Abstract
The changing web and the new generation of users have forced libraries to rethink their position as information providers. New generations of library users prefer to look for information themselves and seek personal help only at times of greatest need. Libraries therefore need to devote more attention to their most important reference tool - the library catalogue. In order to attract users with high expectations and demands, libraries have to make their catalogues more functional, intuitive and up to date. In January 2008 an expert study was carried out to investigate the state of six chosen library catalogues, focusing on functionality and current web trends. The study showed that the traditional catalogue included only a few of the examined features, while more modern catalogues could be grouped into catalogues with improved functionality and catalogues that had focused more on incorporating the Web 2.0 trends. Libraries still need to fully exploit the advancements in the technology to improve the library catalogue and modify it to the behaviour and demands of the new generation of library users in hope to re-establish the library catalogue as the ultimate reference tool.

Keywords: library catalogues, reference services, information retrieval, Web 2.0, users

1.0. Introduction
There is a global discussion going on about the new generation of web and the next generation of users. The so-called 2.0 world made us take a good look at library reference services and how they fit into this rapidly changing environment. There is now an abundance of information accessible freely online and users can retrieve information that once would have required an assistance of a reference librarian. This and the fact that there are more and more commercial information services taking on some traditional roles of reference librarians, has created a feeling that reference librarians had lost their primary position (Tyckoson, 2001).

Despite librarians’ efforts to adapt reference services to the new environment and new information needs using e-mail, instant messaging, and social networking sites, there are still reports on declining use of reference services (Oder, 2007). New generations of library users now feel able to access resources and services themselves and expect simple, “easy-access, one stop, self-help information services […] and personal help only at times of greatest need” (Han & Goulding, 2003). Following this description it seems that libraries should focus their attention to the library catalogue, as the central purpose of reference service is not only to answer patrons’ questions, but also to provide resources to enable users to answer questions by themselves (Pomerantz, 2003).
One of the most important tools libraries can offer is the library catalogue. But compared to the various spreading and successful web services, the library catalogue is less and less recognized as an easy and effective tool, leading library users to bypass it when searching for information. In order to compete, the library catalogue needs to offer the same or even higher level of sophistication as other popular web destinations. Only an effective, intuitive and enriched catalogue will appeal to the new generation of demanding web-savvy users and improve their ability to use library resources and services by themselves.

2.0. What is wrong with the library catalogue?

Problems for the online library catalogue did not begin with the advent, quick development or broad adoption of the web. For more than twenty years, the library catalogue has been criticised for its difficult use and poor functionality. Despite a number of studies and papers suggesting ideas for improving library catalogues, changes have been slow and many of the ideas have not been implemented (Borgman, 1996; Yu & Young, 2004). Most of the changes have been made on surface rather than in the core functionality, leaving library catalogues hard to use (Borgman, 1996). Studies show that besides falling behind the trends on the web, the most problematic area is the catalogue’s interface, lacking in functionality, intuitivity, and content.

Traditional library catalogues are poorly designed for the tasks of finding, discovering and selecting resources available in libraries. They are best at locating and obtaining known items, so the user must know precisely what he/she wants (Borgman, 1996; Rethinking…, 2005). But this emphasis on know-item searching does not follow the actual user behaviour and mental models in information retrieval. Information retrieval process often begins with only a vague idea, which is then gradually formulated sufficiently to begin searching. Besides that, query formulation is difficult as the user needs to have the conceptual knowledge of how the terms can be combined and is required to use the terms that match those in the catalogue (Borgman, 1996). Boolean logic in query formulation is hard for the user to comprehend and research (Novotny, 2004) shows that there is in fact only minimal usage of Boolean operators. Due to the common use of the web, users are accustomed to natural-language searching and simply type multiple search terms (keywords) on a single line without connecting them with Boolean operators. They also build queries using only terms they have in mind, without consulting the controlled vocabulary the library uses, all leading to poor results (Yu & Young, 2004; Novotny, 2004). That is why many (e.g. Borgman, 1996; Hildreth, 1995; Breeding 2006) think that a better alternative to query formulation would be searching by browsing, recognition and discovery. Browsing is recognized as a natural and effective way of searching that requires less effort and knowledge. It is also easier for the user to recognize than recall information (Bates, 2003). As Bates (2007) points out “information seeking is, after all, about finding out things that one does not know before the search begins”. These are all reasons for turning the traditional paradigm “query-first-then-browse» upside down, making the exploration and discovery by browsing the primary search interface, supported by secondary query method (Hildreth, 1995).

The second problematic area in library catalogues is the results list and navigation between results. Queries often return hundreds or thousands of hits, but users are willing to look at only a very limited number. Web search engines have therefore developed very sophisticated systems for relevance ranking of results. Accustomed to get the most relevant results first, users are confused when in library catalogues irrelevant records appear before items they were looking for (Novotny, 2004). With a large number of search results it is also very time-consuming to look at every hit in order to decide whether it is relevant or not. To enable easier and faster selection, result clustering and faceted navigation should be applied to quickly narrow and filter the results to a manageable number (Breeding 2007a; 2007b). One possibility for meaningful clustering of results is also the use of Functional Requirements for Bibliographic Records (FRBR).
The third most frequent reproach against the library catalogue is the lack of information presented to the user. Most records in the library catalogue display only basic textual bibliographic data. To improve the user experience, the library catalogue needs to be enriched with cover art images, tables of contents, summaries, reviews, excerpts, popularity ranks, recommendation lists and features such as “find similar” or “users who borrowed this book also borrowed ...”. These are all things already available on some other web destinations, especially online bookshops such as Amazon.com (Zumer, 2007). They offer users all this additional information in order to promote their collection and to help users choose the items they need.

