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## A Critique of the FRBR User Tasks and Their

### Modifications

#### **ABSTRACT**

*The four FRBR user tasks have become widely accepted as functions of the library catalog, but there have been only sporadic discussions concerning their validity and sufficiency, despite their modification in the models subsequently presented in the FRAD, FRSAD and draft FRBR-LRM reports. This article presents a critique of the four variant sets of user tasks, and proposes an extended set of six generic end-user tasks, applicable to both bibliographic and authority data: locate, collocate, connect, identify, select and obtain. The paper also outlines their interrelationships and suggests those tasks that may be particularly well supported by professional cataloging.*

**KEYWORDS:** *FRBR, FRAD, FRSAD, user tasks, search behavior, cataloging value*

## INTRODUCTION

The four “user tasks” enumerated in the *Functional Requirements for Bibliographic Records* (FRBR),<sup>1</sup> namely “find”, “identify”, “select” and “obtain”, are now widely accepted as key functions of library catalogs and other bibliographic databases. These and the four user tasks enumerated in the *Functional Requirements for Authority Data* (FRAD)<sup>2</sup> form the basis of the tasks that the international cataloging code, *Resource Description and Access* (RDA), aims to support.<sup>3</sup> Since RDA was first published, another set of four user tasks was formulated in the *Functional Requirements for Subject Authority Data* (FRSAD),<sup>4</sup> which covers a category of authority data, i.e. subject authority data, not specifically addressed by FRAD. The three sets of user tasks postulated in FRBR, FRAD and FRSAR overlap, but not completely. An attempt to harmonize the models, including their sets of user tasks, of the three reports, can be found in the recent draft of the *FRBR-Library Reference Model* (FRBR-

LRM).<sup>5</sup> It presents the five generic tasks, for both bibliographic and authority data, of “find”, “identify”, “select” and “obtain”, plus “explore”.

However, the FRBR-LRM draft provides minimal description as to how these five tasks were arrived at, while the wider literature provides only the occasional insight into the intellectual evolution of the user tasks over the past two decades.<sup>6</sup> Harej and Žumer discuss what became the five FRBR-LRM tasks in light of the two models of interactive information retrieval proposed previously by Ellis and Belkin.<sup>7</sup> Ellis’s model consists of eight behaviours of human interrogators of information retrieval systems, namely, starting, chaining, browsing, differentiating, monitoring, extracting, verifying and ending; the way in which these behaviours combine depends on each particular search context. Belkin’s model includes the notion of “information-seeking strategies” that are characterised according to four variables, namely, method of interaction, goal of interaction, mode of retrieval and resource considered. Harej and Žumer concluded that the FRBR tasks, particularly “identify” and “select”, were reflected in elements of both models of information system use, but not that they necessarily fitted the models better than alternative sets of tasks.<sup>8</sup>

More than a decade earlier, Svenonius briefly critiqued the original FRBR tasks in her book, *The Intellectual Foundation of Information Organization*, arguing that the four tasks provided an inadequate picture of how the catalog supported users.<sup>9</sup> She proposed an additional task, i.e. “navigate”, and that the “find” task be split into two sub-tasks; both proposals will be discussed later. In somewhat similar vein, the *Statement of International Cataloguing Principles* published by International Federation of Library Associations and Institutions (IFLA) in 2009 also listed the four FRBR tasks plus “navigate”; a revised Statement is to be published shortly.<sup>10</sup>

This article examines the validity and sufficiency, or otherwise, of the sets of user tasks proposed by FRBR, FRAD, FRSAD and the draft FRBR-LRM. As an outcome, it

suggests a revised set of tasks that could be equally applied to the modelling of both bibliographic and authority data use, and outlines how these tasks interrelate operationally. Finally, the paper discusses how the tasks, as fundamental, generic constructs of document retrieval or “search”, can be supported by professional cataloging as well as by computerized content-based retrieval and social metadata.

## THE FRBR USER TASKS

The definitions of the four user tasks enumerated in the FRBR report are often quoted. They are:

“to *find* entities that correspond to the user’s stated search criteria (i.e. to locate either a single entity or a set of entities in a file or database as a result of a search using an attribute or relationship of the entity);

to *identify* an entity (i.e., to confirm that the entity described in a record corresponds to the entity sought, or to distinguish between two or more entities with similar characteristics);

to *select* an entity that is appropriate to the user’s needs (i.e. to choose an entity that meets the user’s requirements with respect to content, physical format, etc., or to reject an entity as being inappropriate to the user’s needs);

to acquire or *obtain* access to the entity described (i.e. to acquire an entity through purchase, loan, etc., or to access an entity electronically through an online connection to a remote computer).”<sup>11</sup>

“Entities” refer here to those resources provided by libraries and other information agencies, and are represented in the (original) FRBR entity-relationship model by the constructs of “work”, “expression”, “manifestation” and “item”, i.e. the so-called “group 1

entities”, or “WEMI” hierarchy.<sup>12</sup> The user tasks may be seen as an update of previous sets of objectives, such as the oft cited “objects of a catalogue” proposed by Cutter.<sup>13</sup> Library catalogs have been regarded as important “finding” tools, rather than mere inventories, for a very long time. As an index, the catalog allows the user to find resources in a collection without having to look through the items themselves, by searching on records representing those resources. This can be more efficient because the records are more concise and can be accessed more rapidly and in multiple ways. In FRBR, the term “find” is thus used in the “intellectual” sense, in which one finds *out* about the existence of resources represented by their records. This generally leads to an attempt to “find” resources in a “physical” sense, which is represented by the fourth FRBR task, i.e. the *obtaining* of resources (e.g. by accessing them online or via a call number).

