

DISCOVERY & DELIVERY MOBILE STRATEGY

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EXECUTIVE SUMMARY

Research findings:

- People prefer to use laptops for academic reading and research.
- Mobile devices are used when computers or internet are not convenient.
- Some want to access library databases and catalogs from mobile devices.
- Mobile users use library services to find known materials or quick pieces of information.
- Some are already using library services like online databases and library catalogs on mobile devices.
- Some receive academic reading materials on mobile devices from instructors or colleagues, so supporting static links is important as well as search capabilities.
- Reading and research are part of a cycle of academic work.
- Mobile users need to be able to transfer search results to their primary computers.
- Many use email to transfer content between devices, so this is a good practice to support in mobile tools.
- Accessing the internet through cellular connections on mobile devices is problematic for accessing authenticated resources.
- Many use the cellular network instead of WiFi to access the internet from mobile devices.
- Some struggle to use campus WiFi even when they want to.
- Some libraries have built request functionality into their mobile catalogs.
- Survey respondents have some interest in being able to request items on their mobile devices.
- Many libraries are introducing services by text messaging, and there is general enthusiasm for this in the literature.
- Many interviewees were not interested in library notification by text message because they didn't think library notifications were urgent, email can be stored and organized better, emails are more serious, and they wanted to keep text messages as a channel for personal communication.
- Survey respondents also showed significantly less interest in notification by text message than email.
- A few interviewees and survey respondents were interested in notification by text message, especially those without email on their mobile devices.

Recommendations:

- Some interviewees and survey respondents are interested in being able to access library databases and catalogs from mobile devices, as well as having the ability to request items from mobile devices.
- Despite this interest in using D&D products on mobile devices, it is difficult to create mobile-friendly tools because of the relationship between many D&D products and third-party tools and vendor-provided content.
- UC-eLinks could be activated for use with mobile databases, following these steps:
 - Configure web-based mobile licensed resources.
 - Activate UC-eLinks within mobile licensed resources.
 - Track usage.
 - Inform campuses of availability of mobile tools and provide best practices for implementation.
 - Design a UC-eLinks menu that is easy to use on mobile devices.
 - Test these tools and systems on a variety of devices.
- Though it would be ideal to have a mobile version of Request, most avenues to Request are not currently mobile friendly, including the UC-eLinks access points and menu. If more of these access points become mobile friendly, it would be ideal to create a mobile version of the request form.
- If it is relatively easy to implement text message notification for request materials, provide this on opt-in basis in addition to email notification. This service would likely have low usage, so it should only be pursued if it is easy to implement and maintain.

INTRODUCTION

The mobile strategy recommendations for the Discovery & Delivery (D&D) Program are based on two main areas:

1. User behavior and preferences uncovered from the mobile user research project conducted summer of 2010.
2. A close examination of D&D services and their access points as they relate to UC licensed resources and authentication to UC network, as well as constraints due to vendors' ability to support mobile access and functionality.

This report is part of the California Digital Library Mobile Device User Research Project. It provides mobile strategy information that is relevant to CDL's Discovery & Delivery Program, focusing on UC-eLinks and Request services.

Some information about research methodology and research findings can be found in this report, but more complete details on these subjects can be found in the general report, available on the wiki. A section on related mobile tools can also be found in the comparative analysis report, available on the wiki.

RESEARCH METHODOLOGY

We conducted two surveys, both administered online. The first survey was distributed through Facebook and Twitter posts and ads. Most of the respondents (27) were librarians, so only their responses were analyzed. The second survey was distributed to random undergraduate, graduate, and faculty at UC Berkeley. 268 people responded to this survey. Survey respondents held the following occupations:

Faculty	92	34.33%
PhD	55	20.52%
Masters	8	2.99%
First-year undergraduate student	2	0.75%
Second-year undergraduate student	32	11.94%
Third-year undergraduate student	26	9.70%
Fourth-year undergraduate student	34	12.69%
Fifth-year undergraduate student	7	2.61%
Recent graduate ¹	4	1.49%
Alumni	1	0.37%
Part-time student	1	0.37%
Visiting scholar	1	0.37%
Researcher	1	0.37%
Staff	1	0.37%
Other	3	1.12%

We conducted 14 interviews with CDL service users or potential users. In general we sought participants who owned a mobile device with internet access. Two participants did not own a mobile device with internet access; one was a heavy user of the Online Archive of California, another was a faculty member who conducted field research. Participants were offered a \$25 Amazon.com gift card in exchange for participation.