3.0. The wisdom of crowds – the new reference?

The Web 2.0 principles such as collaboration, participation, creativity, sharing, personalization, and individualism have also had an important influence on libraries and library services, where their application has been widely framed as “library 2.0” (Abram, 2005; Maness, 2006).

Influenced by the 2.0 trend, libraries have started building an environment more focused on the user: besides delivering content to users they also seek content from users and encourage engagement, participation, and collaboration (Breeding, 2007). The user is therefore no longer just a reader but also a creator who interacts with others and forms virtual communities.

In the world of Web 2.0 we need to consider how user-generated content and virtual communities are changing the role of reference librarians. The subtitle of James Surowiecki’s book The wisdom of crowds “why the many are smarter than the few and how collective wisdom shapes business, economies, societies, and nations” sums up the issues also librarians need to think about. The idea behind the wisdom of crowds advocates that by acting independently, but collectively, the “crowd” is more likely to come up with the right answer than any one individual, the knowledge of an amateur being as valuable as the knowledge of an expert (Anderson, 2007). We can just look at Wikipedia to see how “collective knowledge of millions of users can produce reference works that are more comprehensive than traditional reference sources produced by a small group of experts” (Wenzler, 2007).

So instead of consulting a reference librarian when looking for specific materials, users base their selections on the opinions and selections of others. This can mean checking how many times an article has been cited or following recommendations, ratings, reviews, or answers on forums and other discussion places. The web has become a platform for collaboration where users not only benefit from other people's advice but also contribute their own. Users willingly share their materials, opinions, and expertise, making the web environment interactive and engaging. It seems that librarians’ hegemony in describing and assessing materials is being replaced by a collective effort (Sadeh, 2007a).

But in order to achieve the usefulness of user generated content, a sufficient critical mass is required. The rule (also known as the network effect) says: the more people that create content the more valuable the service becomes. So far, Web 2.0 features in library catalogues have been underused and have added little value to library catalogues as the value of 2.0 features largely depends on the required critical mass (Wenzler, 2007).

4.0. What is the state of current library catalogues?

To estimate the state of current library catalogues an expert study was carried out in January 2008, based on the framework from a study performed in July 2007 (Merćun, 2007). Following the examined literature, six main areas of research were formed, within each a
number of features were observed, analysing their presence and realization in the library catalogues.

For the purpose of the expert study, 6 library catalogues were chosen:

- one traditional: the Slovene union catalogue COBISS (http://www.cobiss.si) and
- five more modern and innovative ones:
  - Ann Arbor District Library catalogue (http://www.aadl.org/catalog),
  - Hennepin County Library catalogue (https://catalog.hclib.org),
  - Queens Library catalogue (http://www.queenslibrary.org/),
  - Phoenix Public Library catalogue (http://www.phoenixpubliclibrary.org/), and
  - WorldCat (http://www.worldcat.org).

Tables 1 and 2 summarize the results of the expert study, showing which of the recommended features were found in the studied catalogues.

In features most needed for easier and more intuitive searching (Table 1 - searching plus results and navigation) there are only two catalogues (Queens and Phoenix) showing good and promising results. Followed by WorldCat, these three catalogues have gone beyond traditional and offer users simple searching and quick results. The other catalogues are far behind in this area, still offering only complex searching that requires users to make many unnecessary steps.

With the exception of WorldCat and COBISS, library catalogues have provided their users with additional information about the collection, offering enriched content such as cover art images, summaries, tables of content, and various recommendation lists. But there is still room for improvement, especially in the way this additional content is integrated in the catalogue. Libraries should also offer more multimedia content and recommendations on similar books (“more like this”).
### Table 1: Features in six current library catalogues – part 1

