Library Hi Tech

Research and discovery functions in mobile academic libraries: Are university libraries serving mobile researchers?

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Received 2 September 2014
Revised 30 October 2014
Accepted 19 November 2014

EXPERIENCING MOBILE LIBRARIES

Research and discovery functions in mobile academic libraries

Are university libraries serving mobile researchers?

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Abstract

Purpose – The purpose of this paper is to describe the availability of discovery functions on mobile devices at academic research libraries in order to determine if research libraries are providing the mobile services that students believe that they need for academic success.
Design/methodology/approach – The researcher surveyed 53 academic library mobile apps and mobile web sites at Carnegie rated RU/VH universities to determine the number and variety of discovery functions available.
Findings – All of the libraries had some level of research functions available, but there was a discrepancy between those that offered a full range of services and those that offered a minimal level.
Research limitations/implications – Due to the transitory nature of the electronic universe, the data offered represents the state of academic library research services in a single moment in time and is subject to change.
Practical implications – The research provides other libraries with a description of what comprises an adequate suite of essential services and a way to evaluate their own library's offerings.
Originality/value – This is the first study to evaluate and quantify the level of services provided by libraries at Carnegie Foundation RU/VH institutions.

Keywords Evaluation, Academic libraries, Mobile technology, Apps, Smart phones
Paper type Research paper

This research documents the progress academic libraries at high-level research universities are making toward becoming truly mobile research libraries. Trying to chart the progress of mobile services in university libraries is a difficult but necessary task. As with all academic work, there is value in documenting trends, especially so when the change is as rapid as the move to mobile computing has been. Studies that document progress become more important over time and can benefit creators as they attempt to build new systems (Aldrich, 2010). However, with these rapid changes in mobile technology, documentation can be problematic as updates can change apps and mobile web sites on a daily, if not hourly, basis.

Previous researchers have documented the increasing use of mobile technology by students (Bomhold, 2013; Johnson *et al.*, 2011, 2013; Paterson and Low, 2011; Dahlstrom *et al.*, 2011; Smith *et al.*, 2009; Zhang, 2008). Smartphone ownership by young adults age 18-24 was 79 percent in the first half of 2013, and was even higher (81 percent) for 25-34 year olds, up from 35 percent of all adults just two years earlier (Smith, 2013).

The author would like to thank Mr Rex Bomhold and Dr Alicia Westbrook for their invaluable contributions to the statistical portion of this research.

Library Hi Tech
Vol. 33 No. 1, 2015
pp. 32-40

0737-8831
DOI 10.1108/LHT-09-2014-0084

Additionally, the majority of undergraduates believe that their institution's library web site is very/extremely important to school success, and nearly 60 percent said they would use a smartphone to look up academic information or to access digital resources (Dahlstrom *et al.*, 2013). But are academic libraries keeping up with this rapid change? A study of 73 academic libraries at Carnegie rated very high research (RU/VH) universities found that almost 30 percent still had no mobile access in 2013 (Bomhold, 2014). This paper expands on that research by investigating the discovery functions that are provided on mobile devices at 53 universities rated RU/VH by the Carnegie Foundation.

Research and discovery services in library and information science

The phrase *web scale discovery* has been used in the profession when referring to programs that provide users one search box to retrieve results from many, or all of a library's content providers, such as the catalog, databases, and electronic journals. For the purpose of this investigation, the term discovery refers to those functions that the user interacts with, and which change the user's situation. There is precedent for this in the academic literature. Perhaps the best characterization of the process of discovery can be found in Kerne and Smith (2004). They describe information discovery as an "iterative reformulation" process that has sequences of knowledge states that involve human cognitive processes in conjunction with digital sources (Kerne and Smith, 2004). Aldrich (2010), refers to mobile-specific functions where there is an exchange of information as "active," as opposed "passive" functions (hours, location, etc.) which only provide information to the user. Clarke (2006) concurs, defining resource discovery as "the process of identifying and accessing information relevant to learning" (p. 1). Mobile functions that require cognition in conjunction with technology and that can create new knowledge are at the core of this research. These functions that aid in patrons' creation of new knowledge include the catalog, journal databases, course reserves, subject guides, and contact with a library staff member (also referred to as ask-a-librarian).

Problem statement

Undergraduate students' perception of the usefulness of smartphones for academic work is increasing, and they believe that university libraries are very important to their success (Dahlstrom *et al.*, 2013). It is important therefore that academic libraries provide the services that their students will need for that academic work. However, it has been established that mobile service at academic libraries at Carnegie rated RU/VH universities is not yet universal and that there is no clear, predictable pattern to the services that are made available to their students (Bomhold, 2014). The current study elaborates on that research by inquiring what research and discovery functions are provided by the Carnegie RU/VH academic libraries that provide mobile services to students.

