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Creating a Specialized Music Search Interface in a Traditional OPAC Environment

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Abstract

Purpose – Undergraduate music majors often search for resources in a limited number of formats. This developed a specialized search interface which might better support the needs of undergraduate music majors. The aim of this paper is to improve music resource discovery now, without spending any additional funds.

Design/methodology/approach – A literature search was conducted to inform the design process. The web search capabilities of the library's existing catalog system were then used to develop a specialized music search interface. Finally, user testing was conducted to obtain qualitative feedback on the effectiveness of the new interface compared with the general-purpose library catalog interface.

Findings – This project confirmed that an effective specialized music search interface could be created at no additional cost and with minimal effort, and that coupling a keyword search with pre-search format limiting was an effective strategy.

Originality/value – The paper provides a low-cost approach to improving music searching using tools that already exist in most ILSs.

Keywords Computer software, Libraries, Music, Online retrieval, Information retrieval, Online operation, Online catalogues, Library systems, United States of America

Paper type Case study

Introduction

How people search for music is likely to change in the years ahead. In its annual proceedings, the International Society of Music Information Retrieval (2010) routinely describes potential new ways to discover music. The current generation of library discovery interfaces that offer tag clouds, concept maps, and facetted searching will also likely impact how music is discovered. These new methods of music information retrieval, however, are not yet available in many integrated library systems (ILSs). Like many institutions, budget constraints at Western Washington University (WWU) make the purchase of a new discovery layer unlikely in the next few years.

The goal of this project was to improve music resource discovery now, without spending any additional funds. The project resulted in the creation of a specialized music interface based solely on the capabilities inherent in most traditional ILSs. After describing the environment in which the development took place, the article discusses the principle design issues—what type of search would best support music searching and which format limits to offer. Qualitative user assessment was obtained through user testing in which each participant searched for music resources in both the existing general-purpose catalog interface and the specialized music search

interface. The testing used protocol analysis methodology and all test participants were undergraduate music majors. User satisfaction with the new interface was extremely high. Searches within the test were mostly by composer, title, or both, and the format most commonly desired was scores. A number of problem areas for searchers are described, followed by three areas needing further research.

Environment

King (2007), in his review of research on music searching, stated that "finding music materials, defined here as music scores and sound recordings, is more difficult for many patrons than finding books." This statement has been corroborated by comments from students within WWU's music program on the difficulties they experience in finding appropriate music resources.

WWU's Department of Music offers Bachelor and Master degrees in a wide range of music programs including music education, history and literature, performance and composition. There are normally about 200 declared music majors, with about 900 students enrolled in music classes. Students enrolled in other programs, such as Theatre Arts, are also heavy users of music resources. At the beginning of their graduate programs, Master candidates receive in-depth bibliographic instruction on music searching strategies. Current staffing limitations, however, preclude offering similar training to undergraduate students. Therefore, improving the music search experience for undergraduate music majors was selected as the focus for this project.

Recent developments in library search interfaces have almost exclusively focused on "developing tools to search across heterogeneous resources [using] a common search syntax and a uniform presentation of search results" (Naun, 2010). For a number of years, WWU Libraries has offered a specialized search interface that searches only videos and allows users to pre-select the formats desired (DVD or VHS). Anecdotal evidence suggests that the video search interface is popular among library patrons who use videos a lot. The reason for its popularity is likely its elegance — it is surprisingly simple yet effective (Rumsey, 2010). The library's video search interface is an example of a specialized, or vertical, search engine:

> All vertical search engines…are distinguished not by how much information they give you but by how little, favoring precision over recall. And that's the primary benefit they offer. Vertical search tools often can save you time because you don't have to weed out as much irrelevant information as you would with a general search engine" (Peck, 2001).

The author hypothesized that a similar specialized search interface for music, which allowed music searchers to find the music resources they need without having to wade through mountains of irrelevant results, would be viewed by users as an improvement.

WWU Libraries' ILS is Innovative Interfaces' Millennium system. Like many popular ILSs, Millennium uses the search type, search terms and conditions input by the users, constructs a formatted URL containing all the relevant parameters, which is then sent to the system's search engine. The video search interface demonstrated that user-selected search options could be used

to manually construct a URL that the system's search engine would correctly interpret. The goal of the current project was to develop a specialized music search interface that searched for only the music formats desired by the patron and then to perform user tests to determine if the new interface improved the perceived search experience of the target audience.