We conducted on-campus interviews at UC San Francisco (4 interviews), UC Berkeley (3 interviews), and UC Davis (3 interviews). On-campus interview participants were solicited in-person. Although we would have liked to interview subjects at all UC campuses, we were limited by logistics, schedule, and budget. Four other phone interviews were conducted.

	Campus	Occupation	Academic Field	Mobile Device Ownership	Mobile Internet Usage*	Library Usage**
Participant 1	UCSF	Staff, Clinical Fellow	Health/medicine	Palm, iPad, iPod Touch	High	High
Participant 2	UCSF	Faculty	Health/medicine	iPhone	Low	Low
Participant 3	UCSF	Student, 4 th year PhD	Health/medicine	iPod Touch, feature phone	Medium	Low

¹ Recent graduate, alumni, part-time student, visiting scholar, researcher, staff, and other were all combined into an “other” category for analysis.

Participant 4	UCSF	Archivist	N/A	BlackBerry	Medium	High
Participant 5	UC Berkeley	Student, 2 nd year undergraduate	Psychology	iPod Touch, LG Rumor (smartphone)	Medium	Medium
Participant 6	UC Berkeley	Student, First year PhD	Biology	Google Android HTC	Medium	High
Participant 7	UC Berkeley	Student, 4 th year PhD	Information Science	Feature phone	N/A	High
Participant 8	UC Davis	Student, 3rd year undergraduate	Sociology and health/medicine	LG eNV Touch without data plan, iPod Touch	Medium	Low
Participant 9	UC Davis	Student, 4th year undergraduate	Art and history	iPhone	High	Low
Participant 10	UC Davis	Student, 3rd year undergraduate	Biology	LG eNV Touch with data plan	High	Low
Participant 11	Other university	Teaching Librarian/Special Collections Librarian	N/A	iPhone	High	High
Participant 12	K-12 School	8 th -grade teacher	History & English	iPhone, iPod Touch	High	High (Calisphere)
Participant 13	High School District	Technology specialist	N/A	iPhone (personal), iPad and iPod Touch (district)	High	High (Calisphere)
Participant 14	Other university	Faculty	Field ecology	LG phone without a data plan	N/A	Low

D&D RESEARCH FINDINGS

PEOPLE PREFER TO USE LAPTOPS

In general, people prefer to do extensive research and academic reading on their laptops or on paper rather than on mobile devices. 88% of survey respondents use laptops to read academic content, while only 11% read academic content on a mobile device with internet. One student told us that she uses her phone to “check something, look at picture on the internet. If I’m going to do any extensive browsing or academic work, I’ll use my laptop.” Another student stated “I prefer to use my computer for big things that I have to do, like if I have to do a paper or research.”

Most interviewees noted that they did not want to do actual academic research on mobile devices. Many see research as a difficult activity that would only be more difficult on a mobile device. As one undergraduate student noted, “it’s a little complicated to [access library resources] on the computer, so I haven’t tried on the iPod Touch.”

“It’s a little complicated to [access library resources] on the computer, so I haven’t tried on the iPod Touch.”
--Student

Most also told us that they did not read academic content on mobile devices. Some said that they prefer to read PDFs on their laptops, while others stated a preference for reading material on paper. One graduate student told us: “I can’t imagine reading a whole science journal on my iPod Touch.” Another student told us that she doesn’t like reading on her phone longer than 10 minutes. One student told us that he had tried to read on his phone, but he didn’t like reading from the small screen: “I tried, like when the professor sends PDFs, but I’m not great at reading it off of the screens.”

Many have complex organization and filing systems for documents and citations on their laptops, as well as preferences for taking notes on physical paper. However, laptops and internet are not always available and paper is inconvenient, so mobile devices sometimes fill these gaps.

Despite the preference for laptops, many don’t carry laptops to campus. One student told us why she doesn’t carry her laptop: “It’s just kind of a pain to carry around, especially because I live really far away and I walk to campus. I don’t want to carry it if I don’t have to.” Many students use library computer labs when laptops are not available, but it can be a hassle to go to the library and find an open computer, especially when it is only needed for short sessions. Furthermore, some do not have internet access at home, so they rely on internet from their phone’s data plan: “The internet where I live has been down a lot, so I can use my cellular, so I’ve been using my phone internet a bit more.”

Takeaways:

- People prefer to use laptops for academic reading and research.
- Mobile devices are used when computers or internet are not convenient.

SOME WANT TO HAVE ACCESS ON MOBILE DEVICES

Despite this disinclination to do heavy research on mobile devices, there does seem to be an interest in having the option to access library databases, catalogs, and resources from mobile devices. Instead of using these tools to perform actual research, it is more likely that users will use library databases to retrieve known materials or find quick information.

