ExLibris
The bridge to knowledge

Delivering the Experience That Users Expect:

Core Principles for Designing Library Discovery Services

Miri Botzer, Primo Product Manager, Ex Libris

Contents

Introduction

User experience (UX) is high on the agenda of most libraries. Libraries strive to increase user engagement, maximize the usage of collections, and support students and researchers in achieving their academic goals. An understanding of library patrons' needs and the application of modern UX design principles are essential for providing intuitive, user-friendly discovery services and delivering the experience that library users expect.

UX denotes more than a user interface (UI). UX encompasses all the aspects of users' interaction with an application or service—in this case, provided by a library—whereas UI is the way in which users interact with such applications or services.

The decisions made during the design of a UI will directly affect the user experience. For example, consistent design creates more intuitive, repeatable workflows for users, and placing animation effects on action buttons helps users better understand what choices are available at each step of the discovery process.

This white paper describes various aspects of UX design and key principles for planning a discovery user interface. With the help of real-life examples from library UX projects, the paper shows how the results of user studies can be put into practice and provides insights that can assist in the selection of appropriate technologies for a discovery system.

Ex Libris User Study: Takeaways

Web design is not about colors, fonts, and buttons. Web design is about how to provide users with the best tools for achieving their goals. Obviously, to help users, you must first understand who they are, what their needs are, and what goals they have set for themselves. When undertaking a user experience (UX) project, you should thus begin with research into users' information-seeking behavior to make sure that they will be engaged with the system that you are designing and quickly adopt it as their own.

With these goals in mind, the Ex Libris team carried out an extensive user study before redesigning the Primo® discovery and delivery system. Search logs were analyzed; qualitative surveys were conducted via workshops with librarians; and users at different academic levels and from various countries and disciplines were interviewed.

The specific objectives of the study were to gain a better understanding of the similarities and differences between the various types of users, detect recurring themes related to their searches, and identify significant characteristics of discovery that can help users excel in their academic goals. The subjects of the study included active library users as well as those who satisfy their information needs without the library, such as through Google searches.

Analysis of User Searches and Actions

One aspect of the Ex Libris user study involved the analysis of logs from the Primo Central Index. The logs included search queries; search refinements, such as the narrowing down of results through the use of facets; and selection activities, such as requests for the full text of electronic items. The analysis demonstrates, for example, that the main types of searches that a discovery system must support are known-item searches and topic searches. In known-item searches, users seek a specific item, be it a book, an article, or another type of item, where as in topic searches (also called exploratory searches), users are looking for information related to a certain subject but do not have a specific item in mind. The Primo Central logs revealed that more than 50% of searches are for known items; however, topic searches and their variations also constitute a significant mass and should be taken into account as well.

Results of the User Study

The user study revealed many aspects of searching and the use of discovery systems. This section summarizes the main findings. For more information, see the white paper *How Do Users Search and Discover: Findings from Ex Libris User Research* (http://www.exlibrisgroup.com/category/UserStudiesWhitePaper).

One clear result of the user study is that searches differ according to users' academic level. For example, more experienced scholars tend to prefer extensive result lists and the latest publications. Graduate students often seek a mix of materials, both general overviews and specialized materials, rather than just in-depth information. Undergraduates are often satisfied with just a few relevant items.

Searches also differ according to users' discipline. Undergraduates in the humanities often need biographical material, secondary sources, and primary sources, whereas students in the sciences tend to use textbooks and e-learning software—but do sometimes search for material on a specific topic. Moreover, the needs of users in a particular discipline can vary from one country to another because of differences in the way the discipline is taught.

Four key aspects of discovery emerged from the study:

- **Search and find**—the core functionality of a discovery system. Users search in a variety of ways for specific items and for information on general topics and expect rapid delivery of the most relevant results. Sophisticated search and relevance-ranking algorithms present the user with the content that is most relevant to the context of the search.

- **Exploration**—discovery without boundaries. Experienced scholars and students often follow navigation trails in addition to conducting searches. Recommendations, citation trails, and other metadata associations highlight connections between items, as do browsing and virtual browsing, and thus help searchers discover related resources that can expand their research.

- **Learning**—an aspect of information seeking valued by undergraduate and graduate students alike. Participants in the study emphasized that searching and exploration are accompanied by learning—acquiring new knowledge, understanding a research area in greater depth, or gaining an overview of a topic.

- **Personalization**—the fulfillment of users' expectation that their search results will be tailored to their needs. The ranking of search results should be weighted according to the personalization options that a user has selected (such as one's discipline or one's need for the most recently published materials).

Taking these key aspects into account in the design of a discovery system will help libraries provide patrons with a fast, intuitive, and accurate discovery experience and will increase overall user engagement with library services.

Designing for Today's User: Core Principles

After a thorough investigation of your users' needs, it is essential that you define the guiding principles of your design. Then, at each stage of the project, you can verify that every decision you make is aligned with those principles.

This section describes five core principles that we at Ex Libris believe contribute to the success of a UX project.

Principle 1: One Experience Across Devices

The increasing preference for portable devices over desktop computers (as seen in Figure 1) is bringing about a change in users' expectations from applications and services. In the mobile experience, one expects everything to be accessible immediately. One no longer presses keys on a keyboard but rather taps the screen; and scrolling and zooming in are among the most frequent actions on mobile devices.

To maximize the use of any system and improve the user experience in this rapidly changing world, developers must create content, applications, and services that can be viewed and used seamlessly on multiple devices.
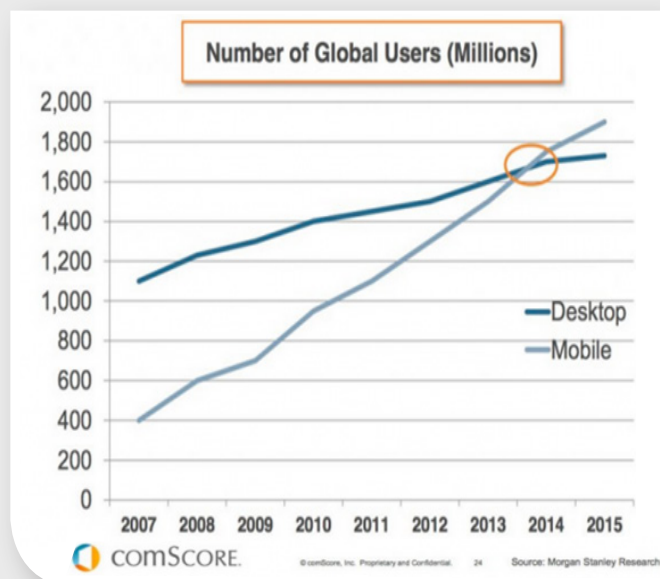

Figure 1. Number of global users: desktop vs. mobile (source: Morgan Stanley Research, cited in comScore)

Principle 2: Intuitive Design

Users should be able to readily understand what they see and what the available actions for them are. Clean, clear, intuitive design is what makes a webpage "digestible." The ultimate purpose of UX is to enable users to navigate easily and enjoy the application. If a user needs an explanation to figure out what to do, the design has failed in its goals.

