

NEXT-GENERATION CATALOGUES: HOW ARE THE ACADEMIC LIBRARIES IN KENYA FARING?

WANYENDA CHILIMO

Department of Information Science
University of South Africa
Pretoria, South Africa
wchilimo@yahoo.com

ABSTRACT

The library catalogue has changed over the years from a card catalogue to its electronic successor, the Online Public Access Catalogue (OPAC), to what is called the next-generation library catalogue, sometimes referred to as the library 2.0 catalogue or ‘the third-generation catalogue’. The purpose of this study was to investigate the current state of catalogues in academic libraries in Kenya and to evaluate whether these libraries have incorporated features of the next-generation catalogues in their OPACs. The study applied a checklist of features commonly identified as characteristics of the next-generation catalogue to examine whether the OPACs of university libraries in Kenya are comparable to the next-generation library catalogue. The findings of the study showed that libraries in Kenya have made some progress towards transforming their OPACs to the next-generation catalogue but have not reached the ideal. None of the OPACs has all the features evaluated. Progress has been made with features, such as enhanced content, simple keyword search and faceted navigation. However, none of the catalogues has federated searching capabilities. The study also found out that close to half of the libraries which have their OPACs available online are using Koha as their Library Management System (LMS). This article provides valuable information for library policy makers interested in modernising their catalogues or acquiring discovery tools for their institution. The article may also be a useful tool for evaluating OPACs modules of the integrated LMS, especially for libraries that are in the process of selecting a suitable LMS.

KEYWORDS

Online Public Access Catalogue, next-generation library catalogue, discovery tools, academic libraries, Kenya, library management systems, features of library catalogue

1 INTRODUCTION AND BACKGROUND INFORMATION

The library catalogue has gone through various phases of transformation over the years. The card catalogue was replaced by its electronic successor, the Online Public Access Catalogue (OPAC), which was mainly text based. The advancement in web technologies made it possible for the catalogue to be delivered online and several Library Management Systems (LMS) became web based. However, the early catalogues, also described as legacy catalogues (Breeding 2007), were mainly designed to deal with the library's physical collection and not the electronic content. In addition, the development of these catalogues did not follow the wider development of the web search engines, hence, they remained static over the years. Therefore, as the web search engines become more sophisticated in their search capabilities and design, and as libraries continue to acquire more electronic resources, the legacy library catalogues have become less appealing and fall short of users' expectations.

Several studies point to user dissatisfaction with the traditional catalogues. De Jager (2007) argues that while libraries spend much time and money on building and maintaining catalogues according to accepted international standards, there is considerable evidence that users are inclined to bypass libraries and their catalogues in their search for information and to rely solely on information provided by web search engines. A study by Zumer (2007) pointed out that 21st century library users are accustomed to web search engines, such as Google, and are increasingly dissatisfied with the search mechanisms of older OPACs. Some of the shortcomings of legacy catalogues, as pointed out by Breeding (2010), include complex search interfaces that are insufficiently intuitive; unable to rank results according to relevancy or interest; too limited in scope; tied to print materials; and less able to address electronic content and lack of social network features to engage library users.

In addition, Little (2012) argues that traditional catalogue interfaces can be embarrassingly clunky compared to Google's clean and simple homepage. He further laments that the traditional catalogue is also a rather blunt and unforgiving instrument at the best of times. Spelling mistakes, typos and indefinite articles can easily cause searchers to hit a wall, and subject heading structure and use can quickly prove frustrating.

The changing user expectations and competition from popular web search engines, such as Google, have put libraries under immense pressure to deliver content and services in ways that users will find compelling, relevant and convenient. This has led to the development of a new genre of library catalogues that incorporate technology not found in the traditional catalogues. Different names have been given to these new OPACs, including next-generation OPACs (Breeding 2007, Lindström & Malmsten 2008; Marcin & Morris 2008; Tarulli 2012; Yang & Hofmann 2010), library 2.0 catalogues (Wilson 2007) and social catalogues, to name just a few. Breeding (2007) points out that there is no single definition of what constitutes a next-generation library catalogue, but

in broad terms, a next-generation library catalogue is able to transcend some aspect of the traditional library catalogue.

In order to keep up with user expectations and the increasing amount of digital content, some libraries have resorted to modernising their catalogues completely and making them look and feel like popular search engines. Other libraries have resorted to adding new search interfaces on top of their existing OPAC. These new search interfaces are commonly known as the discovery tools, discovery platforms or discovery layers.

A discovery platform offers a standalone OPAC that is capable of separating the user interface from the LMS and creating a one-stop search box that indexes the entire collection that may include hard copy books, e-books, e-journals, content from institutional repositories and other library databases (Keene 2011). Unlike federated search tools that provide an interface for searching library electronic resources only, discovery tools provide one search interface for the entire library collection.

Breeding (2010) points out that the logic behind the discovery tools is to provide access to all aspects of library collections, not just content managed by the LMS. Discovery tools are all about helping users to discover library content in all formats, regardless of whether it resides within the physical library or among its collections of electronic content, spanning both locally owned materials and those accessed remotely through subscriptions. Discovery tools are available both as proprietary and as open source solutions. Examples of proprietary discovery tools include Primo, Aqua Browser, Visualizer, Summon, EBSCO Discovery Service, Enterprise and Biblio Commons. Open source discovery tools include VuFind, Blacklight and SOPAC (Allison 2012).

This article investigates the current state of OPAC development in Kenyan academic libraries. The article examines LMSs and OPACs that are being used in Kenyan academic libraries and determines whether these OPACs have managed to incorporate features of the next-generation catalogues. The study will shed light on how academic libraries in Kenya are faring in terms of modernising their catalogues.

Studies on the development of library catalogues in Africa and developing countries in general are rare. To the author's best knowledge, there is a lack of such studies, especially during this time when libraries are transiting from OPACs to discovery tools. According to Breeding (2010), libraries have moved past the time where a traditional online catalogue integrated with the LMS should be offered as the primary search tool for library content. Thus, the article attempts to fill this gap as it will provide valuable information to libraries that are planning either to modernise their catalogues or to implement discovery tools. The article may also be a useful tool for evaluating OPAC modules of the integrated LMS, especially for libraries that are in the process of selecting a suitable LMS for their institutions.

2 ACADEMIC LIBRARIES IN KENYA

Over the past few years, there has been a tremendous increase in the number of universities in Kenya. Nyaigotti-Chacha (2004) reports that, for the last four decades, the social demands for higher education in Kenya have intensified and this has been exemplified by the rise in enrolments in public and private universities, the proliferation of more private universities and the establishment of private wings (self-sponsored programmes) in the public universities. The total number of universities in Kenya has increased from 13 in 2001 to, currently, 66 universities, which include public, private and constituent colleges (CUE 2014b). Furthermore, due to the increased demand for higher education, universities in Kenya are offering university education through various modes, such as weekend programmes, evening classes and holiday-based programmes. Many of these universities also have satellite campuses scattered throughout the major cities in the country and within the East Africa region. This rapid expansion has resulted in an increased number of university libraries in Kenya, both in terms of new libraries for the new universities and branch libraries for the established ones.