About 53% of survey respondents said that they would like to search library databases from mobile devices either “frequently” or “occasionally.” (46% said they would never search library databases on a mobile device.) About 55% wanted to search the library catalog from a mobile device either “frequently” or “occasionally.” (43% said they would never search the library catalog on a mobile device.)

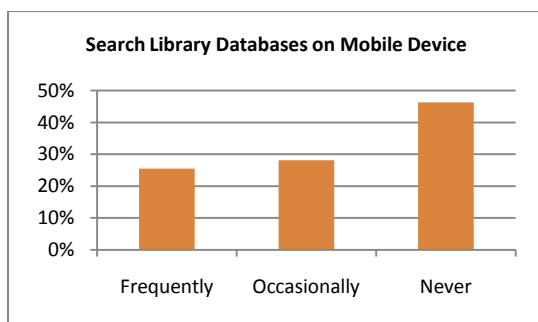


Figure 1 How often would you like to use a mobile device to access the following library/academic information or resources?
N = 237

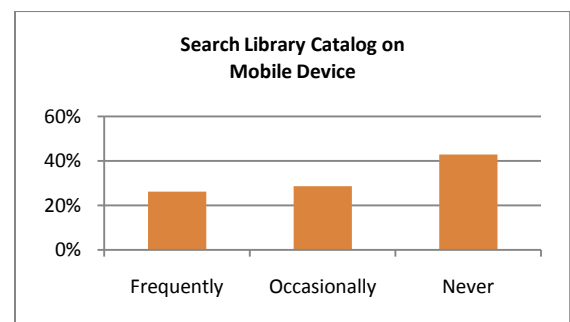


Figure 2 How often would you like to use a mobile device to access the following library/academic information or resources?
N = 231

While most do not want to conduct in-depth research on a mobile device, some are willing to find material that they already know is available. For example an undergraduate student may access materials that have been assigned by instructors, or faculty may search for articles they have already read to recall specific facts. One undergraduate student told us that she would only use her mobile device to seek out a library material that she already knew was available rather than searching for something new: “I probably wouldn’t look for something new on [my mobile device] just because it’s kind of a pain. But if there was something that I knew was already there and was just looking for it, I might do that.”

Another scenario for mobile research is finding quick pieces of information within resources. A staff clinician interviewee described how she needs to look up information in medical journals while working with patients at the county hospital. She hasn’t been able to get the campus VPN to work off site, so she does not have access to licensed resources and uses Google Scholar instead. She currently does this on her laptop, but it is easy to imagine a scenario where she would do this on her mobile device instead.

Another interviewee told us that she would like to be able to search the library catalog from her phone to determine if a book is available in the library. She thought she would use this when she is somewhere without her computer or WiFi access. This person was not really interested in actually accessing the resource from her phone; instead, she wanted to find out if the physical copy was available before she went to the library.

These findings are similar to data from Texas A&M University Library, who recently publicized access to EBSCO mobile databases on its campus. They found that while users did search the mobile database, they did not actually click through to the full-text resources. Only 1% of Texas A&M mobile EBSCO users actually viewed the full text (as opposed to 77% who typically view full-text on a regular device).²

Some are already using library resources on mobile devices. Of the survey respondents who read academic content on mobile devices, 67% reported getting the content they read on their mobile devices from online databases (e.g. JSTOR, Proquest). The next most popular places to get content were Google Scholar (43%), web searches (40%), and the library catalog (39%). Material provided by class instructor and forwarded by a colleague ranked at 38% and 37%, so it is also important to support access to static links as well as searches.