Research questions

For this project, two research questions were identified:

RO1. What mobile discovery services are being offered by academic libraries?

RQ2. How do the libraries compare to each other in terms of the number and level of services offered?

Literature review

The literature of mobile library services sets the precedent for the importance of discovery services to students. Mobile library catalogs (MOPACs) and library

databases are frequently cited as the most useful or potentially useful to students. In a 2009 survey of Washington State University students, Cummings *et al.* (2010) found that 58.4 percent would use their hand held device to search the library catalog, despite the small screen size. Another early study at Cambridge University also determined that the library catalog, electronic journals and databases were perceived as most useful by their students (Mills, 2009). Prior to developing mobile services at the University of Regina, a library working group used surveys to determine how their students wanted to interact with library mobile services. More than 95 percent owned smartphones and there was high interest in the mobile catalog and databases (Nowlan, 2013).

Understanding user behavior is key to creating a useful and well-trafficked mobile site and access to the library catalog should be a high priority (Bridges *et al.*, 2010). The University of Edinburgh library surveyed 1,716 students to find out what they would find useful. Catalogs and databases were two of the four highest, with the other two – checking the library account and checking computer availability – being non-research functions (Paterson and Low, 2011). One study found a preference for accessing a mobile catalog over a desktop site even among those who had not yet upgraded to smartphones (Vasudavan and Ravi, 2013), and focus groups at Kent State University reported that the research section of the mobile library, including databases and the catalog were "essential" (Seeholzer and Salem, 2011). The most recent Horizon Report also refers to access to the library catalog in conjunction with databases as forming a "robust tool" for mobile patrons (Johnson *et al.*, 2014).

Other types of discovery services are also mentioned in the literature as being necessary for student success. Students at Kent State reported to be "very interested" in accessing course reserves through mobile serices, and being able to contact a librarian directly was of "prime importance" (Seeholzer and Salem, 2011). Access to course reserves was also considered useful to Edinburgh University students, especially those who lived too far to travel to campus (Paterson and Low, 2011). The student programmers working with Cornell University library staff to create their mobile site determined that the ask-a-librarian service, subject guides, and course reserves were all useful to students (Connolly *et al.*, 2010) and there was high interest (72.3 percent of respondents) in having access to text reference in a survey of 941 students at Sam Houston State University. In that case, mobile phone ownership was virtually universal, and students reported a belief that smartphones are an important way to make contact with the library and have transactions through services such as text reference (Cassidy *et al.*, 2011). Online subject guides such as the Springer product LibGuides were also cited as important for assignment-driven work in Bucks County Community College (Hemmig *et al.*, 2012). Luo (2013) and Ashford and Rolfe (2013) also stress the importance of contacting the librarian through any means, but particularly texting because of the ease of use and current popularity (Luo, 2013). And at the Technical University of Catalonia librarians cited convenience and perceived usefulness by students as the reason to include ask-a-librarian services in the first iteration of their mobile app (Vila *et al.*, 2010).

Limitations

These findings are based on a survey of mobile services conducted in late 2013 using an Apple iTouch 5. Earlier versions of this device, or other brands of devices may produce different results. Additionally, because of the temporary nature of electronic data, this study represents a single moment in time along a continuum of constant

change and cannot be replicated. The data are not meant to be perceived as final, but only as illustrative. Finally, the results are not indicative of the quality of the services provided, only of the quantity and thoroughness of the complement of services offered.

Methodology

A list of 73 public universities rated as "very high research activity" was located from the Carnegie Foundation (2013). Using the list, searches were conducted in iTunes and on university web sites to determine if the university had a dedicated application (app), and if that app provided access to library services. Those that did not have an app were accessed through the mobile web to determine if the university library had a mobile optimized web site. If the web site was optimized, then the researcher proceeded to the library page to determine if the library services were also optimized for mobile access. Only libraries at RU/VH universities that were either incorporated into the university app or were optimized for smartphone use were considered for this survey. Because of a lack of any mobile library service, 20 universities were removed from the list.

