Public libraries are experimenting within their online catalogs with new means of supporting browsing via tagging systems. Although tagging is promising, research examining the effectiveness of such systems for patrons in this venue is limited. This paper presents results of a research study that examined if tagging in online web-based catalog systems improves browsing. A quasi-experiment was conducted to determine the usefulness of a sample of five online systems using search box verses tagging options to aid in patron searches. Results indicated that tags are useful in advancing the browsability of such catalog systems, but requires further developing to appeal to average patrons and to provide patrons with desired results. Based on the results a theoretical model was developed to aid in further analysis development of potential systems integrating tagging and the usability of these systems. Future studies are anticipated as further developed systems become integrated into web-accessible systems.

Headings:

Online library catalogs
Library catalogs and users
Metadata
Information technology -- Social aspects
Tagging
THE USE OF TAGS FOR BROWSING PURPOSES IN PUBLIC LIBRARY CATALOGS

by

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Approved by

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Introduction

The purpose of a library is to provide people access to information. Different venues cater to different audiences, but the purpose remains the same; information is to be accessible to the patron, preferably with ease. When catalogs shifted into the digital world, the ease of navigation increased, allowing for keyword searching and seamless cross-referencing. There are still challenges, however, with online catalogs not allowing for unstructured searches that provide useful results. The ability to browse through retrieval results based on a unrestricted starting point, such as genre, does not appear to be easily accommodated in current online catalogs.

Now, the Internet has been even further developed to include Web 2.0, introducing a stronger connectivity of patrons to library. A specific aspect of Web 2.0 technologies is tagging. Tagging is a useful means of labeling that can be both social and generic.

This paper presents results of a study conducted to assess the effectiveness of how well tags and tagging systems support browsing in web-accessible public cataloging systems. The sample includes five systems selected for the tagging support provided within the searching venue of the catalog while still providing a search box for keyword searching. The tags are both user developed and professionally assigned to materials.

The research conducted examined the following three questions:
• Do web-accessible catalogs and systems, including online library catalogs, social organizing websites and worldwide data collections, with tagging allow for easier online browsing?
• Are user tags or library staff created tags more useful than search box or keyword based searches?
• Does integrating a tag-supported browsing system into a library catalog benefit patrons?

These questions may provide the library community with a better understanding of how patrons respond to the integration of this new technology and how to make searching within online catalogs more user friendly and responsive to patrons who do not fully know what item they desire.

Literature Review

Cataloging is an art that has been developed throughout the course of library science history. Even before the use of the Internet, library catalogs have provided users knowledge of the material available for their use. With the development of online catalogs the process of searching for materials has been altered to accommodate the ever-changing technologies that are put to use in the organizational processes of libraries. Literature in library science shares studies that have been done to analyze user searching strategies and understanding of online organizational systems. Public library settings in particular are home to a specific set of users whose search needs and information requirements are further morphing. These users need access to more than what the standard method of bibliographic based searching can provide. The introduction of tagging and clustering into catalog systems is still a new aspect of
online searching, but it may assist in these catalogs become more browser friendly in
the future. Six articles have been selected to address different angles of tagging,
clustering and browsing research that collaborates to reveal a thorough appreciation of
the benefits and frustrations that accompany online catalog and the development of
browsable for library users.

One of the original online cataloging systems is known as OPAC. This is a
specific system but has also colloquially stretched into meaning an online system in
general. In their own research review, Large and Beheshti (1997) explore or provide a
into a detailed analysis of the OPAC system and the user interaction of students.
According to the authors, the OPAC was originally a character-by-character search
within the bibliographic records. This proved to be more than problematic when
searching for material within a library’s catalog, only proving results if the input
information precisely matched the bibliographic material of the item. User information
based searches were not even mentioned as being possible. Further development of the
OPAC system eventually provided a more user-friendly approach to searching a library
catalog. This system allowed for input that allowed users to try and recall a very
specific information request from a broad summarization of material (Large and
Beheshti, 1997). This required for the methods of searching to be broken down into
specific components of which Large and Beheshti quote Jean Tague-Sutcliffe saying
“the set of records or documents (document set), the indexing or access method for the
document set (access method), the information need of the user (user need), the
verbalization of this need in a sequence of search statements or menu selections (the
search strategy), the sequence of items presented as a result of the search strategy (the
retrieved set or sequence) and the degree to which the retrieved set satisfies the user’s need (relevance judgment)” (1997, p. 114).