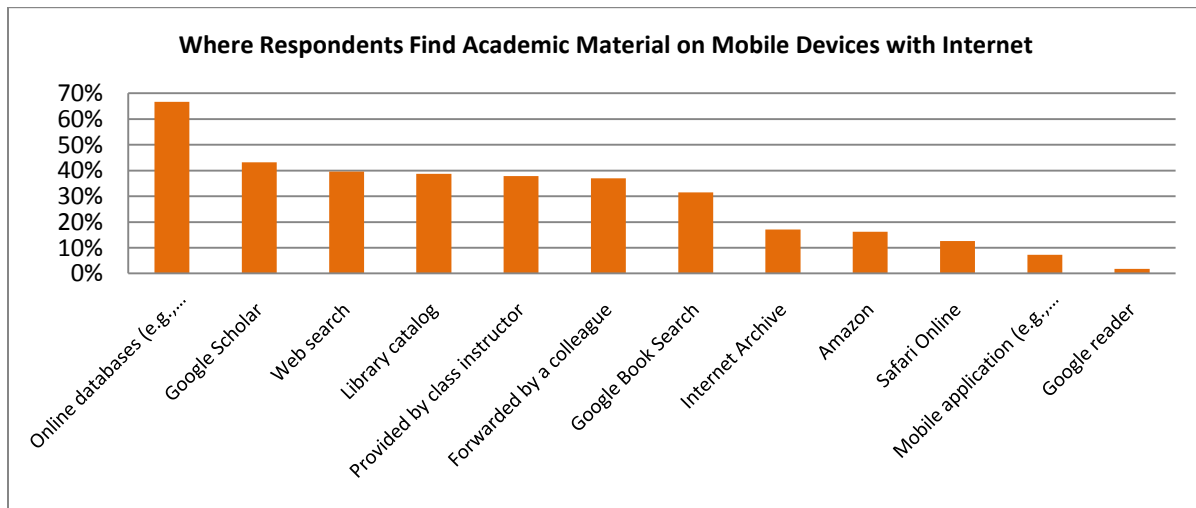


Figure 3 Where do you find academic content to read on your mobile device? (Select all that apply.) *Out of survey respondents who read academic material on mobile devices with internet. N=111

² Bennet Ponsford, personal communication, 6/28/10

Takeaways:

- Some want to access library databases and catalogs from mobile devices.
- Mobile users use library services to find known materials or quick pieces of information.
- Some are already using library services like online databases and library catalogs on mobile devices.
- Some receive academic reading materials on mobile devices from instructors or colleagues, so supporting static links is important as well as search capabilities.

TRANSFERRING CONTENT

An academic cycle of work consists of research, reading, analyzing, and creating. Tasks such as reading and research are not done in isolation, so any new tools must allow for integration with rest of the academic workflow.

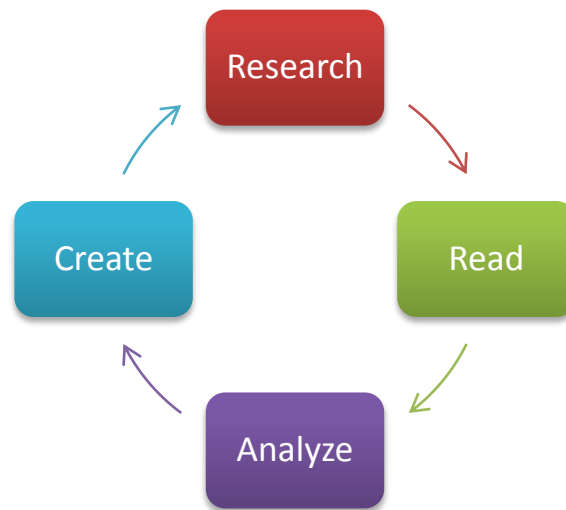


Figure 4 The academic cycle consists of research, reading, analyzing, and creating.

It is important for mobile users to be able to transfer search results (including links to the resource, PDFs, and citations) to their primary computers for organization, closer reading, or printing. A significant issue for interviewees was the ability to organize their readings and citations. Many have complex organization systems on their laptops, such as saving PDFs in folders, saving URLs as bookmarks, or saving citations in EndNote. These tasks are much more complicated from a mobile device because of the lack of citation tools and file organization available on mobile devices. A staff clinician noted: “I like to have my laptop with me because I have all of my stuff organized in a certain way there. And if there were a way that I could do it on my mobile device and then it would end up on my laptop eventually, I would do that. But that’s really my big issue...If it’s something that’s pertinent to my work, I’d want to be able to go and get it and then save it on my computer so that I can reference it later.”

“If there were a way that I could do it on my mobile device and then it would end up on my laptop eventually, I would do that.”
--Staff Clinician

One option to help users transfer content between mobile devices and laptops is to take advantage of a habit many already have of using email to transfer content between devices. An archivist told us “If it’s in an email, it’s in my inbox, in my device. It’s automatically everywhere.” 54% of survey respondents reported frequently sending

themselves emails in order to have information on the go. Providing an easy method to email search results and materials to oneself would help users to integrate mobile database search into their existing workflow.

Takeaways:

- Reading and research are part of a cycle of academic work.
- Mobile users need to be able to transfer search results to their primary computers.
- Many use email to transfer content between devices, so this is a good practice to support in mobile tools.

AUTHENTICATION BARRIERS

Academics using cellular connections instead of campus wireless networks may have significant implications for accessing licensed resources. If academics are attempting to use library resources through cellular connections, even when on campus, they will not have access to resources that require authentication.