Academic libraries in Kenya, just like in other countries, have to cope with challenges brought about by fast-changing information and communication technologies, changing user expectations and growing numbers of students who are mostly located outside the campuses. The latest statistics indicate that Kenya is becoming increasingly 'digital' with the current mobile phone and Internet penetration rates standing at 75 per cent and 49.7 per cent, respectively (CCK 2013). According to these statistics, more than half of the Kenyan population is currently able to access the Internet and the digital technologies. In such circumstances, modernising the library OPACs and making the most of the library services available online so as to meet the needs of the working class students and tech-savvy youth who are joining universities, becomes a matter of necessity. At the moment, many university libraries in Kenya have embraced technology with private university libraries, generally taking the lead. Upcoming universities, such as the constitute college libraries, have also embarked on projects to automate their services and make their services available online.

3 LITERATURE REVIEW

The literature review will present a discussion of the features of the next-generation catalogues and will review empirical studies related to this research.

3.1 FEATURES OF THE NEXT-GENERATION ONLINE PUBLIC ACCESS CATALOGUES

Several attempts have been made to outline features or functionalities that distinguish a next-generation catalogue from a traditional catalogue. One of the most comprehensive attempts to outline features of the next-generation OPAC is the article by Breeding

(2007) which outlines 12 common features of next-generation catalogues. In his article, Breeding analyses the shortcomings of the traditional catalogue, as compared to features provided by web search engines, such as Google, and other commercial sites, such as Amazon. A detailed description of these features is outlined below.

- a. **A single point of entry:** The library catalogue should be a single point of entry to all information resources in the library. It should be a federated search engine for one-stop searching, which allows the simultaneous search of multiple searchable resources. One search in an OPAC should retrieve information on the location of printed books, full-text journal articles, e-books, articles from institutional repositories and other electronic databases.
- b. **State-of-the-art web interface:** To attract users, the library catalogue should be an intuitive and visually appealing site that compares well with other Internet search engines such as Google or Amazon.
- c. **Enriched content:** The library catalogue should not offer text-only displays. The catalogue might bring in content from different sources to strengthen the visual appeal and increase the amount of information presented to the user. The catalogue should include book cover images, user-driven input such as comments, descriptions, ratings, and tag clouds.
- d. **Faceted navigation:** Faceted navigation allows users to narrow their search results by facets. These may include subjects, authors, dates, type of materials, locations, series and more.
- e. **Simple keyword search:** The next-generation catalogue looks and feels like popular Internet search engines and the best example is Google's simple keyword search box with a link to advanced search for users in need of more complex searching options.
- f. **'Did you mean . . .?':** When a search term is not spelled correctly or nothing is found in the OPAC, a modern catalogue may generate a statement such as 'Did you mean . . .?' or 'Maybe you meant . . .?' The catalogue may also suggest the correct spelling or recommend a term that may match the user's intended search term. The correct word is usually a link that will lead users to the right search.
- g. **Related materials:** Ideally, an OPAC should recommend material to readers by making a statement such as patrons who borrowed item A have also borrowed item B.
- h. **Relevancy:** The next-generation catalogue should do relevancy ranking with increased precision. It should influence the relevancy results. For instance, more frequently circulated books indicate usefulness and items deemed important enough to have multiple copies, should be ranked higher in the display.
- i. **User contribution:** The next-generation catalogue allows users inputs into the records. This can include descriptions, summaries, reviews, criticism,

comments, rating and ranking, and tagging or folksonomies. Today's users increasingly look for what other users have to say about items found online, and value what they feel to be their peers' review of items. Tagging clouds can serve as access points and descriptive keywords lead to frequently used items.

- j. Really Simple Syndication (RSS) feeds:** These allow users to connect themselves to content that is often updated. Next-generation interfaces include RSS feeds so that users can have new book lists, top-circulating book lists, canned searches, and 'watch this topic' connections to the catalogue on their own blog or feed reader page.
- k. Integration with social network sites:** When a library's catalogue is integrated with social network sites, patrons can share links to library items with their friends on social networks like Twitter, Facebook and Delicious.
- l. Persistent links:** Next-generation catalogue records contain a stable URL capable of being copied and pasted and serving as a permanent link to that record.

Since Breeding highlighted these features in 2007, several studies have been conducted to check and compare the availability of these features in both catalogue modules of the integrated LMS and stand-alone OPACs or the discovery tools. Yang and Hofmann (2010) used the features to compare the OPACs of two open source LMSs, namely Koha and Evergreen, and one proprietary LMS, namely WebVoyage. They found that none of the OPACs had all the features of the next-generation catalogue involved in the evaluation but Koha's OPAC had more features as compared to Evergreen and WebVoyage OPAC.

The 12 features were also checked against seven open source and ten proprietary discovery tools, where it was found that discovery tools had many next-generation catalogue features, but only a few can be called real next-generation catalogues. Federated searching and relevance ranking based on circulation statistics were two areas that both open source and proprietary discovery tools were missing (Yang & Wagner 2010).

In another study the features were checked against 179 catalogue modules of the integrated LMS and 81 discovery tools (Yang & Hofmann 2011). The study found out that about 16 per cent of the OPACs in the sample did not show any advanced features of the next-generation catalogue. More than half of the libraries (61%) had only one to five advanced features in their OPACs. Only 3 per cent of the OPACs in the sample ($n = 8$) demonstrated seven to ten out of the 12 functionalities of the next-generation catalogue. The study found that weak areas were federated searching, relevance ranking based on circulation statistics, and recommendations based on patron transactions (Yang & Hofmann 2011).

Another attempt to outline features of the next-generation OPAC is a study by Jett et al (2011) who argue that salient features which will predominantly engage the future of the catalogues can be grouped into several groups, as follows: OPACs will allow personalisation; OPACs will allow interoperability and the syndication of contents; content enrichment and information architecture will dominate the traditional information; any information displayed will be filtered through facets and groups; OPACs will enable the users to analyse and use the information more intellectually; OPACs will be able to recommend other information sources that users may be interested in; and OPACs will enable interaction among patrons. Some of the features pointed out by Jett et al (2011), such as faceted navigation, content enrichment and related materials, are also covered in Breeding's article of 2007.

Another attempt to outline features of the next-generation catalogues is a rubric of four broad categories of features as outlined by Moore and Greene (2012). The rubric was used to rate two open source discovery layers, namely, Blacklight and VuFind. The first category covered general features and functionality, which included open URL, unicode compatibility and integration of non-MARC metadata; the second category was account management and authorisation; the third was export and sharing, which included ability to export records to citation software, RSS feeds, print/email/save function and integration with major cellphone providers. The fourth category included search functionality and results display which covered faceted searching, ability to suggest alternative spelling, ability to sort search results by relevance, ability to perform searches that can be limited to criteria such as home location, classification scheme, type of medium, format, collection and language. Some of the features listed by Moore and Greene (2012), especially most of the features under the search functionality and results display, represent the generally agreed upon characteristics of the next-generation catalogues and are also listed by Breeding (2007).

In another attempt to outline features of next-generation catalogues, Macan, Fernandez and Stojanovski (2012) prepared a checklist of features for all the modules of two open-source LMSs, namely, Koha and ABCD. The checklist was then compared to the features of the two LMSs. For the OPAC module, the features were grouped into five categories, including: (i) data and database, that is, metasearch, enriched content, and full-text uploading; (ii) search, retrieval and display, that is, ranking by relevance, faceted navigation, spell-checking, unicode support, search inside the book, display of publication covers, reading/borrowing suggestions, recommendations, virtual shelves, mobile phone access, and integration with mobile phone devices; (iii) full-text search, user functions, namely, selective sort capabilities, ability to sort results by a variety of keys, personal user accounts, and notification services such as e-mail alert for overdue items; (iv) Web 2.0 functions, namely, tagging, rating, commenting, reviewing, and making private or public lists; and (v) reference management, namely, compatibility with different reference management software like Mendeley and Zotero.