<table>
<thead>
<tr>
<th>Library catalogues</th>
<th>A</th>
<th>H</th>
<th>Q</th>
<th>P</th>
<th>W</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Search</strong></td>
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<tr>
<td>Simple keyword search box on each page</td>
<td>+/-</td>
<td>+/-</td>
<td>++</td>
<td>++</td>
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<td>–</td>
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<tr>
<td>Spell checking</td>
<td>++</td>
<td>++</td>
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<td>Automatic spelling corrections</td>
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<td>–</td>
<td>++</td>
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<td>Begin search by browsing</td>
<td>+/-</td>
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<td>+/-</td>
<td>++</td>
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<td>–</td>
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<td>Full text searching</td>
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<td><strong>Results page and navigation</strong></td>
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<tr>
<td>Relevance ranking</td>
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<td>–</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>–</td>
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<tr>
<td>Clustering and/or faceted navigation</td>
<td>–</td>
<td>–</td>
<td>++</td>
<td>++</td>
<td>+</td>
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<tr>
<td>Breadcrumbs navigation</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>–</td>
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<tr>
<td><strong>Enriched content and recommendation lists</strong></td>
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<tr>
<td>Cover art images</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
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<tr>
<td>Reviews</td>
<td>++</td>
<td>++</td>
<td>–</td>
<td>++</td>
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<tr>
<td>Summaries / Annotations</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+/-</td>
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<tr>
<td>Excerpts</td>
<td>–</td>
<td>++</td>
<td>++</td>
<td>–</td>
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<tr>
<td>Tables of content</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
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<td>+/-</td>
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<tr>
<td>New items, most popular, recently returned items and recommendations lists</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>“More like this”</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Audio in video content</td>
<td>–</td>
<td>+</td>
<td>+/-</td>
<td>+/-</td>
<td>–</td>
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**Key:**

- **A** = Ann Arbor District Library;
- **H** = Hennepin County Library;
- **Q** = Queens Library;
- **P** = Phoenix Public Library;
- **W** = WorldCat;
- **C** = COBISS

++ very good; + good, with some limitations; +/- available, but very limited; – not available

If features in Table 1 are focused on functionality, Table 2 is more about current trends library catalogues could adopt from the web. Taking a small lead in more social features are Ann Arbor and Hennepin library catalogues, followed by the Phoenix library catalogue. The number of characteristics found in all six catalogues is smaller and more spread than in Table 1, showing that each library chose a different set of trendy features.

From reference point of view it is important to stress the potential of user participation and personalization. Personalization enables the system to adapt the interface to the end-user’s wishes and recommend materials from the library collection according to the users’ recent searches, favourite titles, or areas of interest. Another way to offer reading recommendations is also by using user participation features. Tags and user created lists can be embedded in the library catalogue, pointing users to similar items chosen by other users. Ratings, reviews, comments, and forums bring to the library the wisdom of crowds that helps the user form an opinion on the material.
The expert study showed three different groups of library catalogues:

1. library catalogues that have not yet begun with this kind of modernization,
2. library catalogues that have focused more on improving functional features shown in Table 1, and
3. library catalogues that devoted their attention to Web 2.0 trends.

Interestingly, catalogues focused on functional improvements offer less user participation and personalization while catalogues with more enhanced 2.0 features have not modernized their search and navigation. Using and testing all catalogues in the expert study we found that the latter catalogues are much harder to use and are not user friendly despite offering users to participate. The new features are shaded by poorly designed interfaces that can frustrate web-savvy users. On the other hand, catalogues that focused on modernizing functional aspects of catalogues are easy and fun to use, supporting discovery and serendipity. With many interesting features that encourage users to research the catalogue, the lack of direct user participation and personalization is not really problematic.
5.0. Conclusion

The web today offers so many options for people to find or ask for information that it sometimes seems hard to see how librarians can compete with that. Thematic forums and “ask the community” tools have become the place where users ask questions or present their dilemmas and other participants quickly help to solve the problem, providing answers based upon their experience, opinion, and expertise. And users trust the community, knowing that active and highly rated participants provide useful and reliable data. But there are still new services surfacing on the web. For example Amazon’s newest experiment NowNow (http://www.nownow.com), a question-answer service that will, for less than a quarter of a dollar, provide three answers for any question via mobile email (the performance of NowNow workers being monitored by user satisfaction feedback).

Facing the Web 2.0 and the web-savvy users, some libraries have been trying hard to adapt and reinvent the services they offer. Improving the library catalogue and modifying it to the behaviour and demands of the new generation of library users may just re-establish the library catalogue as the ultimate reference tool and bring back the users. According to research (OCLC, 2005; Pew Internet and American Life Project, 2007), users still have quite high respect for the library and its services, they just do not use them because they are less convenient than other services. And by now we know that users assign great value to ease of use, ease of access, speed, convenience and immediate satisfaction (Sadeh, 2007b).

There has been much written on how to improve the online library catalogue and it seems that now, with all the advancements in technology, we can finally put ideas into practice. Some library catalogues have already begun with the changes, making library catalogues more user-friendly and also visually attractive. According to the results of our expert study, traditional library catalogues should first apply better searching and navigation systems, and only after the basic functionality of the catalogue is improved should they go to the next level and apply Web 2.0 tools. Of course there are still numerous questions opened and many answers will be available only after the new features are applied and in use.

Combining functionality and Web 2.0 features, the library catalogue would be able to become a real virtual library. It would no longer be only a place where users come to look for a specific book in the library, but a place similar to the traditional library: a place where users browse and discover, spend their free time, socialize with other users, chat, and share experience and knowledge.

References


Hinchcliffe, D. (2006, April 9). All we got was web 1.0, when Tim Berners-Lee actually gave us Web 2.0. Dion Hinchcliffe Web 2.0 blog. Retrieved May 4, 2007, from http://web2.wsj2.com/all_we_got_was_web_1_0_when_tim_berners_lee_actually_gave_us_w.htm