Even though WiFi is often faster than cellular connections, the difficulty of finding strong WiFi networks and logging in may deter potential WiFi users. One undergraduate student explained “I wouldn't go through all the hassle to use the internet at school. I just use the internet that AT&T provides.”

Of survey respondents who do subscribe to data plans, 78% of survey respondents reported using the cellular network frequently to access the internet, whereas only 49% report using WiFi frequently. Accessing the internet by cellular connection is clearly the more popular option.

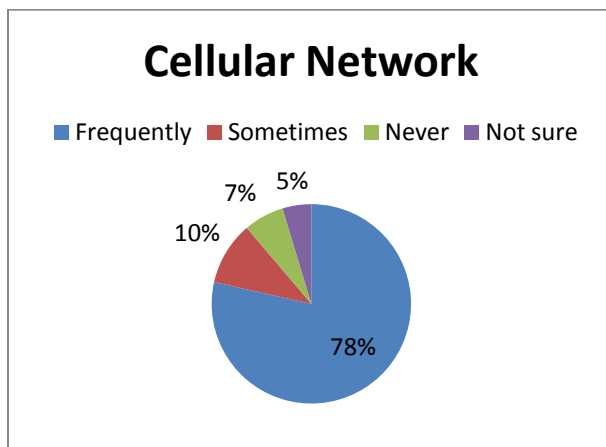


Figure 5 When you use the internet on your mobile device, which type of network do you use? *Out of survey respondents who have mobile devices with data plans. N= 107

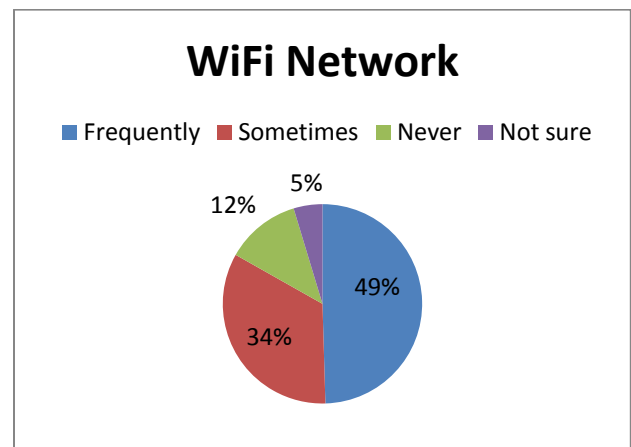


Figure 6 When you use the internet on your mobile device, which type of network do you use? *Out of survey respondents who have mobile devices with data plans. N= 107

Some struggle with configuring access to library resources even when on the campus wireless network. A staff clinician at UCSF who is a heavy user of mobile devices told us “I do sometimes use the library for journals [on my mobile device], but I haven't gotten around the VPN issue to actually be able to pull up the articles.”

“I do sometimes use the library for journals [on my mobile device], but I haven't gotten around the VPN issue to actually be able to pull up the articles.”
--Staff clinician

Takeaways:

- Accessing the internet through cellular connections on mobile devices is problematic for accessing authenticated resources.
- Many use the cellular network instead of WiFi to access the internet from mobile devices.
- Some struggle to use campus WiFi even when they want to.

INTERLIBRARY LOAN AND MOBILE DEVICES

There are two relevant components of request on mobile devices: 1) requesting an item on a mobile device and 2) receiving notification regarding requested items.

REQUESTING MATERIALS ON A MOBILE DEVICE

Some libraries have built request functionality within their mobile online catalogs. Ghent Library in Belgium has a “request item” option on each catalog details page. The request page requires ID numbers and information about the material. The Orange County Library System (OCLS) has a request option on the main page of search results.



Figure 7 Ghent Library search results with request option



Figure 8 Ghent Library mobile request page



Figure 9 OCLS search result request option

Survey respondents expressed some interest in being able to request an item on a mobile device: 14% thought they would request an item from a mobile device “frequently”; another 33% thought they would request an item on a mobile device “occasionally.”

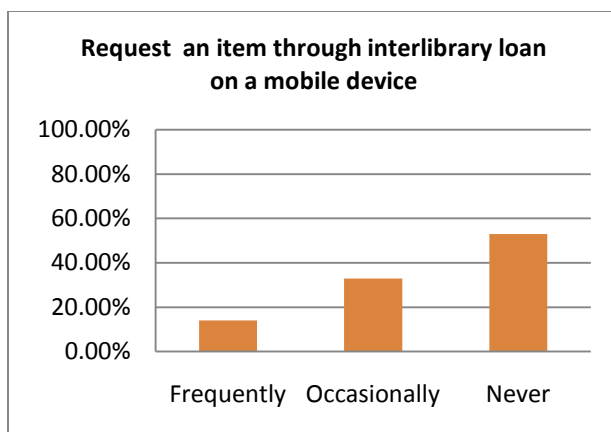


Figure 10 How often would you like to use a mobile device to access the following library/academic information or resources? N = 234

Takeaways:

- Some libraries have built request functionality into their mobile catalogs.
- Survey respondents have some interest in being able to request items on their mobile devices.