Based on the discussion of the features of next-generation catalogues as presented by various authors, the current study will adopt all 12 features developed by Breeding (2007), because the list is very comprehensive and most of the features are also mentioned by other authors. In addition, two more features mentioned by Macan et al (2012) and Moore and Greene (2012) will be added to the list, making it a checklist of 14 features. The two new features include patrons' account management and integration with citation management tools.

Although the study applied similar evaluation procedures that were applied in previous studies, most of the reviewed studies were conducted in the context of developed countries (US and Canada). The current study was based on an African country where conditions and circumstances in which academic libraries operate are different, both in terms of technological advancements and user expectations. Furthermore, unlike studies done by Yang and Hofmann (2010) and Macan and Stojanovski (2012), the study was concerned with how the different libraries have implemented their OPACs rather than the evaluation of the features available and the capabilities of a particular LMS. This is important, especially for libraries using open-source LMSs whereby, due to various reasons, both technical and managerial, they may choose to adopt certain features and ignore others.

3.2 PURPOSE OF THE STUDY

The purpose of the study was to investigate the current state of catalogues of academic libraries in Kenya and to determine whether these libraries have incorporated features of the next-generation catalogues into their OPACs. Specifically, the study sought to:

- a. Determine the LMSs and OPACs used by academic libraries in Kenya.
- b. Determine whether libraries in Kenya have incorporated features of the next-generation catalogues into their OPACs.

4 RESEARCH METHODOLOGY

This was a qualitative study that involved visiting the websites of all academic libraries of universities in Kenya and identifying those that had a link to the catalogue. Once the OPACs had been identified, an analysis of their features was conducted by way of visiting these interfaces online. All the catalogues were checked between June 2013 and November 2013. A checklist of the 14 features of next-generation catalogues was used as an evaluation criterion. The 14 features that were identified by authors such as Breeding (2007), Macan et al (2012), Moore and Greene (2012) as features of the next-generation catalogues, also distinguish between modern catalogues and traditional catalogues. A comparison of the catalogues, based on the 14 features, was done on the basis of the presence and absence of the particular feature (ie, ✓ for presence and × for absence of the feature). The analysis was limited to features of the catalogues

available online without logging in. Features of catalogues hidden behind user log-ins and passwords were excluded. The analysis was based on the OPACs and the way they were implemented, as opposed to the features available and the capabilities of the various LMSs used by the libraries.

4.1 SAMPLING

The population for the study comprised all academic libraries of universities in Kenya. The list was obtained from the Commission for University Education website (CUE 2014b). CUE is a government regulatory body responsible for the quality assurance and expansion of universities in Kenya. From the list of all 66 universities currently registered in Kenya, purposive sampling was applied to limit the sample to institutions that are fully fledged and chartered. Before institutions become fully fledged, they normally go through the Commission for Higher Education evaluation process. During these evaluations, libraries are normally given priority as important entities in ensuring quality education in the universities (CUE 2014a). The study was, therefore, limited to fully fledged chartered universities as they have all gone through the CUE inspections and have been audited for compliance with CUE standards and regulations for university libraries in Kenya (CUE 2014a). Both public and private chartered universities were sampled, resulting in a sample of 39 universities, namely, 22 public chartered universities and 17 private chartered universities.

5 RESULTS AND DISCUSSION

This section provides and discusses the results in three sub-sections based on the purposes of the study. In the first sub-section the results on the library catalogues used in Kenyan universities are presented; the second sub-section presents the results on LMSs used by academic libraries in Kenya; and the third sub-section presents the results on the features of the next-generation catalogues in the Kenyan universities' OPACs.

Table 1: Universities, their OPAC URL and LMS used

| No. | University | OPAC URL | LMS used |
|-----|-----------------------------|---|-------------|
| 1 | University of Nairobi (UoN) | http://library.uonbi.ac.ke/opac/Vubis.csp | Vubis Smart |
| 2 | Moi University (MU) | http://aerospacelibrary.muk.ac.ke:9090/site/php/level.php?lang=en&component=34&item=4 | ABCD |
| 3 | Kenyatta University (KU) | http://maktaba.ku.ac.ke/ | Koha |

| No. | University | OPAC URL | LMS used |
|-----|--|---|------------------|
| 4 | Jomo Kenyatta University of Science and Technology (JKUAT) | http://library.jkuat.ac.ke/ | Koha |
| 5 | Technical University of Kenya (TUK) | http://library.kenyapolytechnic.ac.ke/ | Koha |
| 6 | Technical University of Mombasa (TUM) | http://10.9.0.113:9090/iah/ | ABCD |
| 7 | Pwani University (PU) | http://maktaba.pu.ac.ke/ | Koha |
| 8 | University of Eastern Africa, Baraton | http://library.ueab.ac.ke:8080/ | Library.Solution |
| 9 | Catholic University of Eastern Africa (CUEA) | http://library.cuea.edu/vs/vubis.csp | V-Smart |
| 10 | Daystar University | http://webopac.daystar.ac.ke/oasis/catalog/%28S%28dxxk3hjrr2e5stmstss0h3yx%29%29/Default.aspx?installation=Default | Mandarin |
| 11 | Scott Christian University (SCU) | http://library.scott.ac.ke/ | Koha |
| 12 | United States International University (USIU) | http://library.usiu.ac.ke/uhtbin/cgisirsi/x/x/0/49/ | Sirsidynix |
| 13 | Kenya Methodist University (KEMU) | http://library.kemu.ac.ke/ | Koha |
| 14 | Strathmore University (SU) | http://opac.library.strathmore.edu/ | Koha |
| 15 | Kabarak University | http://41.89.99.3/m4/opac/m4opac.dll?installation=Default&command=getSession&session=b060687d-ebf1-11e3-874d-f378f3f02c85&style=ui | Mandarin |
| 16 | Mount Kenya University (MKU) | http://opac.mku.ac.ke/ | Koha |
| 17 | Africa International University (AIU) | http://library.africainternational.edu/ | Koha |
| 18 | KCA University | http://www.kca.ac.ke/#!/opac/c1olu http://41.89.49.249/ | Koha |

5.1 LIBRARY CATALOGUES USED IN ACADEMIC LIBRARIES IN KENYA

From the sample of 39 universities, the researcher was able to access and analyse the online catalogues of 18 (46%) institutions. Refer to Table 1 for a complete list of the library OPACs involved in the study. Twenty-two (54%) institutions were excluded

from the study mainly because they did not have any link to the OPAC on their website. In two cases the link to the OPAC was there but it was inaccessible. The absence of a link to the OPAC may indicate that the library catalogue for these institutions is either available offline, operating on standalone computers in the library or probably these institutions are using a card catalogue or operating without a catalogue. The costs involved in automating the library, inadequate ICT infrastructure and lack of expertise, are some of the reasons why the catalogues of some of the institutions are inaccessible online.

All the OPACs included in the study were catalogue modules of the integrated LMSs used by the libraries as opposed to discovery tools. In two of the institutions involved in the study, together with the link to the OPAC, there was an additional link to LibHub discovery interface. Sempterooll (2014) developed the LibHub as an electronic library gateway that provides a single interface for accessing resources. However, according to explanations given on the websites of the institutions with a link to LibHub, the interface is mainly used as a federated search tool for searching electronic resources only (UoN 2014). The literature also shows that many other libraries in Africa use LibHub as a search interface for electronic resources (iAGRI 2014; UbuntuNet Alliance 2013). In addition, the links to the LibHub interface were password protected, hence the researcher was unable to access these catalogues and analyse their features.

