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KOS-based information discovery: analysis of subject searching interfaces in discovery systems

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Abstract

A review of 47 library discovery systems found that most default search interfaces consisted of a simple search box, with subject searching generally limited to string matching rather than conceptual matching and typically available through an advanced search option. Access to named knowledge organization systems (KOSs) was limited, and hierarchical subject browsing was minimal or absent. A few exceptions were found, which indicate that alternative approaches are possible. The study concludes that clearer communication between system vendors and system librarians are needed so that discovery systems support both browsing features and conceptual subject searching.

1.0 Introduction

Library catalogs provide access to their collections via subject metadata. This may include keywords assigned by the authors as well as from Knowledge Organizing Systems (KOSs) such as controlled vocabularies, subject headings and classification schemes. Information professionals have always been aware of the human need to browse library shelves, review catalog displays, learn about scientific outputs within a field of knowledge, expand to adjacent or related fields and broaden the discovery scope. Seeking information also means being able to choose the most relevant, appropriate terms to search materials that are not usually written using controlled terms.

These problems have persisted across several generations of library systems and OPACs and have re-emerged in more recent discovery systems (Cuna 2025; Golub et al. 2024). In 2025, the ISKO Scientific and Technical Advisory Council (STAC) Working Group on Subject Access Metadata conducted an international survey of academic and research libraries to collect up-to-date information about subject searching across and support for accessing KOSs in a variety of library vendor systems and search solutions (Haynes et al. 2026).

2.0 Methodology

The STAC survey of 114 academic and research libraries (Haynes et al. 2026) identified widely used library discovery systems including Primo, Alma, EBSCO Discovery System, Aleph and Koha. Following on from the survey, the authors of this study directly accessed and systematically analyzed the library discovery interfaces from the previous survey in order to objectively assess and compare KOS searching functionalities offered by different system providers. The interface analysis applied eleven of the ISKO STAC's KOS-based searching and browsing criteria (ISKO 2023):

Concept searching
Facet searching
Combination of search terms
Preferred terms prompting
Disambiguation
Linking records
Searching major and minor themes
Browsing by concept
Browsing by facet
Narrower and broader term display
Systematic display of search results

3.0 Results and discussion

The researchers reviewed 114 survey responses from which they were able to interact with 47 systems. Many were unavailable because the URL provided in the survey did not work, provided access only to a generic university home page, or led to interfaces in languages that were not accessible to the researchers. To further test the different searching and browsing functionalities, search terms such as “trans*”, “mercury”, and “jaguar” (or their equivalents in Italian, German, Portuguese, Spanish, Croatian, Slovenian and Swedish) were used as well as domain-specific search terms for specialist collections.

3.1 Search interface

All the search interfaces investigated offered a simple search and an advanced search. The advanced searching option supported Boolean operators for combining search terms as well as specifying which fields were searched. They usually presented one or more KOSs in a drop-down menu to search from. It was also possible to limit the search by criteria such as date, type of publication or co-occurrence of search terms. While simple search interfaces sometimes offered a drop-down menu against which one can perform the search, this rarely contained KOS names.

3.2 Subject searching

The main focus of this study was on subject searching and specifically on access to resources via a KOS. Although most advanced searches offered searching by 'Subject' this was not normally defined and so it was difficult to know which data elements were being accessed. A few did offer access to specific KOSs such as UDC, MeSH and Library of Congress Subject Headings. A search of these fields would reveal all the headings containing the search string. Apart from picking terms from the display it was not possible to search for concepts rather than text strings (Figure 1).

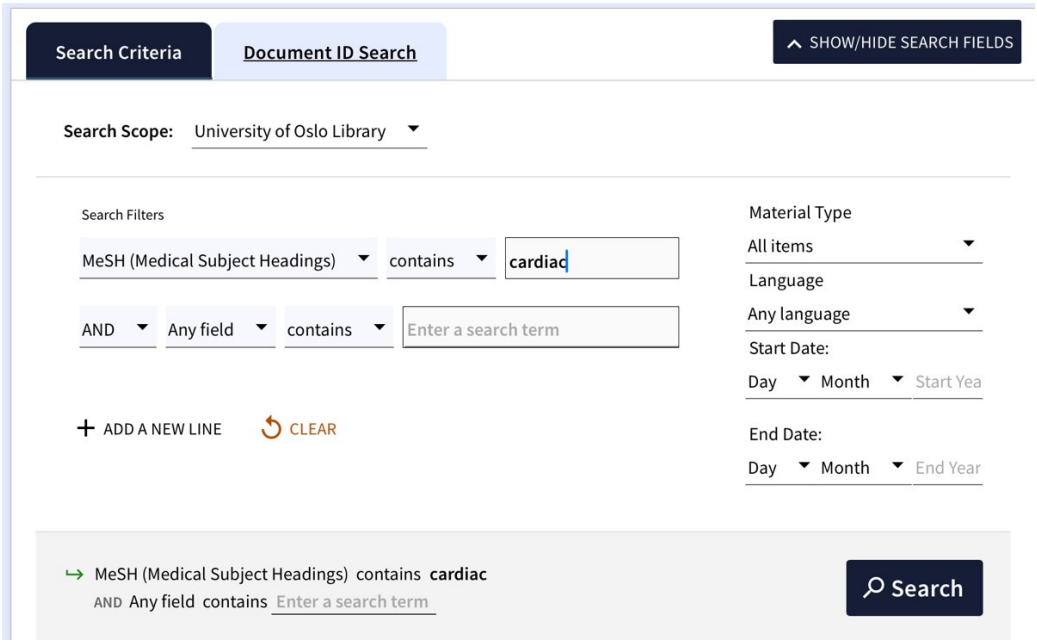

Figure 1. Searching via named KOS (ExLibris Primo)

Some string searches offered a list of possible terms, which provided a degree of disambiguation. However, it was not clear that this was done with reference to concepts in a KOS as opposed to simple pattern matching of text strings. Figure 2 below shows disambiguation of "trans" in a Spanish language catalog, covering concepts such as 'transdisciplinary', 'transition' and 'transnational'.