Users generally go through a process during a search, as they strive to retrieve information that is relevant to their needs. This process is not effective, however, if the system in use does not provide access to relevant materials. A greater problem lies in the fact that these searchers have not specifically defined their information need. “Different OPAC systems provide different techniques for undertaking subject searching, but generally it is possible to search for subjects as represented in the bibliographic records by subject headings, typically LCSH, and keywords in the title, subject heading, and other fields. Some OPACs may provide additional information such as book tables of contents or even back-of-book indexes, though this is still more common in experimental systems. (Large and Beheshti, 1997, p. 122). The authors also note that an OPAC is supposed to be all encompassing, not limiting users to a specific subject field (1997). Even if this is the case for well developed OPAC systems, these subject areas can only be accessed through the proper search terms and key words. If a user is not familiar with Library of Congress Subject Heading (LCSH), it is possible that the material that they retrieve during their search will be completely irrelevant to their desired outcome. This can become an even greater issue when there is not a specific title in mind.

Large and Beheshti’s reviewed the work of Drabenstott and Weiler, who researched the outcome of subject-based searches in online catalogs. A beta system, ASTUTE (A Search Tree Underlying the Experiments), was developed to determine if these type searches were useful to the patron. “Users of online catalogs usually have
several choices for accessing the subject index; ASTUTE is designed to assume the burden of determining which subject-searching approach is likely to produce useful information. Their results suggest that search trees may be better tools for selecting more appropriate paths to subject searching than users’ choices” (Large and Beheshti, 1997, p. 124-125). Providing suggestions for searches allows users to know exactly what they are searching for without having to be family with the LCSH that enables subject searches in a standard OPAC.

Further development of these types of catalogs is what Singer (2009) addresses in his article, “In search of the ‘Next Generation’ Catalog.” Singer tackles the issues of the development of newer and more user interactive online catalogs. With the introduction of more innovative and interactive features, including tagging, he says that MARC may no longer be a sufficient means of cataloging and developing records to use within these advanced catalogs. “This is no criticism of the MARC format, catalogers, or cataloging practices, but the way that data are represented in catalog records is ill suited for a next generation OPAC. The records are sparse, in many cases very sparse. Records are seldom updated. There is also no distinction of discrete concepts within the record: What exists is a blob of metadata about a work with strings identifying the creator or subject” (Singer 2009, p. 140). If MARC becomes obsolete, what sources of information will be used to aid in the searching process? Singer also says, “There is practically nothing the users can do to influence the way the system works and very little they can do in adding useful data to the records, outside of comments, ratings, and tagging. These, sadly, have minimal value given the quite small size of the populations of
the majority of libraries, especially compared to the number of resources in the collection” (2009, p. 140-141). Library formed records are not always relevant enough for the user and are rarely ever updated to ensure the most current information is available for the latest search methods. The introduction of tagging and clustering allows for users to add their own interpretations of the material within the catalog, but as Singer mentions, user input is not enough to change the entire dynamic of a catalog.

With the integration of tagging and clustering into catalog systems, with the use of programs such as AquaBrowser, a cluster tree styled search assistant, users are given more freedom in their searches. Searching in library catalogs is no longer restricted to specific terminologies such as LCSH, but natural language vocabulary by other users can aid in the search process. If a search is not for a known title, the suggestions provided by tags and programs such as AquaBrowser can aid the patron in subject-based searches, until familiar information becomes available.

In “The Other Half of Cataloging,” Petrucciani (2009) explains what Singer brought up about the specifics of obtaining bibliographic information relevant to the more advanced online catalogs. He reviews the basics of cataloging, the purpose of organizing the information for the user. “Catalog building consists of two phases: (1) the creation of cataloging copy representing the works being added to the collection; and (2) the integration of that copy into the existing catalog. Phase One simply involves the creation of a record; Phase Two determines whether or not the reader will be able to retrieve that record once it has been dropped below the rod among a million others” (Petrucciani, 2009, p. 136). A catalog is supposed to be an easy way to find relevant resources in a larger collection. If a catalog is well developed and information is well
recorded it should allow for user to find items easily. Specific information can be retrieved expediently. Problems arise when a user one: doesn’t know the specific information required for a productive search and two: when even with an identifier, there are too many similar sources within the collection (Petrucciani, 2009).

Today catalogs are changing, though, and the bibliographic information and cataloging methods have to keep up in order to effectively produce user friendly results. More relational subject information must be included in order to make an online/electronic catalog more efficient and instigate more relevant record returns (elevating the precision). “The relational model has not had a deep impact on author cataloguing; on the contrary, the logical schemes we are accustomed to, the traditional ones of twentieth century codes, are flat, based on a stiff, mono-dimensional approach” (Petrucciani, 2009, p. 137). Catalogs are becoming more three dimensional, allowing for users to alter records with tags.

The ability to successfully provide enough information that allows for specific searches and browsing style searches requires more development. OPAC’s have to become more interactive and MARC records have to become more encompassing, including information based on the users. According to these articles user input does not have a drastic affect on the search engines within the catalog, but if a user at least has access to tag links and cluster trees that shows other user terminology, less structured searches can produce relevant results.