5.2 LIBRARY MANAGEMENT SYSTEM USED IN ACADEMIC LIBRARIES IN KENYA

Table 1 shows a list of institutions involved in the study, their OPAC URLs and the LMS in use. Various LMSs (both proprietary and open source) are used in academic universities in Kenya. Some of the proprietary LMSs used include Vubis smart, V-smart, Mandarin, Library.Solution and SirsiDynix. Open source LMSs used include Koha and ABCD. When the OPACs were ranked according to the LMSs used, the results were as shown in Figure 1.

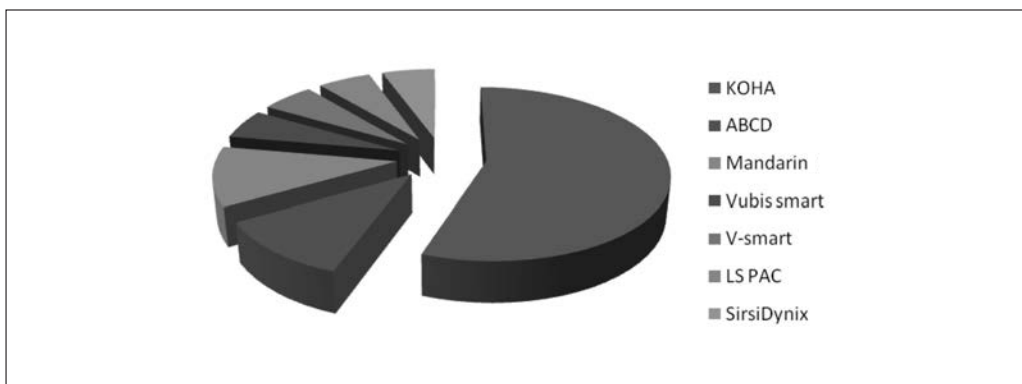


Figure 1: Distribution by LMS used

Refer to Figure 1 for statistics on LMSs used in academic libraries in Kenya. According to Figure 1, more than half (10; 55%) of the libraries with online OPACs were using Koha as their LMS. Other LMSs used included two (11%) for ABCD, two (11%) Vubis smart, two (11%) Mandarin and one (6%) SirsiDynix. Koha has become the LMS of choice for many libraries in Kenya. At the time of the study many libraries were either planning to automate their services using Koha or migrate from other systems to Koha. The main reason for this trend is the cost-effectiveness associated with the use of open source systems.

Singh and Sanaman (2011) point out that minimally funded libraries, such as small libraries and libraries in developing countries, may find open source systems affordable, thus many libraries in Kenya resort under this category. In most cases, academic libraries in Kenya are inadequately funded and they are under pressure to manage funds wisely and to provide quality library services to their users. This scenario makes open source systems an attractive option for these libraries. The advantages of using open source LMSs have been well documented (Breeding 2008; Keast 2010) and include lower initial and ongoing costs, the absence of vendor lock-ins and allowing for greater flexibility.

However, managing open source LMSs also comes with challenges. The main challenge is lack of quality support services or a dedicated vendor company to maintain the system for libraries. In the case of Kenya, some libraries, such as the Strathmore University Library, have managed to overcome this challenge by developing internal capacities and the required technical skills to manage Koha. By doing this, Strathmore University Library was able to successfully manage Koha for its library and even provide paid support services to other libraries interested in using Koha (Shiundu 2012). Other libraries and librarians in Kenya are also following this trend, hence creating a pool of sources for Koha paid support services from which libraries that are planning to use Koha can choose. Free and paid Koha support services are also available through the Koha Kenya Community (2014). The ever-growing international Koha community also provides free support services through its Koha mailing list and extensive documentation on the Koha system that is available through the official Koha website (Koha 2014).

The availability of support services, that is, both free and paid services for the installation, customisation and staff training on the use of the Koha systems and a growing user community, both in Kenya and internationally, are some of the reasons attracting libraries in Kenya to use Koha. Similar trends have been reported elsewhere (Breeding 2008; Dorman 2008; Keast 2011; Macan et al 2012).

5.3 FEATURES OF THE NEXT-GENERATION CATALOGUES

Each of the 14 next-generation catalogue attributes discussed in the literature review section was checked against all the OPACs in the sample. Features were marked ‘present’ (√) when they were seen in the OPAC and they were marked ‘absent’ (X) when they were not seen. The researcher was careful to check each catalogue individually, even when the same LMS was used. This was important because in some cases, different versions of the same LMS were being used and the older versions had fewer features. This was also important for open source LMSs, which are highly customisable and the availability of some features depends on how the system was customised. Results of the evaluation of features of the next-generation catalogues in Kenyan OPACs are summarised in tables 2 and 3.

Table 2: Summary of the features of the next-generation catalogues

| Features | UoN Vubis smart | CUEA V. smart | Deystar Manderin | Kaberek Manderin | Beraton LS PAC | USIU SirsiDynix | MOI ABCD | TUM ABCD |
|--|--------------------|------------------|---------------------|---------------------|-------------------|--------------------|-------------|-------------|
| A single point of entry | x | x | x | x | x | x | x | x |
| State-of-the-art Web interface | x | √ | √ | x | √ | √ | x | x |
| Enriched content | x | √ | √ | x | √ | √ | x | x |
| Faceted navigation | x | √ | √ | √ | √ | √ | x | x |
| Simple keyword search | √ | √ | √ | √ | √ | √ | √ | √ |
| "Did you mean ...?" | √ | √ | x | x | √ | √ | x | x |
| Related materials | x | √ | √ | √ | √ | √ | x | x |
| Relevancy | √ | √ | √ | √ | √ | √ | √ | √ |
| User contribution | x | x | x | x | √ | √ | x | x |
| RSS feeds | x | x | x | x | x | x | x | x |
| Integration with social network sites | x | √ | x | x | √ | √ | x | x |
| Persistent links | x | √ | √ | x | √ | √ | x | x |
| Account management | x | √ | √ | √ | √ | √ | x | x |
| Reference management | x | x | x | x | √ | √ | x | x |

Table 3: Summary of the features: Koha OPACs

| Features | KOHAS OPACS | | | | | | | | | |
|---------------------------------------|-------------|-------|----|-----|----|-----|------|-----|-----|-----|
| | KU | JKUAT | SU | TUK | PU | SCU | KEMU | MKU | AIU | KCA |
| A single point of entry | x | x | x | x | x | x | x | x | x | x |
| State-of-the-art Web interface | √ | x | √ | √ | √ | x | x | √ | √ | √ |
| Enriched content | √ | x | √ | √ | √ | √ | x | √ | √ | √ |
| Faceted navigation | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Simple keyword search | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| "Did you mean ... ?" | x | x | x | x | x | x | x | x | x | x |
| Related materials | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Relevancy | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| User contribution | x | x | √ | x | x | x | x | x | x | x |
| RSS feeds | x | x | √ | x | x | x | x | x | x | x |
| Integration with social network sites | √ | x | √ | √ | √ | x | x | √ | √ | √ |
| Persistent links | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Account management | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Reference management | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |

5.3.1 Single point of entry

An ability to provide a single search box that includes all the materials available in the LMS, as well as full text of all the electronic resources to which the library subscribes, is one of the key features of the next-generation catalogues. Williams (2008) points out that the pursuit of a discovery layer seems to be driven by the need to present one, strong and stable user interface over many disparate sources of information. None of the OPACs under review provided a single search interface for all the resources in the library and it was not possible to perform a true, federated search. Three (16%) of the catalogues reviewed appeared to have capabilities for federated search. In one of the catalogues it was possible to do a single search on the catalogues and to retrieve e-journals, e-books and to link to the full text articles. In another catalogue users were given an option of searching either the catalogue or the electronic journal collection which would lead to full text articles. However, in most of the OPACs under review users had to search the catalogue, subscribed databases, institutional repositories and other digital resources separately. The OPAC was used mainly for searching for bibliographic information and location of books.