REQUEST NOTIFICATION AND TEXT MESSAGING

Request users currently receive email notification regarding availability of interlibrary loan materials. One option is to give users the option of receiving notification by text message instead of or in addition to email notification.

Text messaging services are being implemented in a variety of ways within libraries. These services have the potential to be used by a wider population than mobile internet services because text messaging is available on most feature phones (though there is not conclusive evidence that these services are actually being used more than mobile web services). Text messaging can be used for patrons to contact the library, for patrons to send information to themselves, or for the library to send automated notifications to patrons.

Many libraries have created text message versions of the “ask a librarian” feature (generally conducted by chat or email on a desktop computer). Most libraries that have implemented a “text a librarian” option find that they only receive 20 to 40 text messages per month (Weimer, 2010).

UC Berkeley and UC San Diego, along with many other libraries, have implemented a feature to text a call number to yourself. This allows users to search for an item on a desktop computer but then have a portable record of the item’s call number to refer to when physically searching the library shelves. Many interviewees noted that, in addition to email, they send themselves text messages as notes to themselves. When survey respondents were asked if they ever send themselves text messages, about 15% responded that they do this frequently, and another 26% said they did this occasionally.

A few libraries have implemented automated services by text message, such as notification of materials being due or becoming available. Focus groups of higher education students in UK ranked reminders by text as the most desired mobile library service. Overall, this study found “attitudes towards text messaging from the library are overwhelmingly positive” (Walsh, 2010).

Despite these findings, most of our interviewees prefer library notifications by email instead of text message. Most of these interviewees also had access to email on their phone, so emails and text messages were always accessible.

Some mentioned that text messages demand immediate attention, and they didn't find library notifications to be that urgent. One student noted that email is easier to organize: "I like email because it's easier to store emails and look at them later." Another student stated that she takes email more seriously than text messages.

Many indicated a strong inclination to maintain text message as a channel for personal communication rather than academic or professional. These findings were echoed in survey responses to the question "How do you generally like to receive information?" Email ranked quite highly for both communication with friends and notifications. On the other hand, text message ranked highly as a way to communicate with friends but much lower as a way to receive notifications.

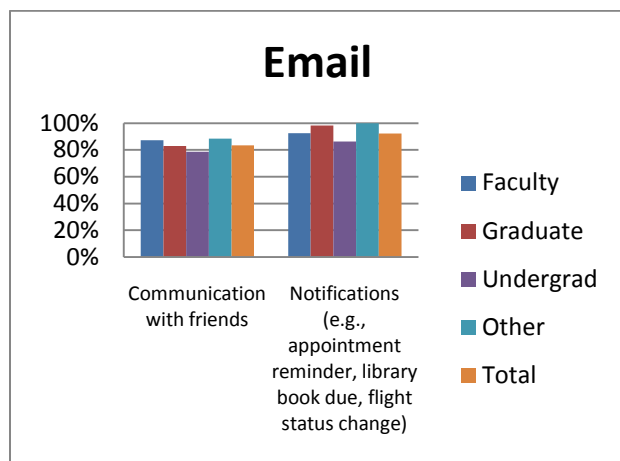


Figure 11 How do you generally like to receive information? (Select all that apply.) N= 259, 261

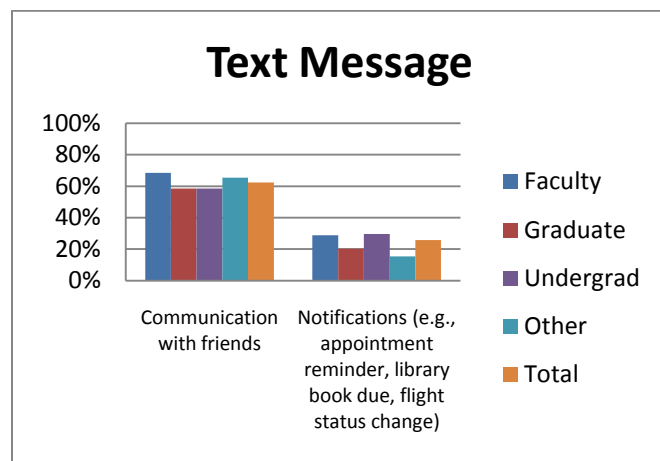


Figure 12 How do you generally like to receive information? (Select all that apply.) N= 259, 261

Some interviewees did note an interest in receiving notification by text message, particularly from those who do not use email on mobile devices. One undergraduate noted that she doesn't always check email during the day, so "if something were to happen during the day, I'd rather get it by text." A researcher who was a heavy user of request services who did not have email on her phone thought that notification by text message would be a better reminder. She found herself often forgetting what item she was going to the library to pick up because she requested so many materials and often has to pull out her laptop and login to email. Furthermore, about 25% of survey respondents noted that they do like notification by text message.