"Glanceability" is a major aspect of intuitive design: the user should be able to grasp all the important information at a glance. However, achieving glanceability without harming the aesthetics and readability of a page can be challenging. Therefore, when designing a service, one needs to determine which functions are relevant for the next step, avoid overloading users with information and options, and create enough white space on the page to enhance readability.

How do we know whether we have succeeded in designing an intuitive, digestible application? Usability testing, usage tracking, and heat maps will help provide the answer.

Principle 3: Action-Oriented Design

What is my next step, the user wonders. With an action-oriented design, only the options relevant to the next step are shown and the user can easily navigate to the desired end. An understanding of user scenarios and the personas featured in user studies is a must for designers who are determining how to display the next relevant action.

Speed is a crucial element; today's mobile users are becoming more and more impatient. They want to perform fewer actions—click fewer times—to accomplish the task at hand. Therefore, designers must put key functions into a prominent position on the screen.

Users also expect that *all* the functionality that they need will be easily accessible, even relevant functions from third-party software.

Principle 4: Personalization

It is clear today that one size doesn't fit all. Even the results of routine searches in Google vary according to the searcher's location, the searcher's previous actions, and many other factors.

The design of an application should make users feel that it was tailor-made, suggesting the best matches for the query at hand and relevant action options based on who the user is, the user's previous selections, and perhaps the user's location.

Personalization options can also mean more decisions for the user—for example, display preferences and functionality preferences. Ideally, the selections made by the user are saved for future use to create an effortless, personalized experience.

Personalization can be provided through options defined by the user ("active" personalization) and also through anticipation of the user's intent ("passive" personalization), based on the tracking of his or her pattern of activity.

Google, for example, delivers a personal experience derived from one's previous actions and historical data. However, some industries might consider this method too intrusive or a violation of privacy policies. Machine-based personalization might therefore be too early or not relevant in certain domains. As Jarno Koponen notes, "a machine telling us what we should be seeing and doing next has a dystopian aura, even in very mundane circumstances" (2015, http://techcrunch.com/2015/09/19/is-personalized-discovery-a-feature-category-or-new-paradigm/).

Principle 5: Serendipitous Discovery

What about information that users are unaware of? Ideally, an application should help users come across new information and provide an opportunity for new encounters. Serendipitous discovery means expanding the result set from obvious information to related yet important information that the user may not know of. Sometimes such "surprises" can change one's understanding of what one is actually looking for and offer a new research direction.

Serendipitous discovery partners with exploration. A popular form of exploration is the use of recommendations made by the discovery system: "Users interested in this item also expressed an interest in the following items." In this way, a user benefits from the selections made by other users and the wisdom of the crowd. Exploration opportunities can also be made available in other forms, such as the clustering of items on the basis of entity relationships and connections between data elements.

Applying UX Principles to the Design of Library Discovery Services

The core UX principles described here apply to the design of a library discovery service just as they apply to any other application. Most of the users of such services are students, and one may plausibly assume that they are accustomed to advanced technologies and complex applications. When these students use the library system, they expect the same experience as what they enjoy in other applications.

This section examines how the UX principles described here apply to the specific characteristics of library discovery.

One experience across devices

Library patrons no longer need to physically go to the library to use its services. Access is available almost everywhere: at home, from anywhere on campus, or on the bus or train. Librarians are encountering more and more users who come into the library with their mobile device and point to items that they have found by searching via the discovery system on that device.

Such users expect to have the full discovery functionality available on their smartphone or tablet. Therefore, developers must take mobile display and functionality into consideration from the very beginning of the design and development process and make an effort to create a clean, aesthetic look for the application. Design decisions depend on the technology that was chosen for the application. If an application is going to be developed for a specific mobile device (what is referred to as a native application), the design decisions will be made on the basis of that device. If the application is to accommodate various types of devices and screens (and is developed in an HTML5 "responsive design" environment), design decisions will be based on screen resolution. For a broader discussion of the technological considerations for mobile design, see the section "Selecting the Right Technology for a Great Experience and Optimal Performance" (page 13).

A discovery system is one of the most important tools that students and faculty members use in their day-to-day work. As a result, partial discovery functionality is not sufficient. These users need access to all available content and relevant information, including loans, holdings, and full text, just as if the device was a desktop computer.

The mobile experience must fulfill users' discovery needs, providing features such as personalization and exploration options, and also be designed to accommodate the specific characteristics of mobile devices. For example, unlike computers, mobile devices enable users to personalize their experience without forcing them to log on.