Lack of federated search capabilities can really frustrate users who are mainly accustomed to the Internet. A study by Leah and Erway (2011) pointed out that ‘library users are surprised that they can search internet resources through a single search engine query, yet often the resources of a university campus are segregated into silos, each

with its own dedicated search system'. A study by Joint (2009), further pointed out that 'browsing through lists of database, e-journal and e-book titles on a library website and then searching a sequence of separate databases is time consuming and inefficient. The impatient searcher will prefer Google'.

Adding federated searching capabilities for all library resources, including subscribed databases for e-books and e-journals, institutional repositories and other databases will really assist users and boost their search experiences. With the growing popularity of electronic resources available through the Kenya Library and Information Services Consortium, of which almost all academic libraries are currently members, it makes sense for libraries to have a central catalogue that will link all these resources and present the result to the user.

5.3.2 State-of-the-art web interface

It is important for the OPAC to have an attractive user interface. Breeding (2007) points out that the OPAC interface should compare well with other web destinations in appearance and in navigation, because users are increasingly well experienced with using the web and have become accustomed to the user interface conventions followed on other websites. Eleven (61%) of the OPACs under review received an endorsement for this feature. These OPACs had attractive interfaces with colourful book cover images, facets on the side and links to various resources in the library, which made it easy for the users to navigate through the resources. In addition, these OPACs were well customised with their parent institutions colour codes and logos. Refer to Figure 2 for a screenshot that shows an example of an OPAC that rated as having a state-of-the-art web interface.

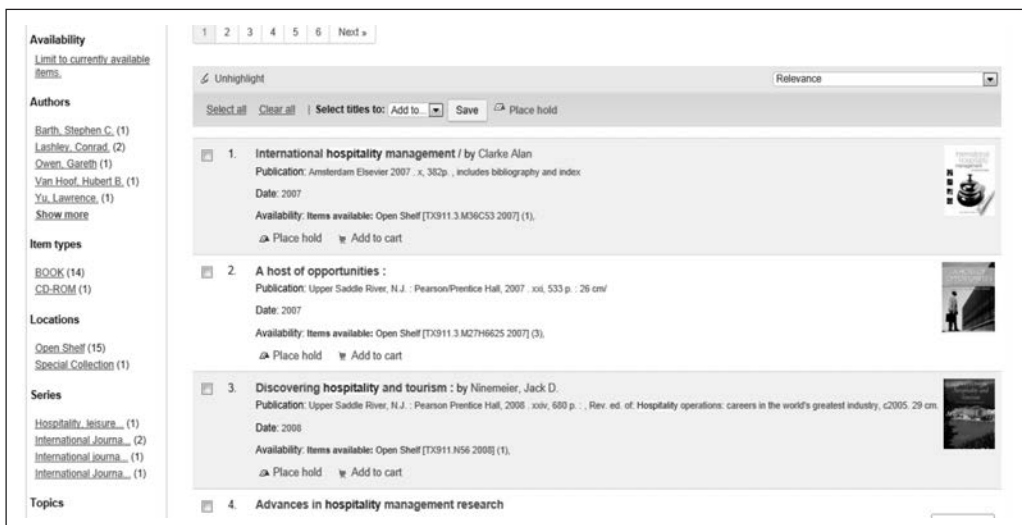


Figure 2: Screen shot of an OPAC rated as having a state-of-the-art web interface

OPACs that were categorised as not having a state-of-the-art web interface had a very basic, simple user interface with text only display, such as the one shown in Figure 3. In addition, OPACs that were not well customised and branded to reflect parent institutions’ colour codes and logos were also categorised as not having a state-of-the-art web interface.

| Title | Author | Year |
|---|----------------------------|-------|
| Application of customer relationship marketing strategies by classified hotels in Kenya | Oduori, Fredrick. Nyongesa | 2006 |
| Application of porter’s generic strategies framework in hospitality establishment in Nairobi | Gitonga, Charles Kariuki | |
| The Business of conferences: a hospitality sector overview for the UK and Ireland | Shone, Anton | 1998 |
| Corporate strategy for hospitality | Knowles, Tom | 1996 |
| Cultural tourism | McKercher, B. | 2002 |
| A decade of hospitality management research | Roper, Angela | 2001 |
| Determination of attractiveness of the hospitality industry in Malawi | Msopera, Justice George | 2013 |
| E-commerce and information technology in hospitality and tourism : E-commerce and e-marketing in the 21st century | Zhou, Z. | 2004 |
| Employment relations in the hospitality and tourism industries | Lucas, Rosemary E. | 2004 |
| The extent to which classified hotels in Mombasa have adopted electronic marketing | Mwangi, Charles, Gacheru | 2007 |
| The extent to which restaurants and hotels operating within the Nairobi central business district are satisfied with services of the city council | Getah, Jackson Ileri | 2008. |
| Food safety in the hospitality industry | Knowles, T. | 2002 |
| Greeting, hospitality, and naming among the Bororo of Central Brazil | Viertler, Renate B. | 1976 |
| Hospitality and catering GNVQ : ADVANCED TEXTBOOK | Johns, Yvonne | 1995 |
| Hospitality and Catering GNVQ ; Intermediate student textbook | Johns, Yvonne | 1995 |
| Hospitality and travel marketing | Morrison, Alastair M. | 2002 |
| Hospitality management | Coltman, M.M. | 2000 |
| Hospitality operations and management. | Kamra, Krishna K. | 2000 |

Figure 3: Screenshot of an OPAC rated as not having a state-of-the-art web interface

5.3.3 Enriched content

Enriched content may include tables of contents, book summaries, reviews, book cover images, author notes, first chapters, book lists, and so on. Enriched content in the catalogue can help to save users time by offering a thorough look at resources right from the catalogue and help users to eliminate less relevant materials without further browsing the physical copy. In addition, enriched content helps to brighten up the catalogue.

Results on this criterion showed that 12 (67%) of the OPACs in the sample had book cover images on display. In most of these OPAC book cover images were obtained from external sources, such as Amazon and Google books. Through these book cover images, users of these OPACs were able to follow links to these external sources where additional content in terms of description, review, table of content and in some cases links to full text books was provided. Eight (44%) of the OPACs under investigation had their interfaces integrated with the ‘The LibraryThing’. By installing the LibraryThing widget these catalogues were able to display book cover images from the LibraryThing. This feature was mainly used to display new books and enhance the visual appeal of the catalogues. Faiks, Radermacher and Sheehan (2007) point out that libraries can offer users a better search experience by offering additional, highly relevant content in their catalogues, such as a table of contents. None of the OPACs under investigation were able to display a table of contents of the books searched.