The practical application of newer methods of cataloging and advanced catalog development is evident in the studies of clustering and browsing in current beta systems. In the article, “Document Clustering with Cluster Refinement and Model
Selection Capabilities,” authors Lui, Gong, Xu and Zhu (2002) explain the benefits of adding a clustering program to online catalogs and the uses these programs have for patrons. These programs allow for users to have access to maps and word groupings that reflect specific subject areas without requiring the users to have a specific search term in mind. “If the document clusters are appropriately created, each of which is assigned an informative label, then it is probable that the user can reach his/her documents of interest without having to worry about which keywords to choose to formulate a query” (Lui, et al. 2002, p. 191-192). The aforementioned AquaBrowser is an example of a clustering scheme that allows for users to peruse through a handful of related terms based on subject matter and bibliographic information. This allows for the user to be able to pick their own starting point, and jump to his or her desired destination based on the options provided by the cluster map, allowing for a less specific keyword search when a keyword is either unknown or irrelevant.

The use of this form of programming within the catalog can help to diminish some of the problems that surround standard information retrieval. The authors of this article review three areas of difficult that surround IR for the regular library user. The first issue has already been addressed: Users are not familiar with the required terminology to sufficiently recall the total collection pertaining to their desired topic. Second: search engines currently retrieve information based on a flat spectrum of bibliographic information. If the search terms do not match the information in the bibliographic record, the record will not be recalled. If the user is unaware of at least one piece of this bibliographic information the search will prove to be void. Unless the term in the search is narrow and specific, the search may provide unproductive results
for a user who needs to search on a vaster spectrum. Finally: even with the use of an appropriate keyword, the number of materials that are now available online from libraries results in an information recall that is overwhelming to the user. Too grand of a selection makes narrowing down the choices to one or two items a daunting task, one that most users do not want to spend time performing. (Lui, et al, 2002).

If clustering programs can be developed to be effective for user searching and browsing the ability to navigate through items will increase. Material that is grouped together by topics, content, subgenres and bibliographic information help users to better define and refine their information need. In the study the author partook in, two different types of clusters were used: flat clustering (also known as document partitioning) and hierarchical clustering. The goal surrounding both types is autonomous, unsupervised and perform document clustering without background information (Lui, et al, 2002). Without some form of control, however, this may prove to be problematic. Clustering is an excellent way to group information together for a user, but how do these items get looped into the same cluster? “For document retrieval and clustering purposes, a document is typically represented by a term-frequency vector with its dimensions equal to the number of unique words in the corpus, and each of its components indicating how many times a particular word occurs in the document. However, our experimental study shows that document clustering based on term-frequency vectors often yields poor performances because not all the words in the documents are discriminative or characteristic words” (Lui, et al, 2002, p. 193). It is necessary to be able to determine content information based on more than term frequency. For materials in a public library, term frequency is not going to serve much
of a purpose at all, especially for fictional materials. Clustering needs to be based off of plot, character scheme, genre and thematic elements.

To make clustering more browser friendly, Krowne and Halbert (2005) discuss the use of taxonomies and text classification in their article, “An Initial Evaluation of Automated Organizing for Digital Library Browsing.” They say, “We define digital library browsing as an exploration or retrieval of a resource or resources through a navigable taxonomy. The taxonomy, which can be hierarchic, may also be referred to as a subject hierarchy, classification scheme, or various hybridizations of these terms. Typically browsing through such an interface is used when the end user does not know how to express the resource they are looking for in terms of keywords, or when they do not have a specific resource in mind” (2005, p. 246-247). Using taxonomies in a catalog system requires the further development of metadata. Regular metadata, regardless of the format or standard used, does not include colloquial information. Taxonomies provide the user with a base point at which to begin a broad search. Recognizable terms give users a sense of familiarity when performing a search and makes browsing more controlled, so results not only possible but relevant.

Making taxonomies usable for the public requires a detailed classification scheme to be interwoven into the metadata records of a collection. Krowne and Halbert (2005) are specifically referring to searching done within a digital library, but the online cataloging system used in public libraries works in similar way. The information for the physical items is digital, which means that the searching is digital. Classification accuracy is necessary to ensure the proper clustering and recall of items when taxonomy terminology is used. According to the authors, the intertwining of the
classification information into the metadata has been useful and decently done, so far.

“In addition, the intellectual coverage and hierarchic structure of a taxonomy is in itself a learning and exploration tool, a fact exploited by end users even if they do not consciously realize it. Thus, taxonomic browsing is a distinct and valuable digital library service” (Krowne and Halbert, 2005, p. 247). Integrating taxonomies into online catalogs in a way that allows for users to have access to the terminology as instructional and suggestive provides the users with a better understanding of the catalog itself and can assist in making online catalogs more browsable, allowing for broad term searches that provide narrow term results.

