary as well. This image is simply meant to be evocative.

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[1] I use a broad definition of technology here, one that encompasses both conceptual tools and analog tools in addition to computational tools.

[2] As pointed out by Floyd & Renear (2007) FRBR's documentation is internally inconsistent when applied to the digital world.