The traditional library catalogue tends to provide only bibliographic information of the book, hence there is a separation between information about the source of information and the information itself. Faiks et al (2007) urge that in this networked information age, there is little patience for separation between information about information and the information itself. Libraries need to enhance the content provided in their OPAC by integrating tables of contents, cover images and even links to full text items. In the case of Kenyan universities where many library users are pursuing evening programmes, weekend programmes and holiday-based programmes, users access the library catalogue from remote locations. The ability of these users to link to the actual document rather than its bibliographic information only is paramount. Users do not appreciate searching the catalogue for the metadata alone and only being able to access the actual document next time they visit the library (Faiks et al 2007).

5.3.4 Faceted navigation

Faceted navigation, also known as faceted search or faceted browsing, is a technique for accessing and exploring information in a catalogue. La Barre (2006) defines facets as representing the categories, properties, attributes, characteristics, relations, functions or concepts that are central to the set of documents or entities being organised and which are of particular interest to the user group. In a faceted system, items are assigned multiple classifications, enabling the classifications to be ordered in multiple ways, rather than in a single, predetermined order. White and Roth (2009) describe faceted search interfaces as interfaces that seamlessly combine keyword searches and browsing, allowing users to find information quickly and flexibly based on what they remember about the information they seek.

In a library catalogue that offers faceted navigation, a user may enter the text query in the search box as a starting point and then the system provides the user with various facets of the information material related to the user query such as subjects/topics, authors, location formats, genre, and so on. The user can then click one attribute of the facets to filter the results set. The benefits of a faceted navigation as outlined by EIFL (2009) include:

- Enhanced feedback – users receive an overview of their search results broken down by category that they can then use to refine their search.
- Informed choices – users know in advance how many items are available in each category, so they can search first in categories more likely to bring them a successful result.
- Users can select their own searching path or hierarchy based on the information presented to them and can add or remove filters or facets at will.

In addition, Fagan (2010) argues that facets provide catalogue navigation and support; they show previews of where to go next; they show how to return to previous states; and

they suggest logical alternatives. Facets also help the user to avoid empty result sets as searches are narrowed; they help to mitigate difficulties in query formulation; and they incorporate browsing into the search process.

Fifteen (83%) of the OPACs in the sample demonstrated faceted navigation. The study showed that there is no consistent set of facets across systems. The feature is highly customisable in many systems, and libraries may decide on the names and which facets they prefer based on their local needs. With universities in Kenya having multiple campuses, many OPACs provide location or campus libraries as one of the facets. However, in most of the catalogues under review, counts were not provided at the end of the facets. If counts are provided next to facet labels they give users a quantitative overview of the variety of data available. The left-hand side of Figure 3 shows facets as provided in one of the OPACs under review.

5.3.5 Simple keyword search

Searching by keywords is the most common way of finding information on the web. Google and the other search engines have acclimatised users to begin their search processes by entering a few words into a simple search box (Breeding 2007). The search interface of the traditional catalogue can be complex and unfriendly to users. In the modern catalogues, users are given an option to use simple key word searching, but a link to the advanced search is also provided for more in-depth searches, especially by researchers. All the catalogues in the sample had this feature. Many of these OPACs had the main search box as a basic one line form with a link to the advanced search.

5.3.6 ‘Did you mean . . . ?’

The ability of the catalogue to detect common spelling errors in a search term is another feature that distinguishes modern OPACs from traditional catalogues. This feature is also very common in web search engines such as Google. A modern catalogue should give the user options on a failed search by giving phrases such as ‘Did you mean?’ and/or providing keyword suggestions or alternatives. Four (22%) of the OPACs in the sample provided this service. Figure 6 is a screenshot from one of the OPACs with spell-check capabilities. In these catalogues, different spelling alternatives are given for a misspelled word. A user can then choose the correct word and continue with the search. Spell-check helps to save users’ time and makes the catalogue more user friendly.

The screenshot shows a search interface with the following elements:

- Search tabs: Search, Advanced search, Index search, Comple
- Search input: ? chemistry
- Search scope: All fields of the record
- Search button: Search
- Database: ? Library Catalogue - University of Nairobi (UONBI)
- Message: The word "CHMISTRY" is not found. You get alternatives.
- Table of alternatives:

| all words | Number of items |
|-----------|-----------------|
| CHISTRY | 1 |
| CEHMISTRY | 1 |
| CEMISTRY | 1 |
| ARTISTRY | 2 |
| CHEMISTRY | 3847 |
| DENISTRY | 1 |
| EMISTRY | 1 |
| MINISTRY | 1321 |
| REGISTRY | 9 |

Figure 4: Screenshot from OPAC with spell-check capabilities

5.3.7 Related materials

Any search query on the Amazon.com website will give users a phrase ‘Users that bought X also bought Y’. While the merchandising motivations of online bookstores may not apply to libraries, there may be a similar interest in promoting other materials in the collection (Breeding 2007). No OPAC in the sample was able to supply recommendations based on patrons’ transaction records and produce a phrase such as ‘Patrons who borrowed item “A” have also borrowed item “B”’.

However, some other forms of recommendation language that point users to other related materials in the collection were provided in some catalogues. Fifteen (83%) of the OPACs in the sample had some form of recommendation language. These OPACs used the following expressions to recommend materials to patrons: try these too; nearby items on the shelf (virtual shelf browsing); find more about this author, topic and other editions of the book. The virtual shelf browsing feature was common in Koha OPACs. The shelf browsing feature gives users the possibility of browsing items on the catalogue in the same order they appear on the shelves. This helps users to know what items are shelved next to the item they want even before going to the shelf. This helps to save users time and enhance their search experience.

5.3.8 Relevancy ranking

Whenever a search is made in the OPAC, a good catalogue should be able to present to the user the best matches of the keyword first. Some older catalogues do not follow this rule and therefore search results are sometimes ranked based on the frequency and positions of items in bibliographical records (Breeding 2007). In such circumstances, search results are sorted by date with the most recent items to be added in the catalogues showing up first. This is different from what is provided in web search engines where the most important or interesting items appear first whenever a search is done, followed by those of diminishing relevance. All the OPACs in the study had this feature. In most of these OPACs, when a keyword search is done, the exact matches in the title field are ranked as the most relevant followed by the partial title matches.

5.3.9 User contribution

Traditionally, only professionally trained cataloguing librarians have the ability either to create or to add content to bibliographical records. However, with the development of Web 2.0 technologies users can also add content in the catalogue in the form of tags, comments, descriptions and reviews. This feature was lacking in most of the catalogues, and only three (16%) of the catalogues under review allowed registered users to add tags to the OPAC. Despite the availability of these features in some of the LMSs used by the libraries under review, such as Koha, most libraries were not using this feature. Further investigation is required to determine the reason why this feature was not used. If this feature is enabled, registered users may be able to add tags and comments to bibliographic records from the search results and/or bibliographic records. Patrons can also leave comments in each bibliographic record if the preference is set to allow this.