The second and third FRBR user tasks, identification and selection, are not quite so obvious, and were not always stated so explicitly in earlier cataloging literature. Nevertheless, their value should be reasonably clear. At some point before information resources are used, it is prudent to establish that they are the correct/best/relevant ones. This can be done through an initial inspection of the items themselves, and often is, but *preliminary* identification or selection can also be carried out at the catalog, before the items are obtained, saving the time needed to obtain (access to) those that are not the right/best/relevant ones. This is what constitutes the “identify” and “select” tasks in FRBR. The two tasks can be associated with two different, well-established types of catalog search, namely “known item” searches on the one hand, and “subject” searches, or, more accurately, “unknown item” searches, on the other.

Known-item searching is an old term for what in the FRBR context would be called, and will be here, “known resource” searching. That is, specific items, manifestations, expressions and/or works may be known to, and sought by, the user. Typically, the catalog

user searches for (with the aim of *finding*, in the FRBR sense) a particular work, caring little about which manifestation of it they obtain, let alone which item (i.e. copy). However, sometimes they will be searching for a particular expression, and sometimes a particular manifestation; occasionally they may even be trying to find a particular item, in which case they will usually be searching, in effect, for a specific item, manifestation, expression and work *simultaneously* (rarely would the user be interested in an item regardless of its information content). Similarly, the term “unknown item searching” becomes “unknown resource searching” in the FRBR model: users often search for unknown resources with particular attributes that pertain to works, such as subject, perhaps in combination with particular attributes that pertain to expressions, such as language; occasionally, they may also be interested in “carrier” attributes, such as file format or branch library location (typically in combination with one or more “content” attributes, pertaining to works and expressions).

If the user is looking for a “known resource” and retrieves several records from the catalog, the information presented in the records should be sufficient for the user to *identify* which (if any) of the records represent the resource sought, so that they can then set about obtaining it (or them). Even if only one record is retrieved, confirming (or otherwise) that it represents the “right” resource before trying to obtain it, would generally be a good idea, though perhaps not as beneficial in cases where the resource represented by the record is immediately downloadable—identification could then be carried out by inspecting the resource itself.

If, on the other hand, the user is looking for “unknown resources” that possess particular *attributes* (e.g. they are on a particular subject) or particular *relationships* (e.g. they are based on another work), and retrieves one or more records from the catalog, they will not identify a particular resource, or at least not in the “confirmation” sense, but instead they will *select* resources that possess the particular attributes or relationships they sought and quite

possibly other attributes and relationships that are indicated in the records. Thus users may select resources on the basis of (a) information they *encounter* in the records and/or (b) predetermined criteria that were not specified in the search query. However, selecting against predetermined criteria really amounts to a second, manual step (which could be automated through a “limit” search) of a two-step “find” task, and as such does not form part of the “select” task in the FRBR model.

Selection can also occur, in fact, in *known-resource* searching. Multiple records for a known *work* may be retrieved for different items/manifestations/expressions of it, (if the user had no particular item/manifestation/expression in mind when they entered their query); all these records represent the resource that the user was searching for. Yet the user will not usually need or want all the items that carry the desired work, and may instead *select* one, or a limited number, of them, based on information about the various items/manifestations/expressions encountered in the records. It should be noted that this selection is done, in theory, after the correct, sought-after work has been *identified*.

It should be acknowledged that in real life search goals themselves can also evolve during the search process. For instance, a known-resource search may retrieve, serendipitously, records of other resources considered even more useful than the known resource; in this way, selection can likewise follow known-resource searching. However, such selection is, by definition, not a direct consequence of a known-resource search, and is a result of what amounts to the finding of unknown resources. Thus it pertains to the basic sequence of unknown-resource search and selection, in contrast to the other basic sequence of known-resource search and identification, in our conceptual model.

As with identification, selection at the catalog can save users’ time and effort. Although this saving may, as with identification, be less significant in the case of resources readily obtainable online, it is worth pointing out that bibliographic records may include

helpful information, for the purposes of selection, that the resources themselves do not contain, or do not readily present to the user. For example, a record may include an independent review of the resource.

It is thus a perfectly reasonable expectation that library catalogs and other bibliographic databases support the four FRBR tasks: the carrying out of each of the tasks can help meet information needs and desires. However, this does not preclude the existence of other tasks that could also usefully be performed at the catalog. Nor does this mean that the four tasks identified in FRBR report could not be reconceptualized as a different set of tasks. The FRBR tasks were put forward as a *conceptual model* of optimal user-catalog interaction. A major purpose of the model is to allow for the determination of elements needed to be included in bibliographic records.<sup>14</sup> However, not all commentators have agreed that the four FRBR user tasks constitute the *best* model for this purpose. For instance, Svenonius argued for the inclusion of the additional task of “navigation”,<sup>15</sup> which we shall discuss shortly.

## THE VALUE OF THE FRBR TASKS AS CONSTRUCTS

Before we consider possible additional tasks, we might discuss whether all of the four FRBR tasks are needed for the purpose of determining the required bibliographic elements. It might be argued, for instance, that FRBR’s identification task is, in fact, superfluous for this purpose, as those elements used to identify a resource could alternatively be used to “find” it, by entering the relevant values in the search query. In other words, the elements needed to identify and find a resource are the same. This need, though, is likely to be relative: some elements are likely to be much more supportive of the tasks than are others. Moreover, this relative need may in fact vary across the two tasks. Although a given element would help users find and identify resources in the same way, i.e. by “pinpointing” them, users may find it easier to identify than to find a resource by means of a given element, or vice-versa. This is



because the *processes* of finding and identifying are different; finding is typically carried out by *writing* (i.e. keying in a search; or by some other input mechanism, such as verbalisation), whereas identifying is done by *reading* (or by some other kind of reception). Some bibliographic elements (such as edition statements) have values that tend to be easier to read accurately than to write accurately, particularly into an empty search box. Thus the *most* important elements for the two tasks could well be different, and so both tasks should be included in the model.