In 2015, The New School university in New York City released a new design of their library homepage that better accommodates mobile devices (see Figure 2 and Figure 3). After the launch of the new design, the use of the library services, including discovery, on mobile devices rose substantially. The number of sessions via mobile devices during a one-month period was 34.8% higher in 2015 than during the same period in 2014. (Table 1).
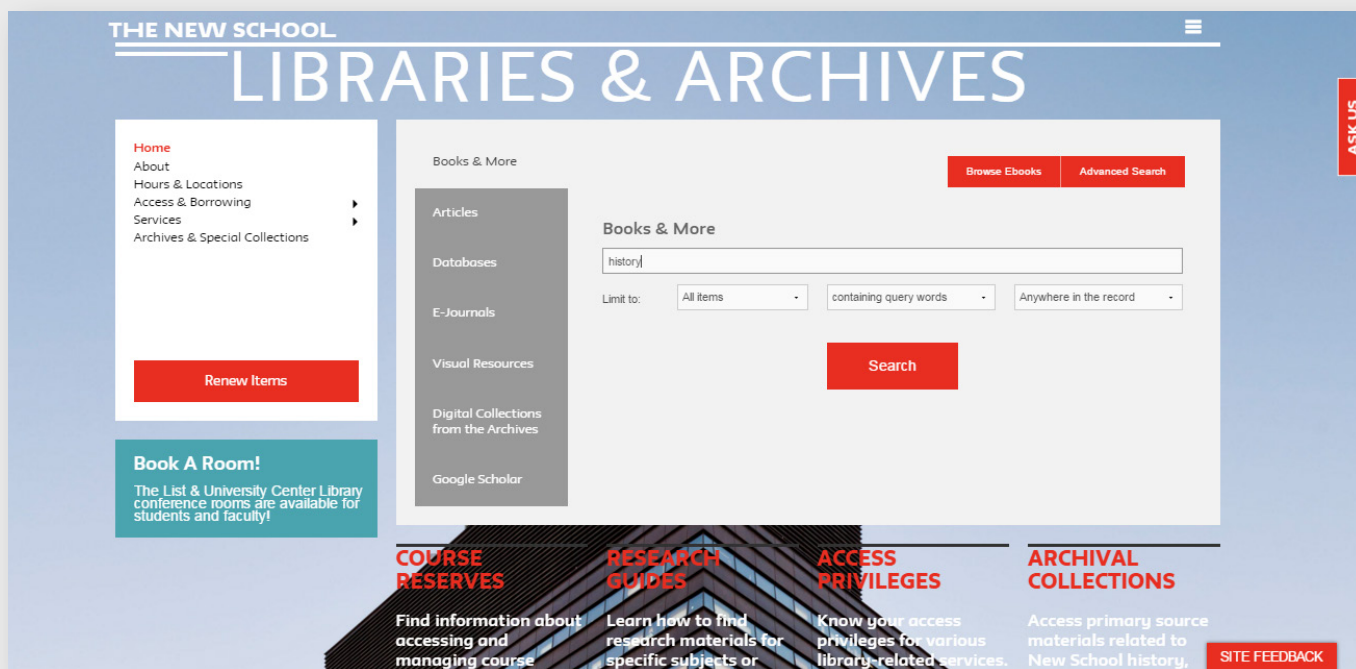
Figure 2. Library home page interface on a desktop computer at The New School
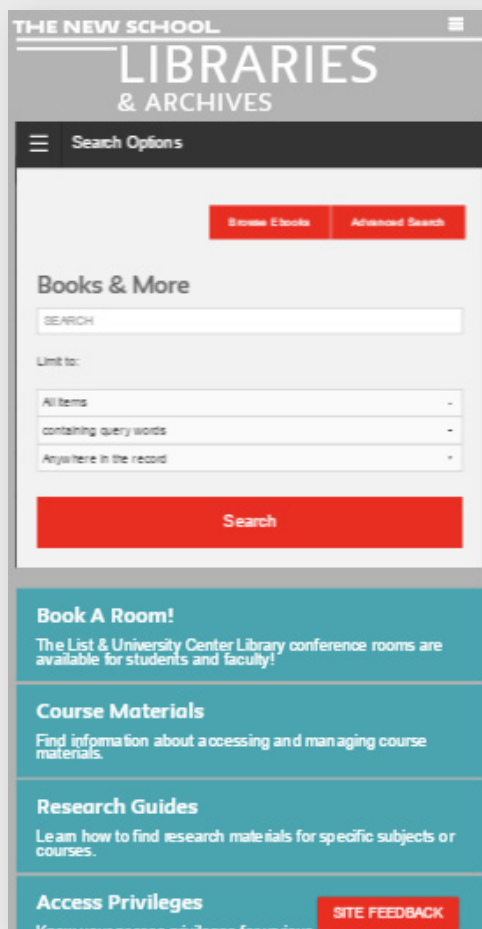

Figure 3. Library home interface on a mobile device at The New School

Table 1. Library homepage usage after the release of the mobile interface at The New School. The column *% Change* shows the increase or decrease in the system's usage in comparison with the same period in 2014.

Device Category	Date Range	Sessions	% Change
Desktop	Oct 4, 2015 - Nov 3, 2015	22,449	
Desktop	Oct 4, 2014 - Nov 3, 2014	23,499	**-4.5%**
Mobile	Oct 4, 2015 - Nov 3, 2015	**2,182**	
Mobile	Oct 4, 2014 - Nov 3, 2014	**1,619**	**34.8%**
Tablet	Oct 4, 2015 - Nov 3, 2015	642	
Tablet	Oct 4, 2014 - Nov 3, 2014	826	**-22.3%**

Intuitive design

Patrons should be able to easily navigate and achieve their goals quickly. However, as pointed out earlier, each type of user—student, faculty member, or library staff member—has different goals and needs. As a result, the application must "understand" the user and then, based on the user's profile and actions, gradually expose relevant information and options.

When accessing a library's discovery system, a patron usually starts by searching. To facilitate this first step, designers should situate the search box prominently, making it visible at a glance.

The discovery application should obviously provide the best tools for conducting a successful search, one that will locate items that satisfy the user's information need. A successful search depends on the application's search and ranking algorithms, the user's query, and the available data. The application should also help the user avoid mistakes and carry out the search efficiently. To achieve these goals, most discovery systems provide the llowing essential features:

- **Pre-search and post-search options for quickly zooming in on relevant results.** Pre-search options (for example, filters and search scopes) are usually located next to the search box. Note that the display of too many options might confuse the user; analyses of Ex Libris Primo Central usage logs have shown that when faced with many choices, searchers often ignore pre-search options and use only the default (simple search) option.

To prevent spelling mistakes and expedite results, discovery systems provide "auto complete" suggestions, which, ideally, should reflect the content that is available in the library collections. In this way, the systems avoid returning a large number of irrelevant results. In addition, if users do make a spelling mistake, it is automatically corrected.

- **Glanceability.** Library users expect to quickly locate items that will fulfill their research need, so discovery systems display results in a way that will help users rapidly identify relevant items. For example, the query term, the titles, and all important metadata are highlighted.

- **Quick access to OPAC functionality and full text.** Once users find the desired item, they want to access the full text fast, with as few clicks as possible. Similarly, access to OPAC functionality is probably one of the most important aspects that UX design needs to focus on.

Action-oriented design

An action-oriented design means understanding the user's intent and enabling the user to realize it as fast as possible. Although the main goal of discovery is usually the delivery of relevant items, this is not always the case: a user might just be looking for items to explore later. In most cases, however, the search flow ends with the user's obtaining a physical item or viewing an electronic one.

If a user is in the first phase of research and is creating a list of items to read later, the discovery system should provide options to print the list, send it by email, or add the items to the user's favorites, all in a single click.

To make sure that the discovery system is fulfilling users' needs efficiently, it should measure the relevant key performance indicators (KPIs), including the time that a user takes to find an item and the number of actions that the user has to carry out to obtain that item. Such data can help vendors and institutions continuously optimize their discovery system.