Libraries should allow users to add tags and other user-supplied data to their catalogues so as to make the catalogues more relevant to users accustomed to the Internet and to improve access to the materials in library collections (Marcum 2008). Allowing user contributions in terms of tags, reviews, comments and rating will allow social interaction whereby users can contribute and interact with the information in the OPAC and with each other (Houghton & Hu 2010; Spiteri, Tarulli & Graybeal 2010). It will also give an opportunity for the library to receive feedback from the users with regard to the relevance of the resources available through the OPAC. User tags, also called folksonomies, can be incorporated into the OPAC to enhance subject access to library materials in addition to the controlled vocabularies such as the Library of Congress subject headings (Lee & Yang 2012; Rolla 2009). The term 'folksonomy' was coined by Vander Wal (2005) who defines folksonomy as the result of personal free tagging of information and objects (anything with a URL) for one's own retrieval. The tagging is done in a social environment, that is, shared and open to others.

5.3.10 RSS feeds

The presence of an orange-coloured icon for RSS feeds was checked in all the catalogues in the sample. Ten (56%) catalogues were given an endorsement for this feature. In catalogues that possess this feature, users can subscribe to receive updates on a page, item or search result. If users subscribe to get information on a search result, they will receive an email every time an item is added to the catalogue that matches their search criteria.

5.3.11 Integration with social network sites

This feature was determined by the presence or absence of a link to a social networking tool. Ten (56%) of the OPACs had links to social networking tools added to the catalogue interface. The most common social networking tools added to the catalogues were the LibraryThing widget, links to Facebook and Twitter accounts of the library and Ask the Librarian feature, which provides a chat or email facility that patrons can use to contact the librarian in case they have a problem with using the catalogue. The LibraryThing is a social cataloguing application designed to help users to catalogue their personal books, CDs, and so on. In addition, the LibraryThing allows users to tag items with meaningful keyword descriptors; to review items; to browse others' holdings based on similarly held items; to browse books tagged with the same descriptor; and to create and contribute to groups (Westcott 2008).

5.3.12 Persistent links

Persistent links, also referred to as permanent links or stable URLs, are links to web pages that remain stable over time as opposed to 'session-based' URLs that will not work after users log off or navigate away from the page. Fourteen (78%) catalogues in the study had this feature. In some of the catalogues a link labelled 'Permalink' was provided in the item's details page, and clicking on the permalink would provide a permanent link for the items which could then be copied and pasted to any location as desired by the user.

5.3.13 Account management and authorisation

Patrons' account management and authorisation is another feature of modern catalogues. This feature allows libraries to create individual accounts for all their patrons and allows patrons to login to their personal accounts within the catalogue. Once logged in, patrons can do several things, such as: view a detailed list of their current and previous library transactions; renew borrowed books online; change their password; submit their purchase suggestions; and add tags to items. Fifteen (83%) of the catalogues had the account management and authorisation feature which allows patrons to log into their personal accounts within the catalogues.

5.3.14 Integration with reference management tools

OPACs in the sample were checked for compatibility with reference management software such as Zotero. Zotero is a free open-source reference management tool that is an extension of Mozilla Firefox web browser which was developed at the Center for History New Media (2014), George Mason University in the US. An open-source reference management solution is a more feasible solution for libraries that might be unable to afford the purchasing of a licensed, proprietary citation management tool for all its users.

In all the catalogues under study, the presence or absence of a Zotero icon within the URL window on **the item's** details page was checked. When Zotero is installed, it recognises a web page, by the presence of an icon (eg, a folder, paper, newspaper, or book) which appears within the URL window. By clicking on the icon, Zotero automatically imports citation information from that web source to the users' Zotero library (Trinoskey et al 2009). Twelve (67%) OPACS in the sample were integrated with Zotero. Examples of other web sources integrated with Zotero, including Google Scholar, are web-based databases such as PubMed, Medline and several OPACs, such as Library of Congress and WorldCat.

5.4 SUMMARY OF THE EVALUATION

To summarise the discussion on the features of the next-generation catalogues and as shown in Table 2 and Table 3: three catalogues had 12 out of the 14 features evaluated; seven catalogues had 10 out of the 14 features evaluated; five catalogues had between five and eight features out of the 14 features evaluated; and three catalogues had less than four features out of the 14 features evaluated. Features that were lacking in most catalogues include federated search capabilities, RSS feeds integration, user contribution and spell-check capabilities.

6 CONCLUSION AND RECOMMENDATIONS

Close to half (46%) of the academic libraries in Kenya had their catalogues accessible online. Various LMSs, both proprietary and open source, are used in academic universities in Kenya. However, the study findings show that Koha is the most used LMS in Kenya. The findings from the study also show that libraries in Kenya have made some progress towards transforming their OPACs with some catalogues registering up to 12 of the 14 features identified as features of the next-generation catalogues. Progress has been made on features such as enhanced content and faceted navigation. However, the findings also show that none of the catalogues was serving as a single point of entry for the entire library collection which is a key feature of the next-generation catalogues

and discovery tools. Other features that were lacking in most catalogues included RSS feed integration, user contribution and spell-check capabilities.

Many libraries in developing countries are currently seeking ways to improve access to their electronic resources by installing a federated search tool for their electronic resources. This is a step in the right direction; however, libraries should aim at discovery solutions that will search the entire library collection, including contents from the LMSs and institutional repositories. In order to achieve this, libraries need to invest in capacity building and technical skills enhancement of their staff and to make use of the available open sources discovery solutions.

The article is intended to be a reference tool for library policy-makers interested in modernising their catalogues or acquiring discovery tools for their institutions. The features discussed in the article may also be used for evaluating OPAC modules of the integrated LMSs, especially for libraries that are in the process of selecting a suitable LMS for their institutions. For libraries that are planning to use open source solutions the information provided in the article can be used as a guide in customising and configuring the system or when drafting paid support contracts with vendors. This will ensure that libraries make the most of the features provided by the OPAC modules of the open source LMS.

REFERENCES

- Allison, DA. 2012. Discovery tools? You can compete with Google. <http://www.slideshare.net/nebraskaccess/discovery-tools-you-can-compete-with-google> (Accessed 13 May 2009).
- Breeding, M. 2007. Next-generation library catalogues. *Library Technology Reports* 43(4):5–14.
- Breeding, M. 2008. Making a business case for open source ILS. *Computers in Libraries* 28(3):36–39.
- Breeding, M. 2010. State of the art in library discovery. *Computers in Libraries* 30(1):31–35.
- CCK *see* Communications Commission of Kenya.
- Communications Commission of Kenya. 2013. ICT Sector quarterly statistical report. http://www.cck.go.ke/resc/downloads/Q4_201213_STATISTICS_final_25th_oct_2013.pdf (Accessed 14 March 2014).
- Center for History New Media. 2014. Zotero: the next-generation research tool. <http://www.zotero.org/> (Accessed 13 May 2014).
- Commission for University Education. 2014a. Introduction to accreditation. <http://www.cue.or.ke/services/accreditation/introduction-to-accreditation> (Accessed 28 January 2014).
- Commission for University Education. 2014b. Status of universities in Kenya. <http://www.cue.or.ke/services/accreditation/status-of-universities> (Accessed 28 January 2014).
- CUE *see* Commission for University Education.
- De Jager, K. 2007. Opening the library catalogue up to the web: a view from South Africa. *Information Development* 23(1):48–54.