Takeaways:

- Many libraries are introducing services by text messaging, and there is general enthusiasm for this in the literature.
- Many interviewees were not interested in library notification by text message because they didn't think library notifications were urgent, email can be stored and organized better, emails are more serious, and they wanted to keep text messages as a channel for personal communication.
- Survey respondents also showed significantly less interest in notification by text message than email.
- A few interviewees and survey respondents were interested in notification by text message, especially those without email on their mobile devices.

CURRENT D&D SERVICES

USAGE

Accessing electronic licensed resources represents a significant portion of CDL service usage. Patrons search licensed resources for materials, and UC-eLinks enables patrons to access full-text versions of these resources.

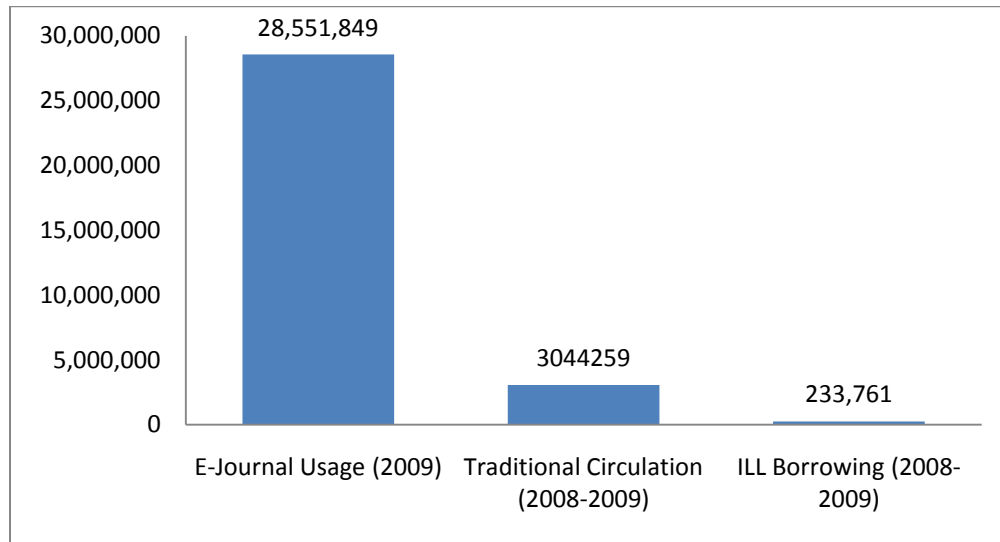


Figure 13 2008-2009 statistics are calendar-year based. Total ILL includes "returnables" (e.g., books) and "non-returnables" (e.g., scanned articles), borrowed from within UC and from other institutions.

D&D SERVICE ACCESS

Students and faculty can access licensed resources from a variety of entry points. D&D services often serve as bridges to and from third-party and vendor-provided content and tools.