Personalization

One of the main goals of the Ex Libris user study described earlier was the creation of personas (fictional representations of target users). The Ex Libris team tried to understand who these users are and what their expectations from the Ex Libris Primo discovery and delivery solution are. The personas were assigned names, jobs, and tasks, and specific user scenarios were created for each one.

One of the conclusions that became extremely clear in interviews with actual users is that their search behavior and their expectations from a search differ according to their discipline and academic degree. Discovery services, therefore, can benefit from having access to a user's profile to tailor the result set to the user's needs and bring about an effective discovery process.

The user study revealed three main areas in which users differ:

- Their field of research
- Their need for the most recently published materials
- Their need for specific types of materials (for example, articles, books, e-books, or images)

As a result of the study, the Ex Libris team decided to increase the emphasis on personalization, which had been available for several years in Primo. The personalization option is now in a more prominent position, readily visible to users, and there is no need to log on to set one's personalization preferences. In addition, a recency parameter is now available; the selection of one's discipline has been made easier; and results are retrieved according to the user's preferences.

When users set personalization preferences before searching, the preferences remain active throughout the session. A discovery system should indicate clearly that personalization has been activated and should also enable users to remove their personalization selections so that the full set of results will be retrieved (Figure 4).

Figure 4. Personalization options and a personalized result list

Personalization of the discovery experience on mobile devices differs from personalization on laptop and desktop computers. Mobile devices are by nature personal; they are not shared the way library computers are. A discovery system can save all of the user's preferences and personal settings on the mobile device, sparing the user from having to make the same selections over and over again.

As noted earlier, anticipatory discovery (passive personalization) depends on the discovery system's ability to save personal information attributes, taking the user's search history into account to predict needs and influence the result list. In the academic world, this practice may raise concerns regarding users' privacy and the security of their personal data. To earn and maintain users' trust, libraries are constantly juggling the demands of providing improved discovery personalization and the obligation to respect users' privacy and preserve their anonymity.

Serendipitous discovery

A discovery system should enable users to explore beyond what they can find through a keyword search. For example, in Primo, users can discover additional material of relevance by selecting items displayed by the bX article recommender, the virtual browsing tool, and the "featured results" bar (where libraries can highlight relevant materials beyond the user's search scope).

The Ex Libris user study that was referred to previously demonstrated that researchers also often search by following various kinds of trails, including citation and reference trails (going from one item to the next through related citations or references), and trails of additional works by an author whom the researcher has selected.

Selecting the Right Technology for a Great Experience and Optimal Performance

A crucial element for obtaining the proper balance between mobility, speed, and personalization is the selection of a technology that is appropriate for the specific application's user interface (UI).

The rapidly expanding range of available UI technologies offers two main approaches: client side and server side. The current trend is the client-side approach, with single-page applications (applications that load all of the required resources during the loading of the first page). An active open-source community supports this approach and is constantly adding new capabilities.

Benefits of the client-side approach include the following:

- A responsive web design can be easily developed.
- The server-side business logic and REST APIs are decoupled from the client side.
- Performance is excellent, through the use of single-page applications.

When opting for the client-side approach, one must choose an appropriate framework to work with (for example, Angular, Ember, or Backbone). The choice depends on several factors:

- The community: how many developers participate in expanding the framework's capabilities and in sharing ideas and information
- The ease of use and of testing
- The quality of the documentation

Various technological approaches exist for making content accessible on mobile devices. Each approach is used to develop a different kind of app. Native apps are those that are developed for a specific mobile operating system;

HTML5 apps, on the other hand, are accessible on various platforms, such as desktop computers, laptops, smartphones, and tablets. Finally, hybrid apps contain features of both native apps and HTML5 apps (Figure 5).
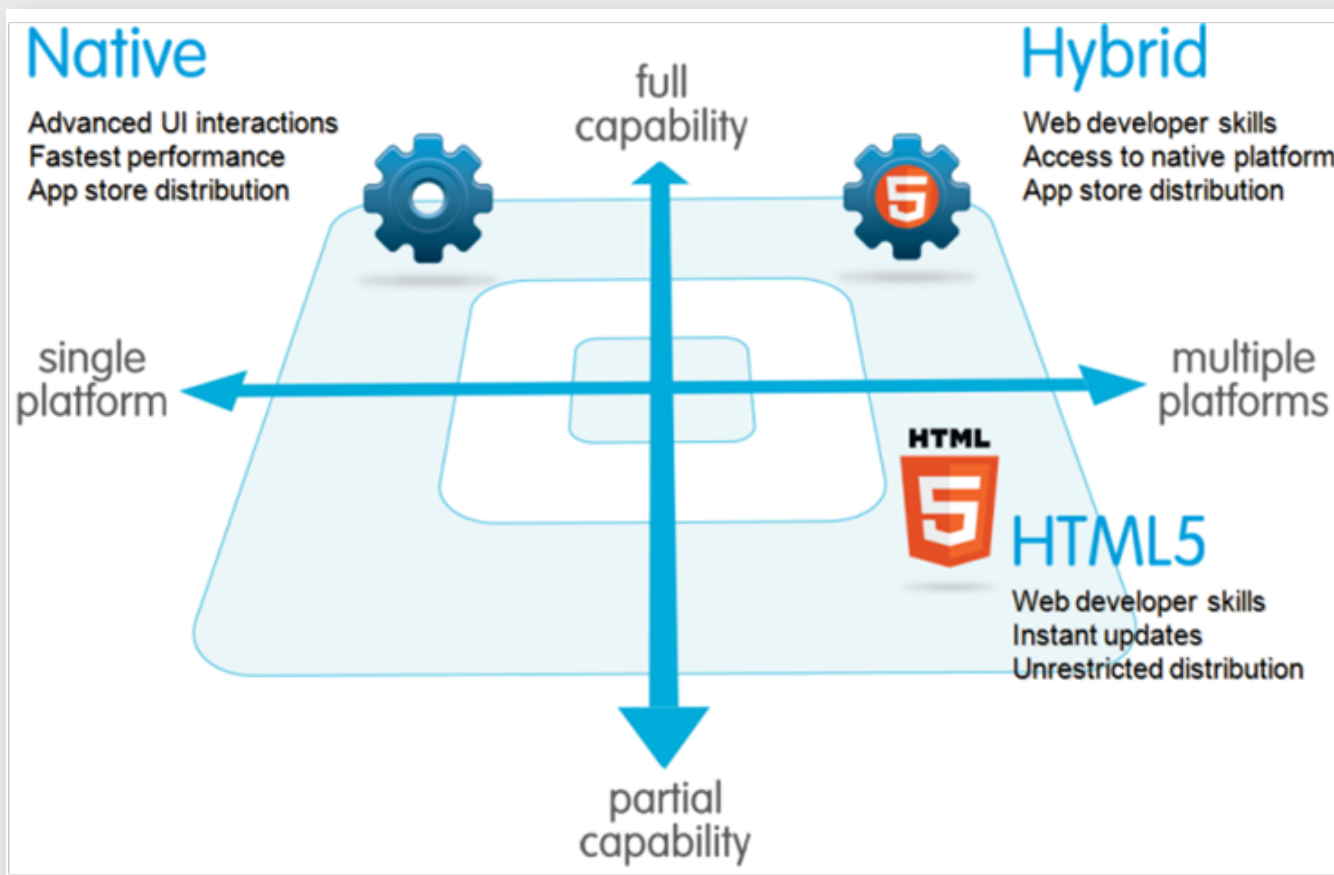