As selection is also, like identification, based on criteria suggested *by* records, it should be fairly clear that the elements most needed for this task could again well be different from those most needed to “find” resources: the sort of resources that might come to the user’s *mind* at the start of a search are not necessarily going to be those prompted by the results screen. And while identifying and selecting resources are both tasks based on received (e.g. displayed) elements, the former is closely associated operationally, as we shall discuss in the next section, with the finding function, or more precisely with a particular finding sub-task that is *not* the finding sub-task with which selection is more closely associated.

Since “obtaining” resources quite clearly requires particular elements that, again, do not necessarily coincide with those needed for the other three functions, we may conclude that all four FRBR tasks are worthy components of their model.

## FINDING SUB-TASKS

We also need to consider whether the FRBR tasks should be subdivided, if not merged.

While the tasks *could* be subdivided in any number of ways, the more complex the resulting model, the harder it would be to apply. However, there is a more obvious way in which the “finding” FRBR task could be refined, based on a distinction we have already made, namely, between the “finding” of known and unknown resources. This distinction was pointed out by

Svenonius, who distinguished between known-item finding and the “collocation” of sets of resources that display particular characteristics (i.e. attributes or relationships).<sup>16</sup> Both tasks are covered by the FRBR definition of “finding”, but Svenonius draws attention to the difference of objective: on the one hand, to separate out a resource, and, on the other, to bring resources together.

Given that the lists of particularly important bibliographic elements for known-resource finding and collocation are likely to be different (for instance, collocation often uses subject elements, whereas known-resource finding does so rarely), and that the two tasks are both extensively carried out,<sup>17, 18, 19</sup> and that the distinction is well established in cataloging theory,<sup>20</sup> it does seem helpful to divide the FRBR task of finding into the two sub-tasks, just as FRBR divides post-search activity into the two tasks of identification and selection. It should be noted that in a FRRBized catalog the finding of a specific higher-level resource, such as a work, amounts to *both* known-resource finding and collocation, as the work record should be linked to all the records for its expressions, manifestations and items. This mirrors the situation, described earlier, when *both* identification (of a sought-after work) and selection (of particular items containing the work) takes place, after a search.

Whereas Svenonius uses “locate” for both types of finding,<sup>21</sup> this term would appear especially appropriate for finding particular resources, as opposed to groups of resources with particular characteristics, and contrasts well with “collocation”. We shall thus adopt the two terms, *locate* and *collocate*, for the two different sub-tasks; “locate” will be defined as “to find particular sought-for entities”, whereas “collocate” will be defined as “to find entities with particular sought-for attributes or relationships”.

## NAVIGATION

As well as refining the finding task, Svenonius proposes that an additional task is incorporated into the model, namely that of “navigation”, which she considers similar to the “browsing” of book shelves.<sup>22</sup> In fact, browsing may be considered a component of the FRBR *selecting* task: users select resources by browsing their unknown-resource search results. As Svenonius’s observes, selection is a result of people not always coming “to a search for information knowing exactly what they want.”<sup>23</sup> Svenonius notes how shelf browsing is facilitated by bibliographic classification; similarly, the browsing of result sets can be facilitated by providing various *sort* and *limit* options, including “faceted navigation”, as well as by displaying those bibliographic elements that most help users make selections.

However, catalog users may not even know what resource attributes or relationships they want, let alone what resources, and so may not be in a position even to conduct an *unknown-resource* search. This does not mean, though, that they must resort to a “lucky dip”. Svenonius argues that the catalog should be set up to facilitate users’ navigation of the *whole* database, not just result sets. When users’ search goals are less clear such that they “do not quite know or are unable to articulate the object of their search”,<sup>24</sup> they need help *before* they try to search for resources.

Svenonius defines “to navigate” as “to find works related to a given work by generalization, association, or aggregation; to find attributes related by equivalence, association, and hierarchy.”<sup>25</sup> She points out that this function is already supported by many catalogs and by cataloging codes (even before the advent of RDA). The means by which catalogs support this function is indicated by the second part of her definition: “to find attributes related by equivalence, association, and hierarchy.” Svenonius has in mind here, of course, the catalog’s *authority files*, particularly its subject authority files, which conventionally include “use” or “see” references, as well as “RT”, “BT” and “NT” (or “see also”) references. Through this reference structure, users are guided to “headings” for related

values, which have been used in the bibliographic file to describe particular resource attributes, such as subject, and such as authorship in the case of name authority files. The structure helps users identify *what* it is they are looking for and *articulate* it in the language of the catalog's bibliographic records.

Sometimes, a user may search for, and *locate*, a particular author or topic on an authority file. After positively *identifying* it, they will *obtain* its heading to search the bibliographic file. However, other times, an authority search may not be quite so straightforward. The user may search for topics in a “subject area”, for instance, and find a set of them related by “association” or “hierarchy”. In other words, the user may *collocate* a set of authorities from which to *select* (perhaps based on certain information in the entities” authority records, e.g. in scope notes), and then *obtain* one or more headings. These authorities may also offer references to other authorities, which might lead to further sets of authorities, and so on—in this vein, the user starts to “navigate” the catalog, to use Svenonius's term.