- Dorman, D. 2008. The potential of metasearching as an 'open' service. *Library Hi Tech* 26(1):58–67.
- EIFL. 2009. Faceted search. <http://www.eifl.net/faceted-search> (Accessed 28 January 2014).
- Fagan, JC. 2010. Usability studies of faceted browsing: a literature review. *Information Technology and Libraries* 29(2):58–66.
- Faiks, A, Radermacher, A & Sheehan, A. 2007. What about the book? Google-izing the catalogue with tables of contents. *Library Philosophy and Practice*. <http://digitalcommons.unl.edu/libphilprac/125> (Accessed 12 August 2012).
- Hofmann, MA & Yang, SQ. 2012 Discovering what's changed: a revisit of the OPACs of 260 academic libraries. *Library Hi Tech* 30(2):253–274.
- Houghton, V & Hu, X. 2010. Social cataloging: a golden opportunity for libraries to engage users. http://www.viviennehoughton.com/uploads/5/2/5/6/5256567/folksomy_socialcataloging_librarything.pdf (Accessed 15 August 2012).
- iAGRI *see* Innovative Agricultural Research Initiative.
- Innovative Agricultural Research Initiative. 2014. LibHub promotion and training. <http://stories.iagri.org/blog/2014/4/libhub-promotion> (Accessed 15 April 2013).
- Jetty, S, Anbu, K, Paul, J, Jain, PK & Hopkinson, A. 2011. OPAC 2.0: towards the next generation of online library catalogues. http://eprints.mdx.ac.uk/7964/1/OPAC_2.pdf (Accessed 15 August 2012).
- Joint, N. 2009. Managing the implementation of a federated search tool in an academic library. *Library Review* 58(1):11–16.
- Keast, D. 2011. A survey of Koha in Australian special libraries: open source brings new opportunities to the outback. *OCLC Systems & Services* 27(1):23–39.
- Keene, C. 2011. Discovery services: next-generation of searching scholarly information. *Serials Review* 24(2):193–196.
- Koha. 2014. Official website of Koha Library Software. <http://koha-community.org/> (Accessed 15 August 2012).
- Koha Kenya Community. 2014. <http://kohakenya.wordpress.com/> (Accessed 28 January 2014).
- La Barre, K. 2006. The use of faceted analytic-synthetic theory as revealed in the practice of website construction and design. PhD thesis, Indiana University, Indiana. <http://leep.lis.uiuc.edu/publish/klabarre/dissBYsection.html> (Accessed 30 August 2012).
- Leah, P & Erway, R. 2011. Single search: the quest for the Holy Grail. <http://www.oclc.org/research/publications/library/2011/2011-17.pdf> (Accessed 30 August 2012).
- Lee, Y & Yang, S. 2012. Folksomies as subject access: a survey of tagging in library online catalogues and discovery layers. IFLA Satellite Post-Conference. Beyond Libraries: Subject Metadata in the Digital Environment and Semantic Web, 17–18 August, Tallinn, Estonia. <http://www.slideshare.net/yanyilee/presentation-lee-8182012> (Accessed 30 August 2012).
- Lindoström, H & Malmsten, M. 2008. User-centered design and the next-generation OPAC—a perfect match. http://library.wur.nl/elag2008/presentations/Lindstrom_Malmsten.pdf (Accessed 2 August 2012).
- Little, G. 2012. Managing technology: thinking about discovery layers. *Journal of Academic Librarianship* 38(6):346–347.

- Macan, B, Fernandez, JV & Stojanovski, J. 2012. Open source solutions for libraries: ABCD vs Koha. *Electronic Library and Information Systems* 47(2):136–154.
- Marcin, S & Morris, P. 2008. OPAC: the next-generation placing an encore front end onto a SirsiDynix ILS. *Computers in Libraries* 28(5):6–9.
- Marcum, DB. 2008. Response to the record: report of the Library of Congress Working Group on the future of bibliographic control. www.loc.gov/bibliographic-future/news/LCWGResponse-Marcum-Final-061008.pdf (Accessed 12 August 2012).
- Moore, KB & Greene, C. 2012. The search for a new OPAC: selecting an open source discovery layer. *Serials Review* 38(1):24–30.
- Nyaigotti-Chacha, C. 2004. Reforming higher education in Kenya: challenges, lessons and opportunities. http://www.international.ac.uk/resources/Reforming_HE.pdf (Accessed 15 August 2012).
- Rolla, PJ. 2009. User tags versus subject headings. *Library Resources and Technical Services* 53(3):174–184.
- Sempertool. 2014. LibHub. <http://www.sempertool.dk/?func=loadTemplateHYPERLINK> "http://www.sempertool.dk/?func=loadTemplate&template=libhub"&HYPERLINK "http://www.sempertool.dk/?func=loadTemplate&template=libhub"template=libhub (Accessed 15 March 2014).
- Shiundu, B. 2012. Open source library management systems. <http://aitec.usp.net/AITEC%20East%20Africa%20ICT%20Summit,%20Nairobi,%2024-25%20October%202012/Bernard%20Shiundu%20Strathmore%20%20Open%20Source%20Library%20Management%20Systems.pdf> (Accessed 15 May 2014).
- Singh, M & Sanaman, G. 2012. Open source integrated library management systems: comparative analysis of Koha and NewGenLib. *Electronic Library* 30(6):809–832.
- Spiteri, L, Tarulli, L & Graybeal, A. 2010. The public library catalogue as a social space: transaction log analysis of user interaction with social discovery systems. *Proceedings of the American Society for Information Science and Technology* 47(1):1–2.
- Tarulli, L. 2012. *The library catalogue as social space: promoting patron driven collections, online communities, and enhanced reference and readers' services*. Santa Barbara, CA: Libraries Unlimited.
- Trinoskey, J, Brahmī, FA & Gall, C. 2009. Zotero: a product review. *Journal of Electronic Resources in Medical Libraries* 6(3):224–229.
- UbuntuNet Alliance. 2013. LibHub: a library search and discovery tool launched in Uganda. *Newsletter for UbuntuNet Alliance* 6(4). <http://www.ubuntunet.net/august2013#libhub> (Accessed 15 August 2012).
- UoN *see* University of Nairobi.
- University of Nairobi. 2014. Discovery interface for electronic resources. <http://uonlibrary.uonbi.ac.ke/node/916> (Accessed 15 August 2012).
- Vander Wal, T. 2005. Folksonomy definition and Wikipedia. <http://www.vanderwal.net/random/entrysel.php?blog=1750> (Accessed 15 May 2014).
- Westcott, J, Chappell, A & Lebel, C. 2009. Library thing for libraries at Claremont. *Library Hi Tech* 27(1):78–81.

- White, RW & Roth, RA. 2009. *Exploratory search: beyond the query-response paradigm*. San Rafael, CA: Morgan and Claypool.
- Williams, M. 2008. New Jack Librarian. www.newjackalmanac.ca/2008/03/ontarioscholars-portal-yours-to.html (Accessed 7 April 2010).
- Wilson, K. 2007. OPAC 2.0: next-generation online library catalogues ride the Web 2.0 wave! *Online Currents* 21(10):406.
- Yang, SQ & Hofmann, MA. 2010. The next-generation library catalogue: a comparative study of OPACs of Koha, Evergreen, and Voyager. *Information Technology & Libraries* 29(3):141–150.
- Yang, SQ & Hofmann, MA. 2011. Next-generation or current generation? A study of the OPACs of 260 academic libraries in the USA and Canada. *Library Hi Tech* 29(2):266–300.
- Yang, SQ & Wagner, K. 2010. Evaluating and comparing discovery tools: how close are we towards next-generation catalogue? *Library Hi Tech* 28(4):690–709.
- Zumer, M. 2007. *Amazon: competition or complement to OPACs*. <http://www.che.or.ke/status.html> (Accessed 30 September 2012).