Using taxonomies to advance cluster properties is a good way to make a catalog more browser friendly. There are still issues in both aspects of these advancing methods of information retrieval. Clustering, as mentioned, requires more than text-frequency. Using taxonomies to aid in the development of these clusters may prove to be beneficial for a public library atmosphere. Krowne and Halbert, however, said that there were issues with making taxonomies and browsing style searches appeal to users. Browsing systems were often overlooked or bi-passed to use the standard search engine. In sum, combining these two approaches, clustering and taxonomy browsing, has tremendous potential to advance the development of library catalogs and allow for more successful systems that better appeal to the public.

Finally, in the article, “User tagging of library resources: Toward a framework for system evaluation,” Furner (2007) specifically covers the development of tagging within library catalogs and the benefits of implementing these interactive programs. Furner explains how tagging is additional information assigned to a particular item or
resource, “with the dual intention (i) that the tags individually or collectively represent features of the tagged resources (or of resource–tagger relationships), and (ii) that such representations or descriptions may be exploited by search services that enable people to discover the particular resources that are of interest to them at particular times” (2007, p. 1-2). Simply put, tagging helps users to find material in natural language. More specific means of tagging, user tagging (also known as collaborative tagging), allows for users to network resource information (Furner, 2007). Collaborative descriptions of items allow for a broader range of search possibilities because it opens up the number of terms a person may relate to the item or resource. Furner says, “A prominent example of a user-tagging service offered by a public library is John Blyberg’s production for the Ann Arbor District Library, which allows library users to assign tags to individual library resources, to write reviews of resources and to comment on others’ reviews, to view lists of most frequently assigned and most recently assigned tags, to view lists of most recently written reviews and comments, to flag useful reviews, and to search the content of tag-sets, reviews, and comments” (2007, p. 2-3). Allowing user involvement allows for connections to be made with other users, even if just in a sense that information is being found by similar people and in similar language.

The author explains how integrating a tagging program in to an online catalog houses a lot of benefits. Tagging programs are user-oriented, empowering, democratic, cheap, collaborative, distributed, dynamic and instructive (Furner, 2007). These qualities reflect a very positive outlook on the use of tagging in an online catalog. These qualities also contribute to the further development of OPACs, much like Singer
(2009) mentions in his article. The “Next Generation” of catalog is coming and with it, changes must be made in order to keep up, not only with the changing technologies but also with the way users are changing with these technologies. “Even more specifically, implementations of user tagging that are designed to enhance the functionality of online public-access catalogs of library resources (OPACs) are the results of developers’ consideration of the potential of “OPAC 2.0”—a model for the redesign of catalogs as “social OPACs” that purposefully invite the users of catalogs to participate not only in the exploration and exploitation of catalog records, but also in their creation” (Furner, 2007, p. 3). Tagging is very common in social networking sites, because people want other people to be able to connect with them through simple and common interests. Users nurture this connection with other users by placing values and colloquialisms on items in the catalog that they feel will provide a link. If tagging because popular enough, it could replace MARC records in the future, because like Singer mentions, these records don’t provide enough accessible information for the user (2009, p. 140).

While tagging opens up an entirely new venue for users, this process cannot be a free-for-all to change and add whatever words come to mind. This would allow for chaos and potential vulgar tags, because of the kids trying to be funny or just sick-minded people. Tagging requires a focus, a targeted audience whether it is the general public or college students. There also needs to be structure and a method of control to ensure accuracies, perhaps a restriction of the number of tags that one item can be issued, vocabulary restrictions or suggestions for good quality tags that allow for accurate access in normal speech.
Overall, the results of these studies indicate that integrating clustering and tagging into online catalogs in order to make information more accessible to the average user. There are many positive points that were mentioned that provide a strong argument for this integration, however there are also still some issues to consider. How will clusters and tags be controlled? The programs may not be costly, but is the upkeep worth the money? If “social OPACs” become the norm, what will become of the current records that are created with MARC? Do the speed, accuracy and quality of return measure up to current standard systems?

These questions led to the development of my own research questions, restated below:

- Do web-accessible catalogs and systems, including online library catalogs, social organizing websites and worldwide data collections, with tagging allow for easier online browsing?
- Are user tags or library staff created tags more useful than search box or keyword based searches?
- Does integrating a tag-supported browsing system into a library catalog benefit patrons?

**Methodology**

In order to obtain the necessary information to formulate a conjecture and potential theories about the future of tag-supported browsing in public library catalogs, I conducted a quasi-experiment, consisting of an interactive search activity with the selected web systems followed by a survey to determine participant reactions to the
systems. This means of experimentation was appropriate to obtain the information I required for this study of web-accessible systems searching means.