Music Search Interface

The first design issue examined was what type of search would best support searches for music resources. King's (2007) survey of research on search strategies employed by users seeking music resources found that "known item searching is more common in the search for music materials than in looking for a book." These studies further showed that the most common way of searching for music resources is by composer or performer, i.e., an *author* search. Unfortunately, author phrase searches for music resources are less successful than author searches for books, because it is common for composers and performers to be recorded only in contents notes, not as main or added entries (Leazer, 1992). As composer and performer names in contents notes can only be retrieved using a keyword search, the author chose to use only keyword searching in the specialized music search interface. Using a keyword search also offers better recall of song and work titles since because they are also often recorded only in content notes. Leazer (1992) found that "keyword searching has proven to be an effective way to gain access to individual works on sound recordings" and that "the degree of success of retrieving an individual work with keyword searching is substantial and is not adversely affected by recall size." If a searcher were to enter the name of a composer and any part of a desired title, only a keyword search, at least within our indexing model, would be successful in retrieving the desired resource.

The second design issue addressed was which format limits would be offered. While there are dozens of physical formats and genres present in the WWU catalog, a working assumption was made that most resources being sought by music majors would be either scores or audio recordings. Therefore, it was decided to offer five format limits: scores plus the four most common audio recording formats in our collection (streaming audio, CD, audiocassette and LP).

The developers customized the search examples shown within the search interface so that they were all related to music searches. The initial version of the music search interface, which was used in the user testing, is shown in figure 1.

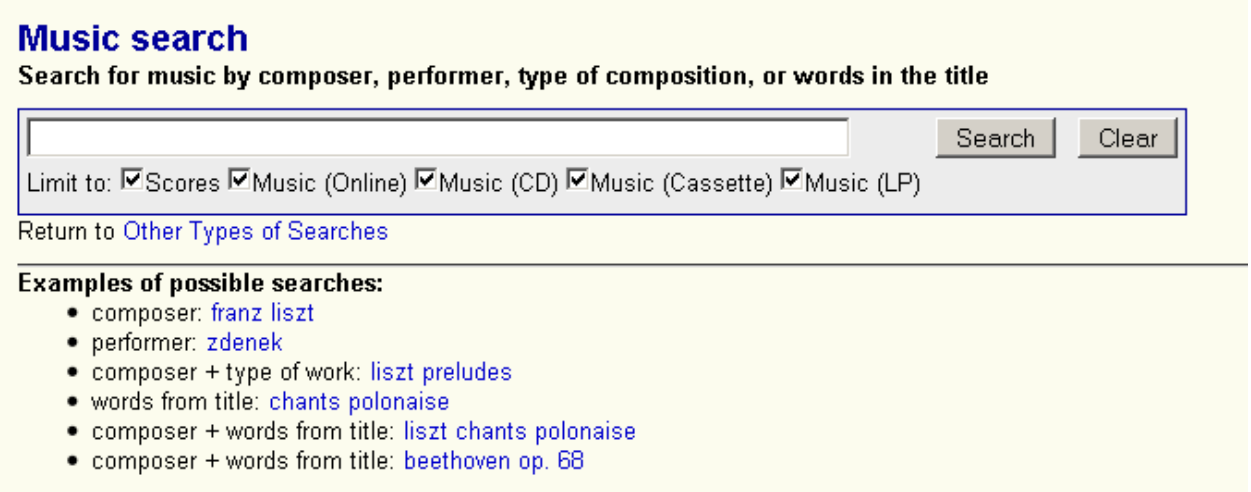

Figure 1.

Methodology

The developer chose to conduct user testing to obtain a qualitative user assessment of whether the specialized music search interface improved the search process as compared to the existing general-purpose library search interface. The testing did not consider time to complete the task or success rate, but focused on user satisfaction. Secondary goals of the user testing were to discover any interface problems encountered by test participants; to solicit suggested improvements to the music search interface; to measure the difference in the sizes of the result sets based on pre-search format limiting; and to confirm that the types of searches used by the test participants, operating within the learning environment of our particular music program, were similar to the results of previous studies of search strategies employed by catalog users searching for music resources.

A set of seven open-ended questions was designed to elicit feedback from the test participants. The first three questions asked test participants to complete a single search in both the general-purpose catalog interface and the specialized music search interface. The instructions prompted participants to try to use a different type of search for each of their three searches, e.g., composer, title, composer plus title, performer, genre, medium of performance, etc. The last four questions aimed to elicit general feedback regarding the music search interface and patron needs not being met within the existing catalog search system. The final four questions were:

(1) Looking around the music interface, is there anything you would like to see changed?
(2) Can you think of any other types of music searches you would like to be able to do?
(3) What is your general impression of the music search interface? Would it be useful or not, and why?
(4) Any final thoughts?

It was decided, based on the literature, to conduct ten user tests. Brantley *et al.* (2006) found that "a number of studies agree that usability testing of a group of no more than eight to ten

subjects is an effective and cost-efficient means of gathering data pointing to problems in Web site functionality, design, and terminology." Based on the user testing conducted by his firm, Nielsen (2000) found that eighty percent of the problems of a website will be discovered with five users, eight users will uncover about ninety percent of the problems, and one hundred percent of the problems will be revealed by 15 users.