It should be noted that when Svenonius talks of “attributes” related by “equivalence”, she really means the *values* of attributes, i.e. their headings and equivalent, non-preferred terms and names. In a similar way to how a bibliographic file user “finds”, in the FRBR sense, both a work and one or more items containing the work, the authority file user finds both a concept and one or more linguistic values for the concept, including, conventionally, a preferred value (i.e. heading).

The first element of Svenonius's “navigation” definition (“to find works related to a given work by generalization, association, or aggregation”) is perhaps slightly less clear. Most likely, Svenonius is still thinking here about the use of authority files, in the traditional, pre-FRBRized sense, that is, of *title* authority files. However, in a FRBRized catalog, the title authority file becomes the records that represent works in the *bibliographic* file. In the FRBR

model, therefore, this kind of navigation occurs *after* resources, i.e. *works*, have been “found”. While the user might search for a work to locate it and select an item containing the work, they might also search for a work to *collocate* a set of related works, since records for works, in the FRBRized catalog, may include entries in linking fields for related works, be they related by “generalization, association, or aggregation”. The user might then link through to a related work record and encounter more links to other sets of related works. Following these links in the FRBRized bibliographic file constitutes a similar form of “navigation” to that described above in the authority file. The behaviour may be alternatively described as a *series of collocations* of related entities. Its iterative and exploratory nature is why Svenonius describes the navigator as “roaming from point A to point B and so on to reach a destination.”<sup>26</sup> The “bibliographic universe” is navigated by means of “maps”, i.e. *reference structures*.

## THE FRAD USER TASKS

Some of the differences between the FRBR, FRAD and FRSAD tasks are due to the way the overarching entity-relationship model, as embraced by those groups working on the respective reports, has evolved over time. Svenonius’s “navigation” task might thus be covered by the FRAD and FRSAD models which post-date her book. The FRAD user tasks, proposed as the key functions of authority files, are to:

“*find* an entity or set of entities corresponding to stated criteria (i.e., to find either a single entity or a set of entities using an attribute or combination of attributes or a relationship of the entity as the search criteria); or to explore the universe of bibliographic entities using those attributes and relationships;

*identify* an entity (i.e., to confirm that the entity represented corresponds to the entity

sought, to distinguish between two or more entities with similar characteristics) or to validate the form of name to be used for a controlled access point;

*contextualize* [i.e.] place a person, corporate body, work, etc., in context; clarify the relationship between two or more persons, corporate bodies, works, etc.; or clarify the relationship between a person, corporate body, etc., and a name by which that person, corporate body, etc., is known (e.g., name used in religion versus secular name);

*justify* [i.e.] document the authority data creator's reason for choosing the name or form of name on which a controlled access point is based."<sup>27</sup>

We should note here that the “user” is conceived of, in this model, as not only *end-users*, but also catalogers charged with maintaining the authority file. Of course, this broad definition of “user” could be equally applied to the FRBR tasks: bibliographic files are also maintained, and used, by catalogers. The accommodation of the cataloger's information needs is the reason for the inclusion of the final FRAD task, i.e. “justify”, which is primarily a cataloging concern. It is, in fact, akin to citing the source of resource description in the bibliographic record (catalogers quite often note where they got their bibliographic information from, e.g. “cover title”). Clearly this task requires different elements from those of the other tasks, and it could therefore be profitably included in the model, but we shall limit our definition of “use” here to that of end-use, as does the draft *FRBR-Library Reference Model*.<sup>28</sup> Although end-users also sometimes want to evaluate bibliographic or authority data, they do this when they *select* entities.

The first FRAD task, i.e. to “find”, appears to be more or less the same as the FRBR equivalent; only the entities, i.e. data, are different. Records of *bibliographic* data represent information resources (the group 1 entities), whereas records of *authority* data represent, according to FRAD, the (revised) group 2 entities of persons, families and corporate bodies

associated with (i.e. “responsible” for) information resources.<sup>29</sup> Of course, the group 2 entities are not the only entities represented in catalogue authority files, but subject (i.e. group 3) authority data was left to the authors of FRSAD, while title authority files became part of the FRBRized bibliographic file. A more generalized treatment of authority data would accommodate not only all the existing kinds of authority file, but also other *potential* authority files, representing other resource attributes.

As has already been pointed out, authority files support the searching of bibliographic files. Searching bibliographic files requires both a conceptualisation of an information need, or search goal, and an articulation of that need (or goal). Authority files help meet both of these requirements. For example, subject authority files can help the searcher work out what topic they want resources on and what term they need to search on to find these resources. In the FRSAD model, the topic and term are referred to as “thema” and “nomen”, respectively.<sup>30</sup>

Just as we split the FRBR “finding” task into locating and collocating, we can do so for the FRAD “finding” task, as the FRAD definition indicates: users can search authority files to *locate* a single entity or *collocate* a set of entities. They can likewise locate a particular *value*, and confirm, for example, the meaning of the particular term, in the language of the catalog, or they can collocate a set of entries that include a particular term.

However, the distinction between location and collocation of authorities is only a useful one if we propose that group 2 or 3 entities need to be collocated according to common attributes as well as direct relationships. This is because the collocation of directly related entities is achieved by *locating* one of the entities, whether this is at the conceptual or linguistic level, so that although the ultimate aim is different, the means, and thus the element set, is the same.