Figure 5. Types of apps and their features (source: Salesforce 2015)

Determining which technology is the right fit depends on the characteristics of the specific project. For example, will the application be expected to function offline? Does the application's technology affect response time? And what skills on the part of developers does the technology require?

The main advantages of a native application are that it is customized for the particular type of device, it has an excellent response time, it is available offline, and it interoperates with the device's built-in features (such as a camera, an address book, and location services). A native application thus provides a complete range of the device's functionalities (referred to as "full capability" in Figure 5).

On the other hand, opting for a native app usually comes at a high price. Costs mount when one must develop and maintain a separate application for each device's platform, design a different experience for each device, and ensure that each version of the app offers the correct branding and services.

Because of the diversity of operating systems and screen resolutions, more and more organizations are developing their apps in HTML 5 responsive design (for a glimpse at how one design appears on different devices, see Figure 6). Apps developed with this technology are much easier to maintain (only one code base is required), they do not have to be downloaded from app stores, and they provide the same experience across all devices. However, with HTML5-based apps, built-in functions of a mobile device, such as compound gestures, are not available, and the apps are not accessible offline.
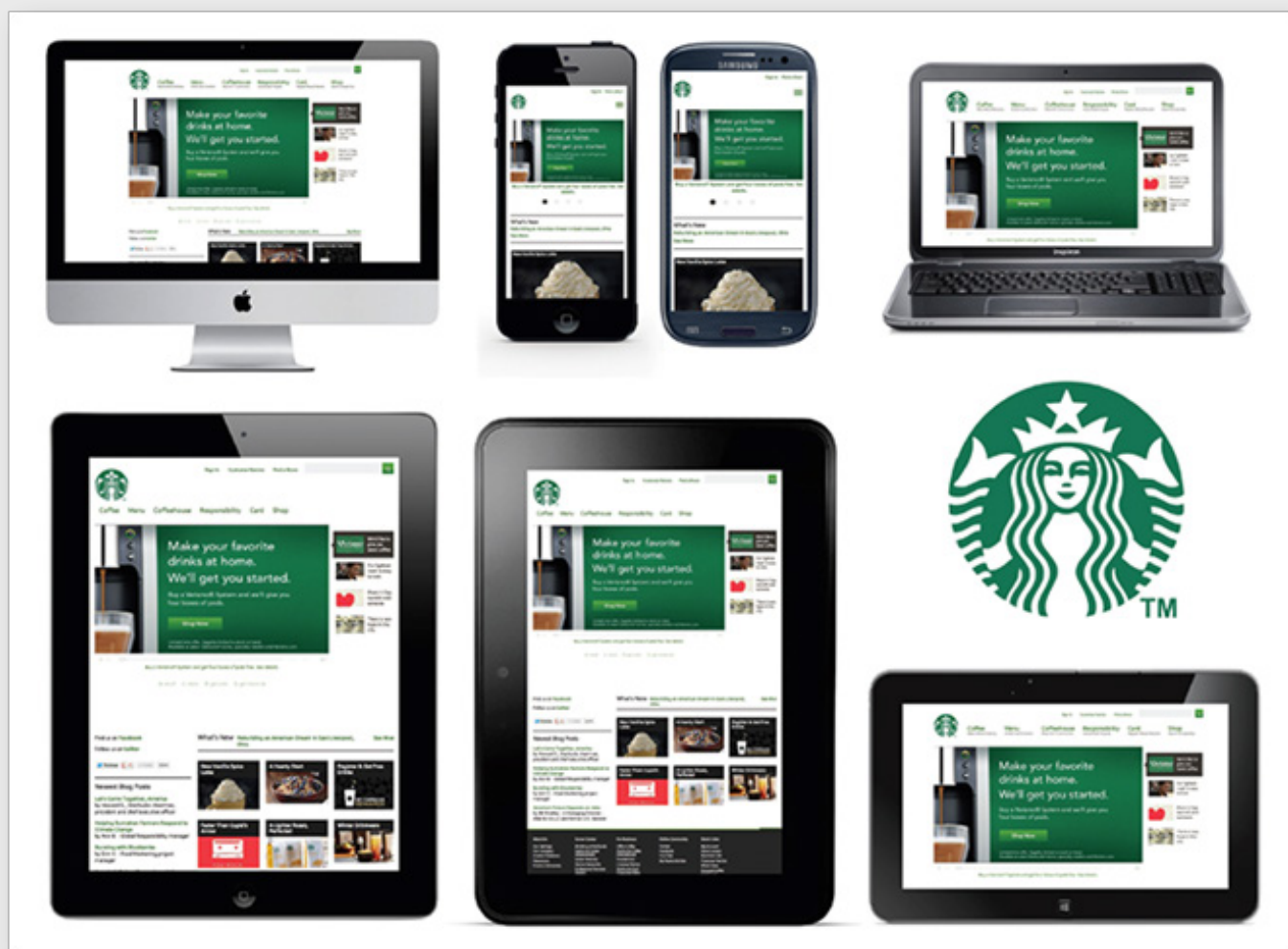

Figure 6. Examples of a similar design on devices with differing screen formats (source: Studio98 2015)

Applications developed through responsive design may not offer users an experience that appears tailored to their specific device, but, on the other hand, users will encounter the same familiar design on all their devices, whether desktop or mobile.[1]

[1] For a more detailed discussion of the pros and cons of each type of app, see "Native, HTML5, or Hybrid: Understanding Your Mobile Application Development Options" (Salesforce 2015).

The Angular JS framework has one of the world's largest companies behind it, Google, so opting for this client-side framework might be a good decision. Angular JS has the most robust model view controller (MVC) patterns, which provide the quickest development cycles. The framework is well defined, and each component is closed and reusable.