All test participants were music majors, as the music search interface was designed specifically for that community. In the WWU music program, graduate music students take formal classes early in their programs on effective strategies for music searching. WWU undergraduates, however, must find the needed music resources often without similar formal training. Therefore, it was decided to limit the testing to undergraduate music majors.

To solicit test participants, a short email describing the music search interface and the design of the testing went out to all students registered as music majors. The email generated only three responses, two of which resulted in completed tests. The developer secured the remaining test participants by setting up a laptop testing system in a Music Library conference room and asking people using the library if they would like to participate in the testing. Although coupons for free coffee were passed out to early test participants, there was an insufficient number of coupons for all, yet the availability or lack of coupons did not seem to impact the willingness of students to participate in the testing.

Using the informal method of usability testing, participants received instructions to complete the search tasks while "thinking out loud," voicing their thought process about the interface, the search process, and the result set. Markey (1984) points out that protocol analysis, or thinking out loud testing, is one of the most useful methods of studying user search strategy, as it more closely monitors the participant's thinking while performing the search. The investigator found this approach extremely effective for this type of research. It was surprising, therefore, that King (2007) found that protocol analysis seems to be used rarely, having been used in only one of the studies of user searching he analyzed.

TechSmith's Morae usability testing software was used to preclude the need to take notes during the test sessions. This software, installed on the laptop used by the participants in completing the search tasks, coupled with a set of two miniature microphones, was able to record the screen in full-motion plus the comments of both person conducting the test and the test participant. After completion of the testing, the investigator transcribed all recordings and noted what was happening on the screen at times of interest.

Results

Test participants' responses were unanimously positive and all stated they would use the music search interface in their scholarly work. Sample comments received were:

- "I only get what I want"
- "A lot faster since I just see what I want and don't have to wade through things I don't want"
- "This seems a lot more straightforward"

- "This is way more convenient"
- "Incredibly useful."

For some searches in the general purpose search interface, two test participants changed from the default keyword search screen to the advanced keyword search screen which allowed them to include pre-search limiting by format. Two other participants used the post-search limit feature of the catalog to limit the resources in the result set to a specific format. In each of the cases, the participants stated that the method of pre-search limiting was much easier to understand and use than the method they had employed. The most common comment in these cases was that it took fewer steps to obtain the same results.

In the general purpose search interface, the large majority of searches were made without any attempt to use either pre- or post-search limiting by format. In the music search interface, the opposite was true. With the limit by format functionality on the initial search page, the test participants selected from one to three specific desired formats for almost every search. The average size of the result sets without format limiting was 311 items, while the average size with the selected format limits was 53 items. Every comment about the difference in the size of result sets was positive.

Scope

The most common comment, mentioned by seven of the ten test participants, was the absence of books in the result set. All test participants found that pre-search limiting to only scores or specific audio recording formats was very effective. However, with the popularity of classes in music education, composition, and music literature and history, most participants wanted to be able to add books to their result sets when appropriate. The lack of a video search limit was mentioned directly or indirectly by four participants. In fact, two of the participants independently mentioned that when searching for recordings of music works, they normally search YouTube first, and only search in the library catalog if they are unable to find what they need on YouTube. Based on these comments, pre-search limits for both books and videos will be added to the production version of the music search interface.

Search Types

Most searches by the test participants involved either composer, title, or both. The strategies employed in the 30 test searches can be seen in Table I.

King (2007) described two studies that "found that music users rarely choose title searching to find their materials . . . significantly less than when people search for books and journals." The large number of title searches performed in this test can be attributed to the request for participants to use different strategies in each of their searches as much as possible. While constructing their title searches, many of the test participants commented on how difficult it was to get the results they needed using a title search. The primary reasons cited were the wide variation in the way titles are recorded and the absence of individual track or song titles in many records. A number of participants stated that the title was often recorded in a language or form

different than the title they knew or had been provided. Findings summarized by King (2007) indicated that "scores tend to reflect the original title in its original language, but the recordings tend to reflect a common English-language title." Participants also stated that anthologies (scores or recordings) containing a large number of works often did not record the titles in catalog records. In order to find individual works, they often did a composer search and then had to retrieve the items and scan the table of contents to find the desired work.

	n	
Title	10	
Composer	6	
Composer + additional aspect	9	
Composer + title	5	
Composer + genre	2	String quartet, cello suite
Composer + medium of performance	2	Vocal, percussion
Performer	2	
Topic	3	Romantic era songs, non-western music, orchestration

Table I.