I selected five web-accessible systems with cataloging focuses that are commonly used either for searching for material or maintaining personal collections: OCLC FictionFinder, WorldCat, Public Library of Charlotte and Mecklenburg County, UNC Library, and LibraryThing (see Appendix A for a screenshot list of websites). These sites were each selected because of an innovative use of tagging. The criteria for inclusion in the study was that each of these web-bases catalogs had tags/tagging systems supporting browsing. A search experiment combined with a survey was designed to gather data (see Appendix B for a copy of the survey). The posted this survey onto both a listserv and through a message on Facebook. Given practical research limitations and the exploratory nature of this work, the aim was to gather data from 5-10 participants. Data gathered was assessed in a matrix to determine the strengths and weaknesses of each web-system. The following three questions guided the analysis:

- Do websites with tagging allow for easier online browsing?
- Are user tags or library staff created tags more useful?
- Would integrating a browsing system into a library catalog benefit patrons?

Combining my understanding of catalog use and tagging along with the survey results I answered these questions and propose the foundation for a theoretical model that if further developed could help patrons to better search an online catalog without having specific knowledge of their desired search results.
Findings and Discussion

The following section of this paper will explain the results of the survey and provide discussion for the importance of the results and the further development of catalog tagging.

Survey Results

Results are measured in degrees of satisfaction of search results and ease of use. The levels of measurement used: Poor, Unsatisfactory, Satisfactory, and Excellent. Tags: Of the five web systems, I examined each website had some form of tags designed for patron usage. These tags are in freeform user developed tags and refinement tags designed to narrow search categories based on specific search venues, such as genre or material format. The survey results as seen in Table A: Tag Results, showed users to have an equal number of Poor and Unsatisfactory results as Satisfactory and Excellent results throughout the websites. The percentages for the Satisfactory results showed to be higher, however coming in as high as 60% for two of the websites.
Search Box: The use of the search box is more common method of searching that patrons are more familiar with using on a regular basis. The results show that using the search box provided more consistent Satisfactory or Excellent results than the tags, averaging 60% of users being pleased with the search box results of each different site, as seen in Table B: Search Box Results. The method of tagging did not appear to influence preference. UNC uses a refining style, which is a list of tags on the side that have been selectively chosen by a professional to help narrow down specific areas of interest, such as material type, year of publication and subject matter. LibraryThing uses freeform user tags, which are free floating tags that have accumulated based on a vast number of users who have categorized a certain item based on content based
information such as genre, character, setting and plot. The users found the search box to be more time sufficient as well and preferred its use to the use of tags.

Table B

<table>
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<tr>
<th>Sites</th>
<th>FictionFinder</th>
<th>WorldCat</th>
<th>PLCMC</th>
<th>UNC</th>
<th>LibraryThing</th>
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<td>50%</td>
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</tr>
</tbody>
</table>

Keywords: The use of keywords is the basis of a search box search, and the search habits of most users. The use of keywords for this study, however, is based on the use of genre oriented keywords. For example searches were supposed to be preformed using search terms such as: sports fiction or fantasy. These results are similar to the search box results and are shown in Table C: Keyword Results. The users felt that the results for these searches were usually Satisfactory or Excellent.
**Research Questions**

Question 1: Do websites with tagging allow for easier online browsing?

Combining the measurable rating scale results with the short answer results of the survey, the users find that tags can be useful for browsing purposes. Most participants prefer to use tags when performing the search for a specific title without being allowed to use bibliographic specifications. For the keyword-based searches, however, the search box is still deemed as the most effective method of obtaining usable results. Overall the tags are viewed as useful, but do not save time or provide accurate results without search box influence.

Question 2: Are user tags or library staff created tags more useful?

Users were not able to tell a significant different between the accuracy of user created tags versus staff created tags. There was also not a significant preference.
between the use of freeform (or free floating) tags versus the refining tags. Freeform
tags were used more with the keyword searches while refining tags were used more for
the browsing search.

Question 3: Would integrating a browsing system into a library catalog benefit patrons?

Based on the survey results, systems currently do not provide a smooth enough
integration of tags to be deemed 100% useful. Tags can cause confusion and frustration
to users who are unaware as to how tags work or because of inaccuracies in tags. As of
now keyword searches and search boxes are the most well received method of searching,
and it can be assumed this is because of the familiarity users have with this method.
The results, however, do show that tags are not completely useless. If tagging systems
were further refined and then integrated into catalogs with an explanation as the
purpose, tags can be developed into useful tools that allow for users to provide
controlled input that assists other users.