FRAD stipulates various attributes for describing group 2 entities, for “second order” searching. Clearly, this kind of searching may be desirable on occasion. For example, users

may want to collocate authors of resources by their nationality or gender. Collocation of authorities by common attribute helps users to search the catalog not only for resources by particular authors and on particular subjects, etc., but also for resources by particular *kinds* of author, on particular *kinds* of subject, etc. In theory, we could extend this order out, by indexing and searching on attributes of the attributes of the attribute, and so forth. Indeed, there is no end to such extensions (just as there is no end to the *possibilities* of the Semantic Web). However, we shall assume here that two files to search on, i.e. the authority and bibliographic file, is the limit of what is practicable, from a *human* searching and indexing point of view.

While location and collocation cover the first part of the first FRAD task, there is also a second part: “to explore the universe of bibliographic entities using those attributes and relationships.” We have already noted the exploratory connotation of the term “navigation”, which was used by Svenonius to represent the following of references/links across a network of authority (or work) records. It was suggested that the activity represents a series of “collocating” tasks, which are performed *through* the “location” of a related entity. This form of “location”, however, is slightly different from the known-resource search entered into the search box, and essentially equates to the *identification* of a particular entity through encountered data (i.e. a reference). Thus it does not require a different set of elements and need not be included in our model as an additional task.

Like “find”, the FRAD definition of “identify” corresponds fairly closely to the FRBR definition. The user confirms that the entity is the one sought (e.g. it is the “right” person); in theory, this includes the identification of the value sought, i.e. “the form of name to be used for a controlled access point”, after it has been located.

The third task enumerated in FRAD, i.e. “contextualize”, is about “clarifying” relationships between different entities at both conceptual and linguistic levels. Such



clarification is essentially part of the process of *selecting* the “appropriate” conceptual entity or entities in order to obtain the correspondingly appropriate heading or headings. However, it is not clear how this “contextualisation” could be operationally delineated, as a sub-task, from other components of the selection process.

This leaves omitted from the FRAD list two tasks on our FRBR list that we have already associated with authority file use, namely, selecting entities and obtaining headings. The *selection* of topic(s), author(s), etc. is a task which follows the *collocation* of related topics, authors, etc. This mirrors the *identification* of the “right” topic, author, etc. following a *locating* search on the authority file.

The *obtaining* of the heading to search the bibliographic file is missing from both FRAD and FRSAD, even though there is scope for the task in the latter model, as it distinguishes between entity and heading, or “thema” and “nomen”. Although obtaining the heading requires only an indication of which “nomen” is authorized, this datum is unique to this task, and so “obtain” will also be added to our model of authority file use.

## THE FRSAD USER TASKS

The FRSAD model was published a little more recently.<sup>31</sup> The FRSAD user tasks are to:

*find* one or more subjects and/or their appellations, that correspond(s) to the user’s stated criteria, using attributes and relationships;

*identify* a subject and/or its appellation based on their attributes or relationships (i.e., to distinguish between two or more subjects or appellations with similar characteristics and to confirm that the appropriate subject or appellation has been found);

*select* a subject and/or its appellation appropriate to the user’s needs (i.e., to choose or reject based on the user’s requirements and needs);

*explore* relationships between subjects and/or their appellations (e.g., to explore relationships in order to understand the structure of a subject domain and its terminology).”<sup>32</sup>

The first three tasks appear to represent, in relation to subjects, the three authority tasks of find, identify and select that we have already described. We have also already encountered the term “explore”, to describe the following of a series of references between entities, including subjects, but concluded that while this form of exploration is an important user *activity*, it does not represent an additional task for the purpose of our model, but rather a series of collocations. The “explore” task discussed by Harej and Žumer is similarly redundant, to the extent that they associate it with this form of collocation.<sup>33</sup>

On the other hand, there is another form of “exploration” and “collocation” that could be usefully distinguished as a different, and additional, task for our model. We incorporated collocation *by common attribute* into our sub-models of both authority and bibliographic search. This form of “collocation” can also be done *during* the search process, as well as at the start of a search. Users may encounter (authority or bibliographic) data in record displays that provides them with new search ideas—they can follow up on these by either copying the data into a new search box or by clicking on the data, if it has been provided as a hyperlink. For instance, the user may click on a subject heading in a bibliographic record to “collocate” all the works about that subject, or on a name heading to “collocate” all the works written by that author, or on a series title heading to “collocate” all manifestations published in that series, and so on. Or they may click on a link in an authority record to “collocate”, for example, all the authors of a particular nationality.

It was argued earlier that locating and identifying are two tasks rather than one for our purposes because the latter is based on encountered, or received (typically *read*), information, whereas the former typically involves *writing* and is thus based, often, on the user’s

knowledge and memory. Similarly, collocating entities at the start of a search, via an empty search box, may require the support of different elements, or in a different order of importance, than does “collocating” entities via a hyperlink in an encountered record. To distinguish this second type of *intra*-search “collocation”, we shall use the term “connect”, in the context of both authority and bibliographic file use, avoiding the term “link” due to its association with the use of links to related authorities and works. To *connect* is therefore a special form of collocation and will be defined as “to find other resources with a particular attribute value encountered in a record”.

This connecting function allows for what is sometimes called “pearl searching” or “pearl growing”, when searchers use encountered data in records to explore the database further.<sup>34</sup> It also allows for what is often called “faceted navigation”, in which users link to a subset of the previous record set based on a certain attribute value.<sup>35</sup> This of course is the equivalent of adding the attribute value to the initial search, i.e. narrowing it. However, typically faceted navigation is not premeditated, but the result of the user’s encounter with retrieved data.