Interface

Only a few participants offered comments on the design of the search interface. A few participants were unclear as to whether the label *Music (Online)* included audio recordings, scores, or both. This label will become *Online Audio* in the next version of the interface. The second design issue was a request for *Select All* and *Clear All* buttons or some other method of choosing only the formats desired rather than unclicking a large number of undesired formats (the original interface design had all limit selection boxes checked at the beginning of each new search). The developer felt that many users would be frustrated by the repeated error message received if no search limits were set on a fresh search screen and the user failed to select one. The stated goal in twenty three of the thirty test searches, though, was to find scores or scores plus additional formats. Based on the preponderance of searching for scores in the initial user tests, the next version of the interface will have only the scores search limit pre-selected, and allow the user to then select additional formats. If this change is not effective, the developer will examine the addition of *Select All* and *Clear All* buttons.

One participant wanted to be able to specify the relationship of the person to the work, for example whether Bernstein was acting as a composer or performer. As stated by Snyder (2010), although a great suggestion, the relator codes indicating a person's role in the creation of a work are not, at this time, consistently included in bibliographic records.

A larger number of participants commented on the display of the results, even though that was not within the scope of the user testing. A number of comments seem to confirm Evans' and Cleveland's (2008) contention that experiences provided by major search sites like Amazon and iTunes are shaping users' expectations of what library catalogs should be offering. Comments on the organization or appearance of the result set included requests for:

- recommendations for similar works or other resources that might be of interest;
- clearer clues as to the format of each item (some icons and the standard General Material Designator *sound recording* were felt to be unclear or too general);
- more cover images;
- the ability to click on the image of a resource and be provided a description of its contents;
- grouping the resources by format, e.g., all the scores together and separate from the recordings;
- more intelligent ranking of results, with resources in which the desired composer is the main focus appearing higher than resources in which that composer was only one of many composers such as an anthology;
- the inclusion of more information about works, for example, background, the name of the parent work if there was one, "the type of information found in New Grove [*New Grove Dictionary of Music and Musicians*]," other works by the same composer or performer, and lists of items grouped by era, style, or other characteristics.

Many of these requests were for information traditionally treated as outside the scope of library catalogs and so the desired information is often "not currently or adequately covered by existing bibliographic record standards" (Merkley, 2010).

Future Research

The author identified three areas that would benefit from additional investigation. First would be to test user satisfaction in a comparison test between a special purpose search tool designed for a specific community, as described in this paper, and the newer discovery interfaces that provide dynamic post-search limiting of the result set through a set of facets on the left or right sides of the result screen. Would users be more satisfied with pre-search limits, post-search limits using facets, or a system that used multiple tabs to display the result set with each tab containing only a single format?

In the WWU catalog, full tables of contents are included in bibliographic records much more often now than ten years ago. Yet the institution's catalog contains many bibliographic records for score and sound recording anthologies that lack a full listing of all the titles, composers and performers contained in the resource. Practitioners would benefit from an examination of possible strategies for enhancing older records that are efficient, effective and affordable in the current environment of constrained budgets.

Finally, how can library systems effectively guide users to the resources desired when the search is for a variant of the title not contained in the bibliographic record? The need to adapt the

syndetic structure of library catalogs to support keyword searching has been long recognized. Jamieson *et al.* (1986) studied the ability of authority record *see* references to guide users from variant forms of headings to the preferred form. Their conclusion was that while keyword searching is a powerful retrieval technique, it cannot be fully effective without the inclusion of a structure that leads users from variant to preferred forms of headings. Yee (2001) recommended that the authority file be fully integrated within FirstSearch, including the ability to use the authority file in "keyword-within-heading matches," stating that it would "demonstrate to users a strong contrast between the tightly controlled data librarians create and the chaos on the Web." More recently, Snyder (2010) compiled a number of issues related to users' use of titles in searching for musical works, some of which again relate to the inability of library systems to effectively guide users from any of the titles commonly used to refer to a musical work to the resources that contain the work, in spite of the disparity between the title known to the user and the title as recorded in the bibliographic record. Although today's major library search systems still do not include this functionality, the growing use of open-source search systems presents the opportunity to develop and test methods that would improve the effectiveness of keyword searching.

Conclusion

This project confirmed that a specialized music search interface could be created which undergraduate music majors rated as a more effective tool for their needs than the general purpose library catalog interface, and that the development could be accomplished at no additional cost and with minimal effort. Coupling the keyword search for better recall with a pre-search format limit which decreases the size of the result set proved to be an effective strategy. Allowing users to pre-select search limits based on format produced a smaller result set which reduced the searcher's sense of information overload. The author hopes this case study will help other libraries develop similar search interfaces designed to support the search needs of a specific academic community, using the capabilities of their existing integrated library system.

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