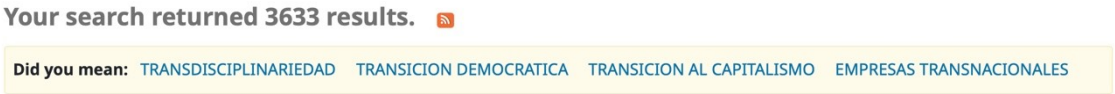

Figure 2. Extract from a Spanish language catalog (Koha)

3.3 Search results

Search results were typically ordered by relevance, author, title or date (ascending and descending). Results were listed with 'Title' appearing more prominently, usually in order of relevance but other sorting options are available in most cases.

It was not always clear whether the 'Subject' search is limited to subject metadata (subject, keyword, classmark). The results display page highlighted matching words in titles and other elements displayed in the first brief results page and additional elements in the details of the individual result page, which included subject but not class elements.

A search for a call number did not provide a hierarchical/contextual display of results by class/call number. The search interface more often supported call number than class searching. Caption information from the classification systems was not matched and the user had to search by notation. In addition, call numbers were not available to users through the brief or full metadata display. It was then necessary to view the source record (e.g., MARC) to confirm that the class/call number was indeed present and relevant to the title displayed on the results page.

3.4 Browsing

The browse by subject feature tended to display all the subject entries starting with the text string entered in the search box.

Library discovery systems based on Koha did offer subject search with broader term, narrower term, and related term (Figure 3). In many cases this feature was not implemented. Only the 'Subject phrase' option offered any results. This may have been due to the practical difficulty of implementation. It appears that libraries have opted for a default feature without taking steps to make it work for their users. It would probably need to be associated with one named KOS in order to work properly.

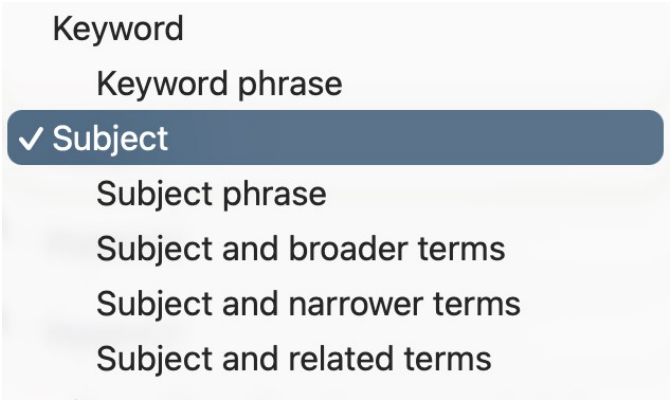

Figure 3. Example of subject browsing menu offered in Koha systems

One of the systems reviewed had a 'Call number' search feature, which offered a 'shelf browser' to show other items that were near the classification code entered. In this case the

search was for Call number = “NA”. Figure 4 shows an extract from the shelf browse offered to the user.



Figure 4. Shelf browser

4.0 Conclusion

Although there were variations in the implementation of library discovery systems, some common themes were evident. Most of the systems reviewed start with a single search box and no browsing overview. This imposes limitations to user experience comparable to lack of open access to shelf browsing in library collections. Most widely used information retrieval system interfaces are similar in their functionality, offering searching of specific metadata fields within document and collection type category (e.g., books, periodicals, and digital collections).

Across most interfaces, the ‘Subject’ field is poorly defined. Searching ‘Subject’ frequently retrieves terms from ‘Title’, ‘Abstract’, and other metadata fields, not only from a controlled subject vocabulary i.e. KOS. In many cases, subject metadata appear to be aggregated from multiple KOSs, which are rarely listed. Moreover, these vocabularies generally do not appear to be linked or mapped.

As a result, the systems rely primarily on string matching rather than conceptual searching. For example, entering a string such as “trans” retrieves terms that begin with that string or contain similar fragments, sometimes producing irrelevant matches (e.g., parts of personal names). Autocomplete or KWIC (key word in context)-like lists of terms starting with the typed string are useful when offered, but again were only offered at string matching level.

Many interfaces display a minimal set of searching functionalities. It would be worth exploring the reasons behind the implementation of what appear to be default settings offered by vendors. This may be a more general cultural problem beyond subject searching. It may be that libraries look at what has been done in other libraries assuming those are more updated applications, instead of reflecting on functionalities really needed by their own users.

Overall, our observations lead us to conclude that concept searching and browsing via KOSs are not available to users in most of the analyzed discovery systems. This is despite

many of the required features being available and offered by system vendors. It is difficult to explain why metadata searching is so frequently based on simple metadata text indexing. Where an index happens to be displayed, it is often an alphabetical list with no subject browsing option beyond text. The impact of AI on concept searching is a potential future area of investigation, building on the work of Salatino et al. (2025).

This preliminary research highlights one of the problems of access to subject metadata, particularly associated with KOSs. Although in theory some systems could support conceptual searching, we did not find any instances where this has been fully implemented. The lack of conceptual searching and browsing is not a technical limitation of KOSs. It is worth exploring whether this may be a communication problem between library managers and vendors or whether there is an issue with exclusion of professional librarians from the decision-making process.

AI Usage Statement: This paper has been authored by humans. No text or data in this paper has been generated by Artificial Intelligence or by the use of Large Language Models.

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