## THE DRAFT FRBR-LRM USER TASKS

The FRBR-LRM aims to “consolidate the FR family into a single coherent model to clarify the understanding of the overall model.”<sup>36</sup> Its five user tasks and their definitions are as follows, with the term “resource” being used in a very general sense, to mean any group 1, 2 or 3 entity or any actual library resource:

“*Find* -- to search on any relevant criteria in order to bring together information about one or more resources of interest;

*Identify* -- to clearly understand the nature of the resources found and to distinguish between similar resources;

*Select* -- to determine the suitability of the resources found and to choose (by accepting or by rejecting) specific resources;

*Obtain* -- to access the content of the resource;

*Explore* -- to use the relationships between one resource and another to place them in a context.”<sup>37</sup>

These definitions, as one might expect, are all based on their counterparts in the original models. However, it may be noted that the meaning of “identify” has been broadened beyond its common usage, and the sense in which it was which primarily used in FRBR, i.e. to *confirm* a particular resource, to that of “understanding” resources. This may allow Harej and Žumer to argue “that *selection* can be done only after *identification*”,<sup>38</sup> but it unhelpfully undermines the conceptual pairing of known-resource searching and identification, on the one hand, and unknown-resource searching and selection, on the other. It is true that selection requires (some) understanding of the nature of the entities under selection, but this can be regarded as *part* of the selection task (though not a discrete sub-task). Thus the FRBR-LRM definition of “identify” will not be adopted here; instead, we shall define the task as “to confirm particular sought-for resources”.

The FRBR-LRM definition of “select” on the other hand, can be adopted as is, except for the word “resources”, which can be replaced with “entities”: “to determine the suitability of the entities found and to choose (by accepting or by rejecting) specific entities.” The FRBR-LRM definition does not work so well with headings, so it will be extended thus: “to access the content of resources or acquire headings”.

With respect to the draft FRBR-LRM “explore” task, we have previously argued that, in the sense of utilising links that signpost “relationships between one resource and another”, the task does not represent an additional function. In contrast, “find” can usefully be subdivided into three discreet sub-tasks, i.e. locate, collocate and connect.

## SIX GENERIC USER TASKS

Thus our list remains at six generic tasks, all of which are applicable to both bibliographic and authority data. They are defined as follows.

*Locate:* to find particular sought-for entities

*Collocate:* to find entities with particular sought-for attributes or relationships

*Connect:* to find other resources with a particular attribute value encountered in a record

*Identify:* to confirm particular sought-for resources

*Select:* to determine the suitability of the entities found and to choose (by accepting or by rejecting) specific entities

*Obtain:* to access the content of resources or acquire headings

An important aspect of our model of catalog end-use are the ways in which the six tasks operationally interrelate. Their chronology and sequencing has been touched on in the foregoing discussing, and is outlined more clearly, as a set of search sequences, in Figure 1. These basic sequences do not preclude more complicated processes in real-life searching, when information goals may not only be clarified during, and through, a search session, but may even multiply, leading to plural, interrelated sequences occurring simultaneously. There may also be additional sequences due to the different levels of resource and entity: we have

already noted how, for instance, items can be selected after a work has been identified.

However, in essence, bibliographic files can be searched with or without initial authority file searches; and, either way, entities, at a given level, are either located and identified and obtained, or collocated and/or connected, and selected and obtained.

<Fig. 1 to be inserted here>

## THE VALUE OF THE CATALOG BY USER TASK

Library catalogs have not had a particularly good press in recent years, with their demise predicted on a fairly regular basis,<sup>39</sup> despite theoretical advances made through the likes of FRBR and practical advances made through modern computing. Many libraries have overlaid their catalogs with discovery layers that aim to provide federated searching across a wide range of databases, of which the catalog is but one. Indeed, in some discovery interfaces, it is hard, if not impossible, to specifically search the library catalog; in many others, certain elements of its traditional functionality have been lost to the cause of integration and the one-stop-shop demands, apparently, of end-users. While the conventional elements and levels of catalog data, or at least bibliographic data, are still being added, one might ask, given the changes in library provision and patron behaviour, whether this is in fact necessary. Our model may accurately describe optimal catalog use, but as a generalized model of resource discovery, it could be supported more effectively, perhaps, by means other than the conventional, manually constructed catalog.

The generic nature of the tasks in our model do allow, it is contended here, for a degree of generalisation. That is, the tasks we have posited could likewise be applied to the searching of other databases providing access to library resources. Let us take a full-text newspaper indexing service, as an example. Users locate known articles, identify them and download (obtain) them; or they collocate articles on certain topics, etc., select some of them,

and download them; or they collocate articles on certain topics, etc. and then connect all the articles by, say, a particular reporter; or users might start off by browsing a list of the indexed topic terms, and select and click on (obtain) one of them to bring up (collocate) relevant articles; if the terms are controlled, they might instead locate and identify a particular concept represented in the topic list, and then click on its established term to bring up relevant articles; or they might look down a list of reporters, each qualified by their newspaper, and click on a newspaper title to bring up (connect) the list of reporters who worked for that newspaper.

This model may not be so applicable in the world of the Semantic Web, and for searching that involves data mining and operations on “big data” that take us beyond the manipulation of relational databases. However, most library discovery services are still primarily based on databases and a pre-Semantic Web reality. Thus the model, it is contended, can be generalized to contemporary library provision at least.

The question, then, is whether the generalized model of library resource discovery is better supported by the conventional catalog with its professionally created bibliographic and authority data, or by other means. Hider has identified three main ways in which document search and retrieval are supported in the contemporary information environment: professional indexing/cataloging; social metadata (user/contributor tags, ratings, reviews, etc.); and content-based retrieval.<sup>40</sup> The library catalog is the epitome of the first of these approaches; frequently cited examples of the second include YouTube and Flickr; while web search engines epitomize the third approach. Instead of attempting to argue, however, that one of these approaches is the best one, we shall conclude this paper by suggesting the relative merits, in very approximate terms, of each approach in the support of the particular components of our generalized model of document retrieval, that is, of each of the user tasks.