A technology that works with a single-page application reduces the traffic between the server and client, thus improving the user experience and performance. The server sends only a small amount of JSON and JavaScript code to create the HTML output, a feature that is crucial in developing applications for mobile devices, which are less powerful than desktop devices.

Another advantage of selecting a client-side approach and decoupling the client side from the server side is that this approach requires the use of REST APIs, in alignment with what most libraries use.

UX in Action: New User Interface of Ex Libris Primo

The Ex Libris Primo discovery and delivery solution is in use at thousands of institutions around the world. In light of the rapid pace of technological changes over the last few years and the growing importance of mobile devices in the discovery arena, Ex Libris decided, in early 2014, to embark on a project to create a new Primo user interface.

The mobile revolution is, indeed, changing everything we know about users' search habits and expectations from library services. Therefore, one of the first decisions by the Ex Libris team was to focus on putting Primo at the forefront of mobile technologies and design for library services.

Today's users automatically go to the web to search, explore, and discover new knowledge for almost every aspect of their life, and they expect a discovery system to deliver results that are tailored to their needs. Therefore, another high priority for the Primo team was to facilitate exploration and personalization and employ a visualization approach that would support these activities. On the other hand, retaining a "flat" result list would be essential for queries of the "search and find" type, which are mostly known-item searches, to help users easily locate the most relevant item. With the goal of providing the best possible user experience, one that addresses users' needs in one consistent application, it was clear that the project would entail more than just modifying the UI and CSS code; rather, a more profound change to the entire Primo experience would be necessary.

Embarking on this exciting journey, Ex Libris put together a new UX team and hired talented designers. The team analyzed the results of the Ex Libris user study and created user personas, which were helpful in the definition of user workflows and discovery scenarios. From the beginning of the design and development phases, the team consulted customers, who provided feedback on the new UX throughout the process. The rest of this section presents the new Primo UX that resulted from the project.

One can see that the interface of the result list is clean, presenting only data that can help the user easily determine which item to select (Figure 7). If the full text is available, a full-text link is positioned with the item in the result list. Note the row of icons to the right of each item; anticipating the user's next actions, these icons lead directly to an action menu. To avoid overloading users with options, the result screen does not display all the available services (such as links, recommendations, and tables of contents), so an icon (•••) indicates that more services are available.
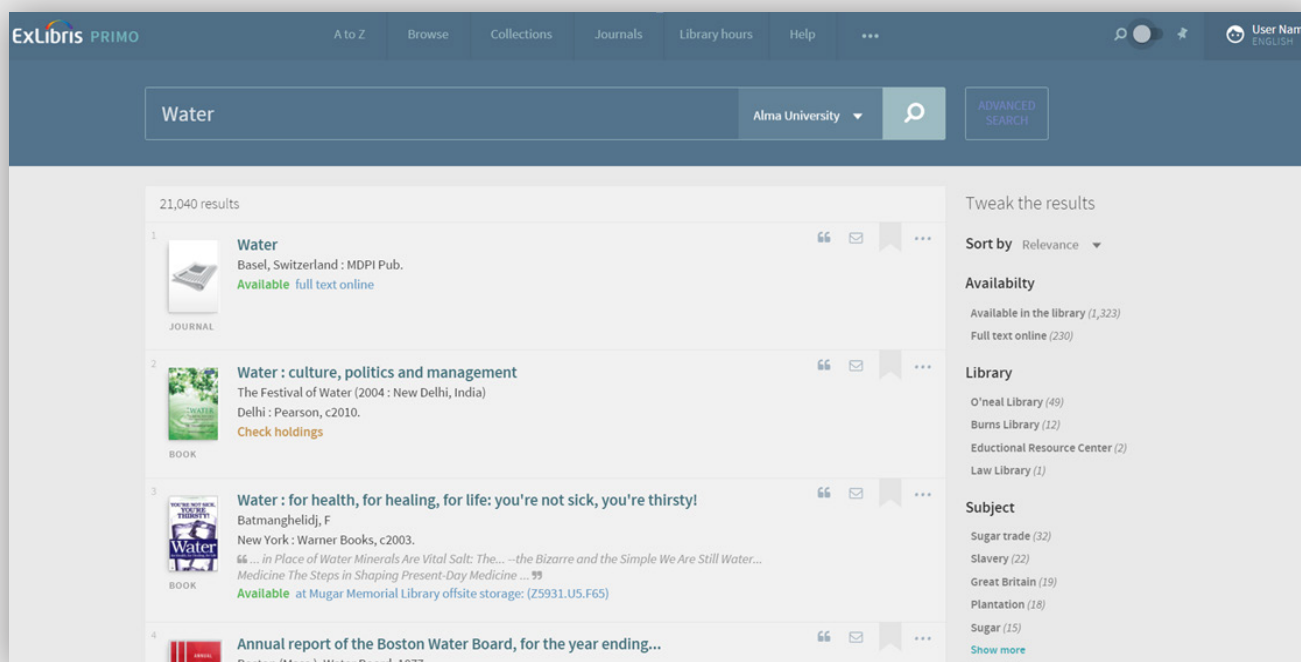

Figure 7. Primo UI: A result list displayed on a laptop or desktop computer

Once the user selects an item, all the available information about it appears (Figure 8). This process is the essence of "gradual exposure."
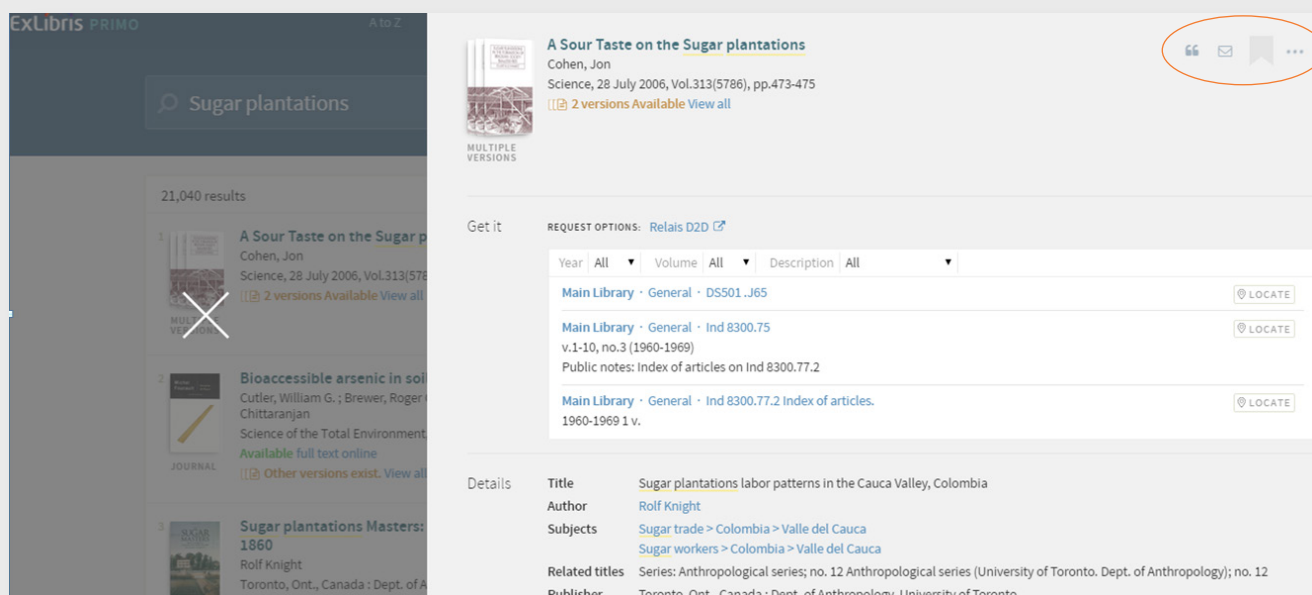
Core Principles for Designing Library Discovery Services