The apps were then downloaded to a fifth generation Apple iTouch and surveyed for access to library services. If the library had a mobile site, that site was used to collect the data. Results were compiled in a Microsoft Excel workbook and analyzed for the ability of the patron to access research services. Bomhold (2014) reported on the frequency of primary library access and the presentation of static information such as hours, directories, and maps. Discovery functions included course reserves, database access, mobile online public access catalogs (MOPACs), ask-a-librarian functions, and subject guides. The data were then analyzed for associations between services offered or excluded among the libraries.

The data were entered into an Excel spreadsheet and assigned numeric ratings to find a Discovery Function Score (DFS). The five categories (MOPAC, databases, ask-a-librarian, course reserves, and subject guides) were each assigned a weight in relation to its importance as demonstrated in the academic literature. MOPACs and databases, which were repeatedly mentioned as being most necessary by students (Bridges *et al.*, 2010; Cummings *et al.*, 2009; Johnson *et al.*, 2014; Nowlan, 2012; Paterson and Low, 2011; Vasudavan and Ravi, 2013), were each given a weight of 2, and the other criteria given weights in relation to this. Ask-a-librarian services were given a 1, subject guides were given a 0.5, and course reserves, which were mentioned least frequently, were assigned 0.25. The highest possible DFS was therefore 5.75.

Among the five criteria, only ask-a-librarian services could not be answered with a yes/no condition. Contact with library personnel were offered in several different ways, and frequently multiple methods were offered at one library. Four options were identified; through text or instant messaging (IM), online chat, e-mail, or phone. These functions were also weighted; e-mail and phone functions considered old, non-mobile-specific technology that takes little extra effort to provide, and text has been noted to be the most student friendly (Luo, 2013). Consequently, in this category each function was assigned a score on a scale of 0-4, with 4 being the highest, or most valued by the students. For this category, text or IM functions were assigned a 4, chat = 3, phone = 2, e-mail = 1, and 0 for no service. Since libraries often provided multiple options in this category, the service types were first given a number according to the highest level of service with an additional 0.1 given for each supplementary service provided. For example, a library that offered ask-a-librarian service through text or IM, chat, and e-mail received an initial value of 4 for offering text or IM, and then a second value of

0.2 for the extra services of chat and e-mail for a total of 4.2. A library that offered chat and e-mail received an initial score of 3 for the chat function, with 0.1 added for the extra e-mail service for a total of 3.1. The libraries were thereby given weighted values for both the number and type of services offered. A top score of 4.3 in the ask-a-librarian category was worth 1 in the overall possible score of 5.75 for all discovery functions.

After all the data were gathered and calculated, the results were sorted from highest to lowest DFS and were analyzed for significant similarities or discrepancies.

Results

For this research, 53 academic libraries at Carnegie-rated RU/VH universities were surveyed for their DFS. The score was calculated by determining which, if any, discovery functions each library offered to mobile users. The five discovery service functions investigated were the catalog (MOPAC), journal databases, ask-a-librarian, course reserves, and subject guides. Each category was weighed according to the importance of the function to patrons, as cited in the literature.

All of the libraries provided access to their catalog to mobile customers, and 39 (73.6 percent) also offered database access. Mobile access to subject guides was provided at 23 libraries (43.4 percent), and 13 (24.5 percent) had access to course reserves (Table I).

Within the ask-a-librarian category eight of the libraries (15.1 percent) did not provide any service, while another ten (18.9 percent), provided only one way to contact them, most frequently (five times or 50 percent) an e-mail form. At the 26 libraries that offered IM or text as an option in the ask-a-librarian category, one had no other option, four had one other option, 12 had two other options, and nine had all three other options (chat, e-mail, and phone). For those that had no IM or text option, two had chat only and seven offered chat, phone, and e-mail. Two libraries offered only a phone option, three had phone and e-mail, and five had e-mail only.

wThe final DFS of all the libraries are indicative. Only two libraries (3.77 percent) offered a complete suite of mobile services (DFS = 5.75), but 18 more (34 percent) scored above a 5 (DFS = 5.1-5.70 or 88.6-99 percent of the total score), and another 18 libraries (34 percent) scored 4.48 to five points (78–87 percent of the total). None of the schools scored between 3.48 and 4.48, and 15 (28.3 percent) scored below 3.48 (Figure 1).