We should point out first, though, that we are dealing here with a theoretical model, and so we make no comment on the economic and practical considerations of the three approaches. Clearly one reason for the library catalog's bad press has (always) been its cost.<sup>41</sup> This becomes something of a moot point should we conclude that the catalog does a relatively poor job at supporting *every* user task. On the other hand, if we conclude that the catalog and catalog data does a relatively good job at supporting at least some of the tasks, but is relatively expensive, then it is for each librarian to decide whether these tasks are important enough and whether the combined value catalog data adds more than offsets the additional costs, in comparison with other services and products the particular library could otherwise provide. Unlike the model, the *application* of the model cannot be readily generalized.

The author rated the support which *could* be provided by each approach according to the very broad scheme of: strong support; fair support; or slight/no support. The results are shown in Table 1.

<Table 1 to be inserted here>

Content-based retrieval applies statistical algorithms that match up searchers' queries with various variables of texts, images, audio, etc. When large amounts of content are available, this matching process often produces impressive results for unknown resource searches, including subject searches, bringing together similar items that are relevant (if not always the most relevant). Typically, entries include a snippet that assists with identifying known resources, although locating a known resource by means of a name or title can sometimes be problematic due to the amount of "noise" emitted by other textual elements, without the aid of the human tagging (and machine prioritising) of the name/title. The snippets can also help users select resources, though decisions are quite often revised once the resources themselves are accessed, which is usually a matter of clicking on a hyperlink.



Computer-based retrieval does not of course extend to authority entities such as people, organisations or subjects, or at least not yet, though it might be used to analyse their digital proxies, such as Facebook pages, company websites or dictionaries. In other words, the approach does not offer authority control. The author has rated computer-based retrieval as thus strongly supporting the collocating, connecting, identifying and obtaining resource tasks, providing significant support for the locating and selecting resource tasks, and no support for authority searching.

Social metadata, on the other hand, is better at enabling users to pinpoint particular resources, particularly through authors' and contributors' tagging. User tagging can also support subject and other unknown resource searching to some extent, especially in terms of recall, if less so in terms of precision. User reviews and ratings can assist in the selection of resources, though searchers need to consider possible biases. While social tagging offers system users lists (and clouds, etc.) of terms and other types of tag to search on, they are uncontrolled, leading to the synonym and homonym problems that authority control aims to overcome. The author has rated social metadata as strongly supporting the locating, identifying and obtaining resource tasks, and providing some or partial support for all the others.

Finally, professional indexing is seen as providing strong support for almost all of the tasks in our model of document retrieval, which one would hope were the case given that the model is derived from the FRBR family of models that underpin cataloging codes such as RDA. However, it is acknowledged that catalogers and other professional indexers rarely have sufficient time to include their own reviews or commentaries on the resources they describe, and that their relatively terse entries tend not to support the selection of resources very well: searchers still tend to review their selections on accessing the resources themselves. Each of the three approaches thus provides some support for resource selection,

but not necessarily sufficient support individually; ideally, the approaches should be combined, as their support for this task is complementary.

It should be emphasised that these ratings are merely intended as a starting point for more detailed, empirical research about the effectiveness of particular methods in particular contexts. The ratings should *not* be “averaged out” or weighted; and they cannot be used to argue for the overall superiority of any particular approach or paradigm. However, what the table does tentatively suggest is that there are a number of components, or potential components, of the (human) search process that can be much better supported by professional cataloging and indexing than by either of the other two approaches, and that each approach provides relatively good support for some components and less good support for others. This does not necessarily mean that all three approaches need to be used in every case, but it does suggest that all three approaches should at least be *considered*. The many claims around the relative strength of content-based retrieval are not necessarily false, but they need to be evaluated against the backdrop of the whole gamut of possible search tasks, not just in relation to particular facets. Often document retrieval and the “search” process is abbreviated to mechanized “resource discovery” at the expense of the more “human” components of the process. It is one thing for a search engine to *retrieve* relevant resources—they do this very well, on the whole—but it can be very much another thing for the library patron to end up benefitting from the *best* resources.

More specifically, Table 1 suggests that the professional constructed and maintained catalog comes into its own by providing quality authority data that helps end-users work out what it is they want to search for, and how. All six of the generic tasks are, or can be, strongly supported by authority files, which cannot be generated by computers because the entities authority records describe are not digital nor can they be digitized. They can, of course, be self-described, in some cases, or described in social media and through other non-

professional input, but the authority “of the crowd” does not lend itself to the systematic construction of controlled vocabularies with consistent structures that allow end-users to “explore” in the ways we have described above.

In terms of bibliographic file use, a task for which cataloging would also appear to add considerable value, potentially, is that of *select*. Search engine algorithms can support selection by providing accurate relevance rankings, but this works less well for non-topical relevance; social metadata can also support selection by providing an indication of “quality” through user ratings and reviews, but these are unlikely to be comprehensive nor particularly objective. Professional description can fill some of the gaps in this area, which may not be as visible as the actual retrieval of resources and their records, but may nevertheless be very important. As we noted earlier, users rarely have the time to look at everything, so they want to select those resources they can *most* utilize. Often they do not know which resources these are when they start their search, which is the methodological shortcoming, of course, of the classic information retrieval experiment based on predetermined “relevance”. Thus the extra help provided by catalogers in assisting users select the most useful resources should not be overlooked. Essentially, selecting from search results entails *browsing*, comparable with browsing and selecting resources in the library stacks. As a form of information behaviour, browsing has been studied from time to time,<sup>42</sup> but less extensively than have other more directed—and visible—forms (such as “finding”).