Figure 8. Primo UI: Action-oriented design. In the upper-right corner, note the icons leading to the full action menu.

The Primo action menu, one click from the result list, enables users to perform actions such as viewing information about an item, sending the information to themselves or a colleague, adding the item to their list of favorites, and saving the item in a reference tool (Figure 9).
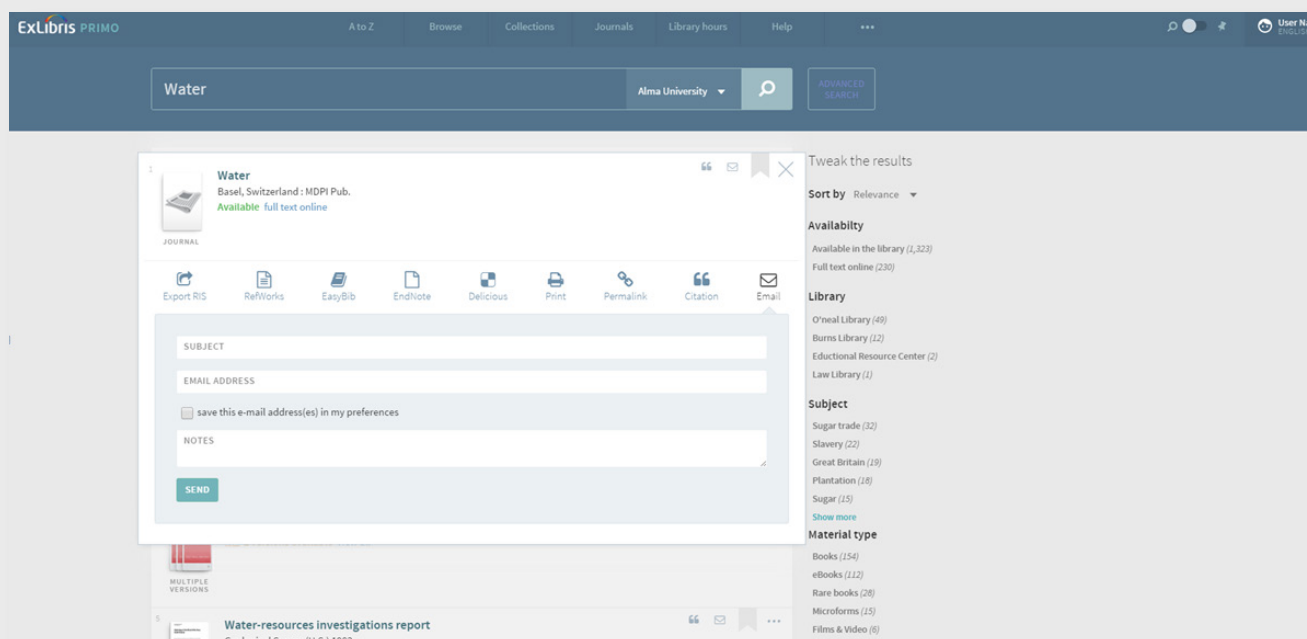

Figure 9. Primo UI: The action menu

Core Principles for Designing Library Discovery Services

Regardless of the platform, every device has the same user interface (Figure 10). Some of the features are hidden or adjusted for smaller screens; for example, facets are hidden by default, appearing only when the user clicks **Refine the Results**.
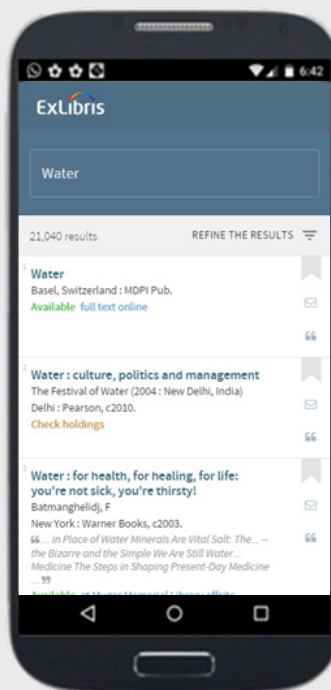