The majority of libraries (38 (71.7 percent)) did reasonably well with a DFS $\geqslant$ 4.48. This demonstrates some attempt to provide patrons with discovery functions that will help them accomplish their research, in keeping with their Carnegie rating of RU/VH. All of those libraries provided access to both the MOPAC and the electronic journal databases, and had some mix of other important functions such as course reserves, subject guides, and ask-a-librarian services. The remaining 15 libraries (28.3 percent)

Table I. Percent of libraries offering each function

Function	Number of libraries	% of all libraries
Catalog access	52	98.1
Database access	39	73.6
Ask-a-librarian	45	84.9
Subject guides	23	43.4
Course reserves	13	24.5

only offered minimal level (DFS < 3.48) mobile discovery services. Eight of those had a DFS = 3.4–2.1 and only offered one major service (catalog (87.5 percent) or journal database (12.5 percent)) and a rudimentary attempt at additional service through e-mail, chat, or phone ask-a service. The bottom 7 with a DFS of 2 only offered access to the MOPAC.

Most notable was the gap between the high-scoring and low-scoring groups. All the libraries scored either ⩾ 4.48 or ⩽ 3.48, with none scoring between 61 and 77 percent of the total DFS. This illustrates that while many libraries have focussed efforts on moving all their library services to a mobile platform, others are either struggling to keep up with rapidly changing technologies or still view mobile services as peripheral to other services, despite their university's otherwise demonstrated dedication to research.

Discussion

This research exemplifies the state of mobile library services in late 2013. While most libraries have embraced the idea of mobile library service being central to their service plan, almost 30 percent still only offer a bare minimum. The reasons for this are not within the scope of this survey, but causal factors may be found in the most current literature on the state of academe. An Association of Research Libraries report found that libraries have received only incremental increases in acquisition and administrative allocations from 2011 to 2013, not nearly enough to make up for the dramatic budget cuts after the Great Recession of 2008 (Lowry, 2013). Not only did the current increases not make up for the earlier losses, but they were not even enough to make up for increased costs due to annual inflation. Furthermore, the majority of increases in staff salaries did not come from additional funding, but from staff reductions taken elsewhere; through layoffs, the elimination of positions, hiring freezes, or staff furloughs. The years 2008-2013 represent an unprecedented and progressive de-funding of academic libraries (Lowry, 2013). Because this time span is roughly the same as the mobile boom, it can be inferred that a lack of funding may play a role in some library's inability to keep up with the needs of their patrons and the demonstrated mission of their university.

A need for dynamic leadership may also play a part in the inability of libraries to keep up with the mobile trend (Johnson *et al.*, 2014). The patrons' adoption of new technologies means that they are searching for information in new ways, and therefore service models must also change (Delaney and Bates, 2014). Facilitating the move to mobile requires that deans and other library staff recognize this and can collaborate

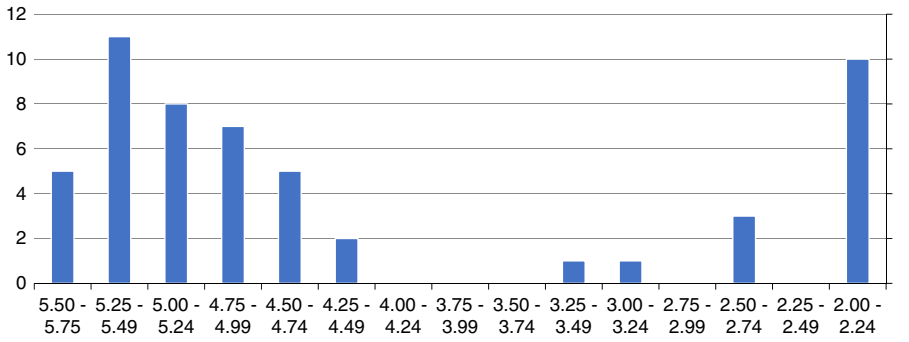

Figure 1.
Libraries sorted by discovery function score

successfully, and swiftly, with other units on campus to make it a reality. However, this need to "embrace radical change" (Johnson *et al.*, 2014, p. 28) is a challenge that the most recent Horizon Report identified as "wicked," meaning that it is "complex to define, much less to solve" (p. 18). The need for rapid institutional movement to keep up with the technological changes is directly opposed to the normally glacial speed with which universities are accustomed to moving, and can present challenges to both those who are eager and reluctant to adopt it, and for this there is no easy fix. Those who are most necessary to implement the move to mobile may find that the organizational structures already in place are not conducive to a monumental shift in the service model.

This research is illustrative of one moment in time, and while that moment may be in the past, it demonstrates how the move to mobile is being undertaken by academic libraries at very high research institutions. When this survey was conducted, almost 30 percent of the libraries still did not provide a full range of mobile services to their students. The move to mobile libraries is so rapid however, more research needs to be completed to see if this is indicative of continued lack of funds, a resistance to a change in service models, or if it is an anomaly that will be rectified over time.

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