A System in Theory

Online catalogs are very useful when users have a slight idea of what subject
matter they want to search for and recall. Searches by author or title are the most
precise, but only useful if the user is aware of either author or title. Keyword searches
provide results based on subject headings along with title and author, but the results for
these searches only recall materials that reflect the keyword in the “aboutness” of the
material. After results are given, some catalogs, such as UNC’s new Beta catalog,
provides the user with the ability to narrow down results based on subject headings
(along with other venues unrelated to this topic). This requires the user to understand
the function of subject headings, which most do not. Even if the user did understand
subject headings for searching purposes, the system still requires the user to know what is being looked for before the search begins. Online catalogs are not browser friendly. I think that online catalog systems can be designed to allow for more facetted browsing that allows for the user to recall results based on the genre or domain of a material, much like in a bookstore. This added feature to the system could allow for users to use tagging clouds to browse through the materials in the library without spending hours in the stacks just staring, by allowing for users to narrow down potential selections by eliminating materials that do not fall under the specified domain.

For example: A patron who is looking for a book to read might enter “fiction” into the browsing search box and is then given a list of different fiction domains, such as science fiction, historical fiction, romantic fiction, fantasy fiction, etc. The patron then selects the desired tag and receives a new cloud with more narrow specifications relating to the first tag. The process continues until the patron reaches the narrowest description of a domain and is provided with a list of materials under that domain. Books should actually be provided the entire way through the process, accompanying the browsing lists, in case the patron is able to find something in a broader domain. In the end, the results of the browsing search could look like:

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fiction   Historical Fiction   Historical Romance Fiction   Historical Romance Civil War Fiction
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Then Came Faith by Louise Gouge
Google Books has a system similar to my imagined designed, though it does not allow for the narrowing of domains as much as I believe to be useful. The library cataloging system would also allow for more efficient cross-referencing so a patron can narrow down domains in any order that they decide, such as moving from Romance fiction to Romance Historical fiction rather than from Historical fiction to Historical Romance fiction. This system would require bibliographic information to reflect the book. For fictional works, specifically, it would be necessary to develop an index that allows for information to be retrieved based on the content of the work, providing access points to the work based on both literal and possibly figurative meanings along with character names, settings, genre, etc. This information could then be clustered together with material of similar content to form the retrieval groups of the browsing search results.

Factors about keyword searches within full texts also have to be considered for the searching within the browsing aspect of this theoretical catalog. If the user is in fact allowed to implement searches by key words to initiate a browsing search in a specific area, the results to be retrieved will be based on information specific to the search. There would not be a specific work being searched for that would require precision, but the user would instead be looking for a multiple results in order to pick and chose from a list.

The use of tagging within a cataloging system may assist in turning this theoretical process into an actuality. Catalogers do not have the resources or the time to enter in information pertaining to the content of a book, especially when this is not a book of which he or she is familiar. It is impossible for a cataloger to read every book that needs to be entered into the system. Users, though, read these books on a regular
basis. If the catalog had a section designated to user tags for content related searches, a browsable system could perform searches based on both the official bibliographic information and the user’s input. The Public Library of Charlotte and Mecklenburg County has a tagging system in place, but there is not a browsable catalog intertwined.

There is a whole process that the user must go through during the search to effectively retrieve information that is relevant to their need. This process is not feasible, however, if the system in use does not provide access to materials through user-friendly searches. This is part of the inspiration for the angle of my new system, and my desire to design a system that will allow for users to both search for specific materials and be able to peruse through titles without being overwhelmed by the sheer volume of ever single item in a collection.

In the afore mentioned article, “An initial evaluation of automated organization for digital library browsing,” authors Krowne and Halbert discuss the changes they believe need to be made to information retrieval systems within digital libraries in order to make browsing more efficient for the user. The methodology used to support their analysis consisted of testing four different browsing options in a test system to determine which aspects of browsing are smoother systematically for the user. The test results of this study provided support for the theorized needs of an automatic system used to create browsable subject identifications. Subjects were asked to find books within the system using browsing techniques rather than directly searching. The results of these experiments helped to confirm a need for taxonomies, category labels and more specific classifications. The testing methods used also helped to reveal problems in the analysis of techniques.
The users that were involved in the study were aware that they were being observed in their browsing methods and were in a controlled environment. If the study had also included observation of unknowing subjects by implementing each of the four different browsing systems in four different libraries and then tracking the users’ techniques and then surveying the users to determine their satisfaction with their browsing results using the test system, which would allow for the tests to show the results of authentic browsing rather than only having directed browsing showing results of the system use. When users are browsing through material, whether it be online, in a store, or in the stacks of a library, they do not know what it is that they are looking for because they don’t yet know what material they want or need. The original experiment test subjects were given a specific book to find in the system. I suppose this was because it was the system’s accuracy that was being tested, rather than the user’s ability to navigate through the system efficiently; however, this method eliminated the “browsing” aspect of the search because a specific material was being sought.