Figure 10. Primo UI:
A result on a mobile device

The list of favorites has the same look and feel and provides the same information and action icons as the result list (Figure 11). The list of favorites and the result list are refined in the same way, as well.
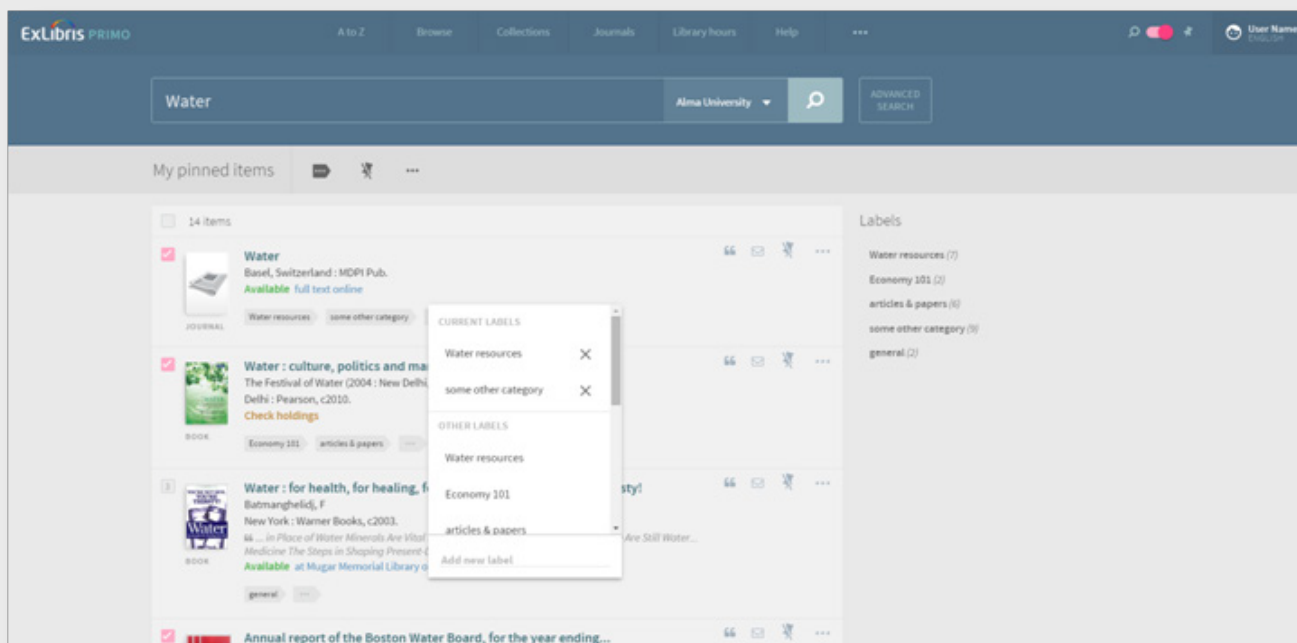

Figure 11. Primo UI: A consistent display for all workflows

⬛ Conclusion

Meeting users' expectations and providing a superior experience are, or should be, key goals of every institution and company, regardless of the industry or service that is provided. Encompassing the many aspects that constitute an interaction between a service provider and a user, UX may be put into practice in diverse ways across different industries, but it always has the same purpose: to engage users by combining intuitiveness, accuracy, and relevance and by delivering the expected outcome without delay.

The same premise applies to UX in the academic domain. The needs and goals of libraries may differ, but we at Ex Libris believe that the underlying principles of designing discovery services pertain to all libraries. The way in which these principles are applied may vary from one institution to another.

A methodological process of understanding who the user personas are, what their needs are, and what their normal workflows consist of can help designers and developers align the discovery system to patrons' needs and increase the use of library discovery services.

While the bulk of such a project occurs prior to the implementation of a discovery system, the work doesn't stop there. Users' needs may change over time, new trends in web design may emerge, and the evolution of technology may create opportunities for improving discovery for library users. This is where ongoing analysis and measurement of the discovery service's performance are key to the continued success of a library.

Ex Libris believes that a UX approach that is based on the principles described here is essential for driving user engagement and delivering the experience that patrons expect. At the same time, this approach can help libraries increase the academic impact of the services that they provide.

🔶 Works Consulted

Bank, C., and J. Cao. 2014. *Web UI Design Best Practices* (e-book). UXpin.
http://www.slideshare.net/TheHWD/ux-ui-principles-and-best-practices-20142015.
Accessed September 17, 2015.

comScore 2012, *State of the Internet: 1st Quarter 2012.*
http://www.comscore.com/Insights/Presentations-and-Whitepapers/2012/State-of-US-Internet-in-Q1-2012.
Accessed October 13, 2015.

Gould, J., and C. Lewis. 1985. "Designing for Usability: Key Principles and What Designers Think." *Communications of the ACM28*(3): 300-311.

Koponen, J. M. 2015. "Is Personalized Discovery a Feature, Category or New Paradigm," September 19.
http://techcrunch.com/2015/09/19/is-personalized-discovery-a-feature-category-or-new-paradigm/.
Accessed October 25, 2015.

McKeachie, C. 2013. "Choosing a JavaScript MVC Framework," September 19.
http://www.funnyant.com/choosing-javascript-mvc-framework/.
Accessed September 17, 2015.

Salesforce. 2015. "Native, HTML5, or Hybrid: Understanding Your Mobile Application Development Options," April.
https://developer.salesforce.com/page/Native,_HTML5,_or_Hybrid:_Understanding_Your_Mobile_Application_Development_Options.
Accessed September 17, 2015.

Stohn, C. 2015. *How Do Users Search and Discover: Findings from Ex Libris User Research.* Ex Libris.
http://www.exlibrisgroup.com/category/UserStudiesWhitePaper.
Accessed September 21, 2015.

Studio98. 2015. "What Is Responsive Design?" https://www.studio98.com/what-is-responsive-design/.
Accessed October 21, 2015.

Wimberly, C. 2015. "5 Simple UX Principles to Guide Your Product Design," July 8.
http://blog.invisionapp.com/ux-principles-to-guide-your-product-design/.
Accessed September 17, 2015.

◼ About Ex Libris

Ex Libris is a leading global provider of cloud-based and on-premises solutions for higher education. Offering SaaS implementations for the management and discovery of the full spectrum of library materials, as well as mobile campus services for driving student engagement and success, the company serves over 5,600 customers in 90 countries. Ex Libris solutions are deployed at 43 of the top 50 universities worldwide and more than 40 national libraries.

With the Ex Libris Alma® resource management service and Primo® discovery and delivery solution, libraries lower operational costs, increase efficiency, and add value to their institution through diverse new services and collaboration with other libraries and organizations. The Ex Libris campusM™ mobile platform enables universities to deliver a unified digital experience, promoting student engagement while providing mobile access to campus-wide information and services.

For more information about Ex Libris Group, see our website and join us on Twitter, Facebook, YouTube, and LinkedIn.

◼ Trademarks

Ex Libris, the Ex Libris bridge, Primo, Aleph, Alephino, Voyager, SFX, MetaLib, Verde, DigiTool, Preservation, URM, Voyager, ENCompass, Endeavor eZConnect, WebVoyage, Citation Server, LinkFinder, LinkFinder Plus, and other marks are trademarks or registered trademarks of Ex Libris Ltd. or its affiliates.

The absence of a name or logo in this list does not constitute a waiver of any and all intellectual property rights that Ex Libris Ltd. or its affiliates have established in any of its products, features, or service names or logos.

Trademarks of various third-party products, which may include the following, are referenced in this documentation. Ex Libris does not claim any rights in these trademarks. Use of these marks does not imply endorsement by Ex Libris of these third-party products, or endorsement by these third parties of Ex Libris products.

Google is a registered trademark of Google, Inc.

www.exlibrisgroup.com