## CONCLUSION

The end-user tasks enumerated in the latest FRBR model, i.e. the draft FRMR-LRM, mostly coincide with the generic tasks, applicable to both bibliographic and authority file use, identified in the conceptual analysis presented in this article. However, the draft FRBR-LRM’s “explore” task does not appear to meaningfully add to the find, identify, select and

obtain tasks, and should be reviewed. Conversely, the “find” task could be usefully divided into three tasks, which this paper has labelled “locate”, “collocate” and “connect”. The locating and collocating tasks correspond to known and unknown entity searching, and precede the identifying and selecting tasks, respectively. The connecting task points to the iterative search behaviour said to have been enhanced by interfaces accommodating faceted navigation.

The expanded set of end-user tasks identified in the paper provides a fuller backdrop against which to assess the value of professional cataloging. While some components of document retrieval may be adequately supported by automatic and/or social indexing, other components may be not be. Empirical research is needed to confirm the added value that professional cataloging can still bring to information access. Equally, those who argue that cataloging has become obsolete in today’s information world, need to address the bigger picture of human search behaviour.

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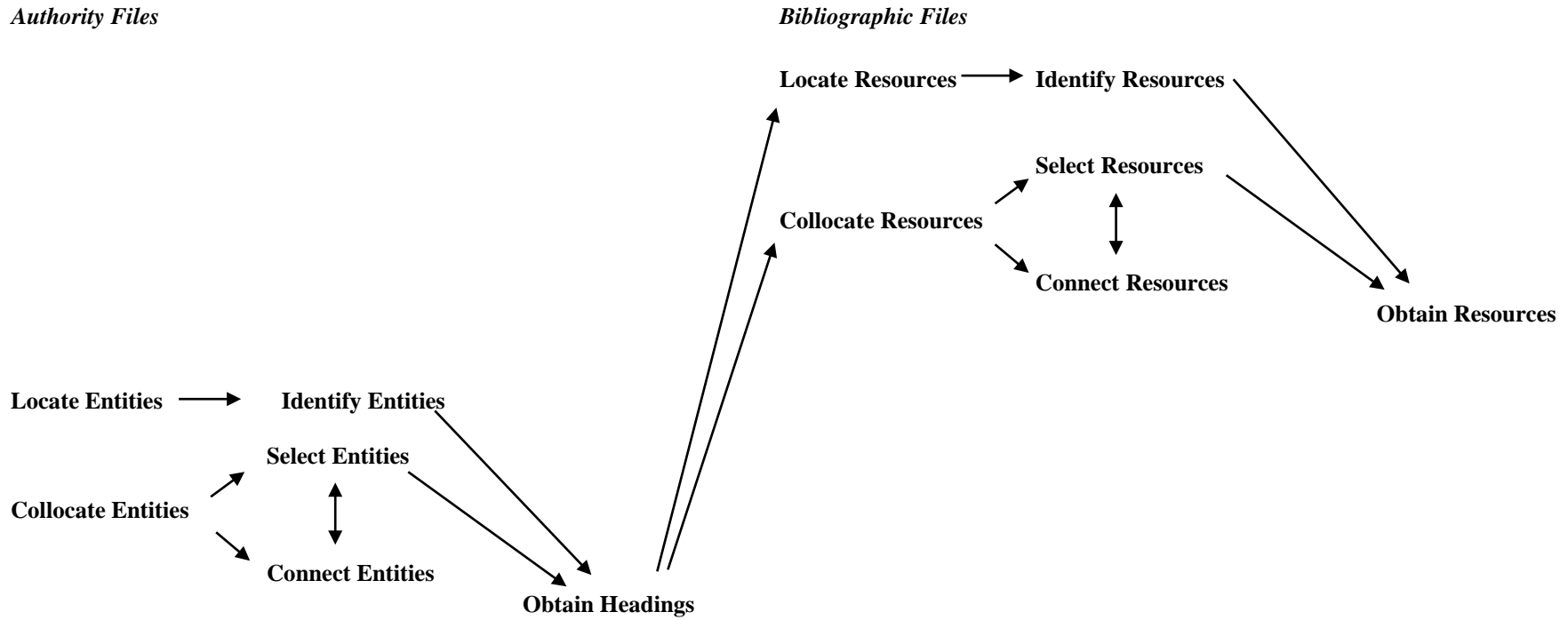
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**FIGURE 1** Basic Sequencing of End-User Tasks



**TABLE 1.** Support Provided by the Three Approaches to Document Retrieval

	<i>Locate</i> resources	<i>Collocate</i> resources	<i>Connect</i> resources	<i>Identify</i> resources	<i>Select</i> resources	<i>Obtain</i> resources	<i>Locate</i> authority entities	<i>Collocate</i> authority entities	<i>Connect</i> authority entities	<i>Identify</i> authority entities	<i>Select</i> authority entities	<i>Obtain</i> headings
<b>Content-based retrieval</b>	Some	Strong	Strong	Strong	Some	Strong	None	None	None	None	None	None
<b>Social metadata</b>	Strong	Some	Some	Strong	Some	Strong	Some	Some	Some	Some	Some	Some
<b>Professional indexing</b>	Strong	Strong	Strong	Strong	Some	Strong	Strong	Strong	Strong	Strong	Strong	Strong