Should a system of this nature become tangible, catalogers would be responsible for adding (using controlled vocabulary) the list of domains that the material falls under categorically in addition to the standard bibliographic information that identifies the aboutness of the material and filtering through user tags to ensure relevance to the material. Once an item has been added to a catalog, the system needs to be able to locate it for each domain selection in the browsing search. Each domain needs to be able to be recalled when linked with other domains within its identification as well. The best way to do this would be for each separate category to be accessible through a keyword search that reads each word individually like a full text search.
Importance of Study

The integration of Web 2.0 into library resources has become standard. With the development of the Semantic Web, it is only a matter of time before interactive resources are an expectation for libraries. Using tagging and tagging clouds with standard catalog systems is an integration of these developing technologies that is both logical and eventually inevitable. This study shows that despite the expected integration of these technologies, the practical application has left something to be desired. Tags within catalogs still require standardization and explanation for patrons to be able to find these resources useful and usable. The search quality that tags and tag clouds could provide if implemented properly is outstanding, but first we must understand how patrons want to use these resources. Further research would reveal a national understanding and provide starting points for further development of these systems.

Limitations and Future Research

Resources and study group size limited this study. While websites are available to people nationwide, and because of the nature of volunteer selection, it is possible there were volunteers from various states, the sample size does not allow for this to be a significant factor. Also, the school library site and the public library site were both North Carolina resources. To make this study nationally effective, library sites from every state should be used to measure the development of Web 2.0 technologies and integrations into library catalogs. This study is provides an intimate look at the user interaction with tags in catalog systems, but it does not allow for the breadth required to design a system of tagging that provides appeal to the masses. Further study of larger
groups would allow for more generic understanding across greater user bases. A larger study could also allow for the user to be personally observed during their search process rather than only relying on anonymous volunteers with purely Internet based interaction. This would allow for researchers to see how the users understand the tagging systems rather than base results solely on a number scale.

**Conclusion**

The quasi-experiment accomplished gathered information through volunteer participation for an activity and a follow-up survey to determine the benefits of tags and tagging systems in web-accessible systems. Results indicate:

- Users find structured tags helpful to narrow down selections.
- The style of tagging, refined and professional versus freeform and user created, does not matter to the patron.
- The search box is still the preferred method of searching based on ease of use and time it takes to obtain results.

Furthermore, after gathering these results, further analysis led to findings of that the integration of tagging systems and tags, whether user based or professional assigned, is not yet a welcomed search method for standard patron searching. Further integrations and introductions of tag use are required to fully develop such means of searching into a desired form of catalog interaction. Despite the fact that patrons expect the newest resources and systems to be available to them, they do not always understand these uses enough to effectively produce desired results. New systems need to be developed in ways that are easy to use, yet provide the patron with an innovative
experience. At this point, browsing still does not provide the results that are necessary to be deemed an effective form of searching.

As tags and tagging systems develop, these resources will become more prominent in regular patron use. Future studies can provide further examples and understanding of how patrons interact with new techniques and technologies. It is important that studies of this nature continue in order to be able to cater additional technologies to the user, providing patrons with the best search experience possible. Future studies should also include tests of new systems before grand scale integration into web-accessible systems. It would also be helpful to determine if geographic demography has an effect on the use of these systems.

The integration of tagging into catalog systems is just one example of how technologies can change the usability of our library resources, if the average patron can understand these methods of information retrieval. As the technological world develops, so must libraries.

Library science is an ever-changing venue that is embracing new technologies and adopting new methods of resource retrieval based on these technologies. It is important that libraries are able to keep up with these changes, as it is what patrons both expect and deserve. Imagine if we were still using card catalogs despite the benefits of the Internet. The results of this research show that there is so much further to go and provides just a few ideas of how to get there.
Appendix A

OCLC FictionFinder

WorldCat
LibraryThing

Tag info: basketball

Most often tagged basketball
The Absolutely True Diary of a Part-Time Indian by Sherman Alexie (28)
My Losing Season by Pat Conroy (29)
Travel Team by Mike Lupica (29)
A Season on the Brink by John Feinstein (29)
The Punch by John Feinstein (30)
Last Shot: A Final Four Mystery by John Feinstein (34)
Trium by Walter Dean Myers (39)
The Book of the Game by David Trebek (39)
The Last Amateurs: Playing for Glory and Honor in Division... by John Feinstein (27)
Miracle on 44th Street by Mike Lupica (39)
Black and White by Paul Volponi (29)
Summer Ball by Mike Lupica (39)
Salt in His Shoes by Michael Hyatt Jordan in Pursuit of a Dream by Delores Hyant (39)
Sacred Hoops: Spiritual Lessons of a Hardwood Warrior by Phil Jackson (39)
The Best of Basketball: The NBA According to The Sports Guy by Bill Simmons (39)
Hoop by Walter Dean Myers (39)
A Sense of Where You Are: Bill Bradley at Princeton by John McPherson (39)
Game by Walter Dean Myers (39)
Front and Center by Catherine Plimack (39)
Eagle Moon: A Year, A Tribe, and A High School Basketball... by Michael D'Onofrio (39)

Using the tag basketball

Related tags
- 20th century
- African American
- alcoholism
- American American literature
- basketball
- biography
- college
- coming of age
- contemporary fiction
- death
- family
- fiction
- friendship
- high school
- humor
- literature
- manga
- murder
- mystery
- Native American
- Native Americans
- non-fiction
- novel
- poetry
- read
- realistic fiction
- religion
- romance
- short stories
- sports
- teen
- unread
- Vietnam War
- YA
- young adult

Related subjects
- Basketball • Fiction (30)
- Basketball players • United States • Biography (29)
- Basketball • United States • Biography (29)
- Basketball • United States • Biography (29)
- Basketball • United States • Biography (29)
- Basketball • United States • Biography (29)
- Interpersonal relations • Fiction (28)
Appendix B

Dear Participant,

Thank you for agreeing to partake in my survey. Please read the three points below and proceed as instructed.

1. Read scenario one and two, presented below.

2. Conduct your searches in the five systems (linked via a URL) below, addressing each scenario, and assess the results.

3. Rate the results using the rating scale provided under each system.

Please conduct both scenarios and respond to the specific system separately for the scaled questions. Please complete your searches for both scenarios for every system before completing the Short Answer portion of the survey.

Scenarios

Using one website at a time, search for the following:

- A young adult sports fiction book that features basketball—the final result is up to your discretion, please choose whichever title which is provided in the results that you feel you would select to read.
- A specific title (below)—you will search for this title, however, without using the title or the author, but only information from the plot summary (below). The book: Ender’s Game by Orson Scott Card. Summary: “Intense is the word for Ender's Game. Aliens have attacked Earth twice and almost destroyed the human species. To make sure humans win the next encounter, the world government has taken to breeding military geniuses -- and then training them in the arts of war... The early training, not surprisingly, takes the form of 'games'... Ender Wiggin is a genius among geniuses; he wins all the games... He is smart enough to know that time is running out. But is he smart enough to save the planet?” (From the back of the book, provided by the New York Times)
Rate Results

Please rate the following on a scale of 1 to 10, 1 being the worst and 10 being the best

FictionFinder (fictionfinder.oclc.org)
1. The tags initially given on the homepage were useful
   1  2  3  4  5  6  7  8  9  10
2. The search box results provided relevant book titles
   1  2  3  4  5  6  7  8  9  10
3. Searching using keywords based on genre provided useful results
   1  2  3  4  5  6  7  8  9  10

WorldCat (http://www.worldcat.org)
1. The search box results provided relevant book titles
   1  2  3  4  5  6  7  8  9  10
2. Searching using keywords based on genre provided useful results
   1  2  3  4  5  6  7  8  9  10
3. The refining tags (on the left side of the page) were useful in narrowing results
   1  2  3  4  5  6  7  8  9  10

PLCMC (http://catalog.plcmc.org/)
1. The search box results provided relevant book titles
   1  2  3  4  5  6  7  8  9  10
2. Searching using keywords based on genre provided useful results
   1  2  3  4  5  6  7  8  9  10
3. The library developed tags were useful
   1  2  3  4  5  6  7  8  9  10
4. The user developed tags were useful
   1  2  3  4  5  6  7  8  9  10

UNC Library (http://www.lib.unc.edu)
1. The search box results provided relevant book titles
   1  2  3  4  5  6  7  8  9  10
2. Searching using keywords based on genre provided useful results
   1  2  3  4  5  6  7  8  9  10
3. The refining tags (on the left side of the page) were useful in narrowing results
   1  2  3  4  5  6  7  8  9  10

LibraryThing (http://www.librarything.com)
1. The search box results provided relevant book titles
   1  2  3  4  5  6  7  8  9  10
2. Searching using keywords based on genre provided useful results
   1  2  3  4  5  6  7  8  9  10
3. The user developed tags were useful
   1  2  3  4  5  6  7  8  9  10
Survey Questions

Please answer the following short answer questions

1. Which website catalog provided the best results for your search?
   a. Basketball search
   b. *Ender’s Game* search

2. Which website catalog was easiest to use for your search?
   a. Basketball search
   b. *Ender’s Game* search

3. Did you find the tags in each website catalog useful?
   a. Basketball search
   b. *Ender’s Game* search

4. Was it easier for you to acquire relevant results using the search box or using the tags provided?
   a. Basketball search
   b. *Ender’s Game* search

5. Do you prefer the “refine” tags or the freeform tags when searching?
   a. Basketball search
   b. *Ender’s Game* search

6. Which do you believe to be more time efficient, search boxes or tags?
   a. Basketball search
   b. *Ender’s Game* search

7. Would you use any of these website catalogs on a regular basis to assist in personal book selection, when you may not know a specific title to find? If yes, which site would you use?
Bibliography