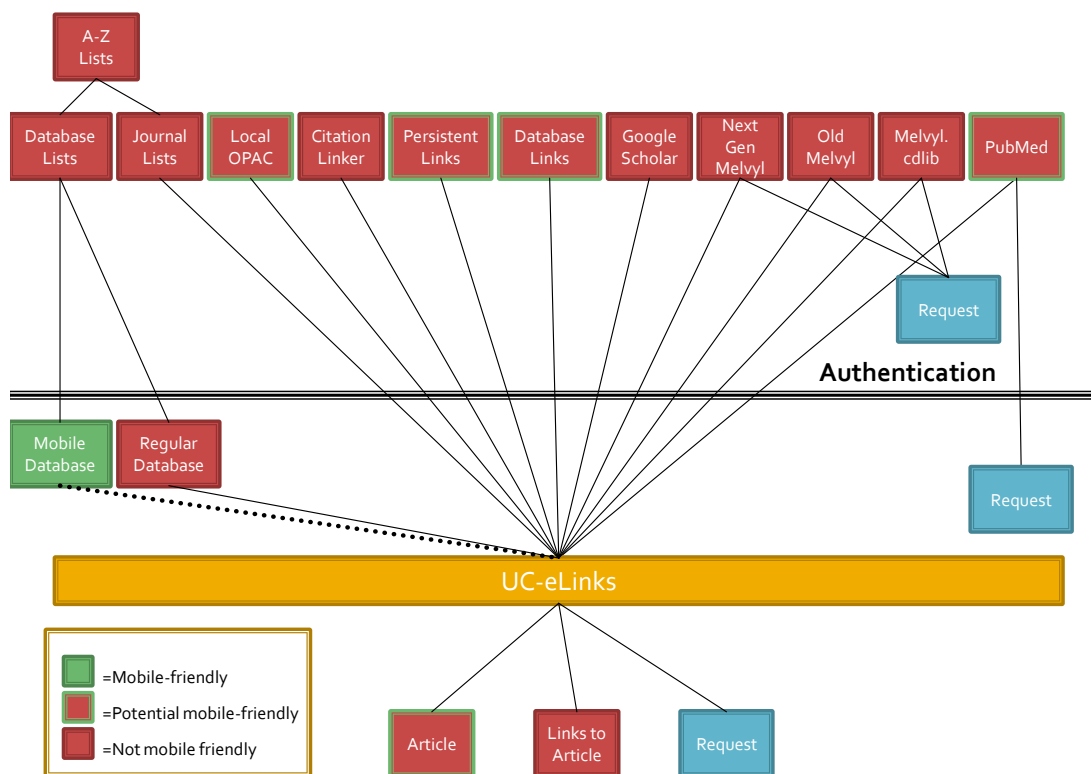


Figure 14 Chart depicting access points to UC-eLinks and Request

UC-ELINKS

UC-eLinks can be accessed through a variety of sources. All of these resources require some form of authentication in order to access UC-eLinks. Some of the resources will not allow unauthenticated users to even search; others will allow search but not access to the actual materials.

- 1) Campus A-Z lists
 - a. Database (campus managed)
 - b. Journal (UC-eLinks managed)
- 2) Local OPAC
- 3) Next Generation Melvyl
- 4) Persistent links
- 5) Direct to database by link or bookmark (not all databases allow bookmarking logged-in version)
- 6) Google Scholar
- 7) Citation Linker
- 8) Melvyl
- 9) Melvyl.cdlib.org

REQUEST

Request can be accessed through UC-eLinks, Worldcat Local/Next Generation Melvyl, Melvyl, Citation Linker, and PubMed. In addition to needing a PIN and account number to request interlibrary loan items, most methods for accessing the request form are through UC-eLinks and require authentication to use.

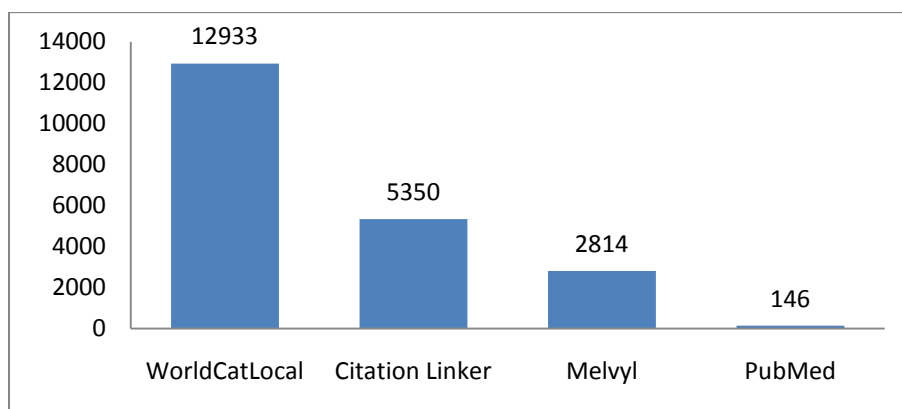


Figure 15 Data not available for UC-eLinks. Data from 7/1/10-7/31/10. Source: <http://www.cdlib.org/services/d2d/ill/request/stats/monthly/201007>

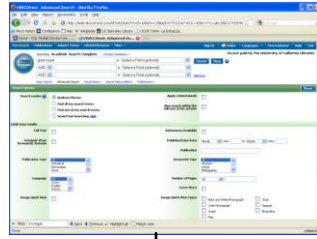
MOBILE ACCESS

Most access points to UC-eLinks and Request are not currently mobile-friendly, though there are some access points that are mobile friendly and some possible future mobile-friendly options. For example, OCLC has not created a mobile version of WorldCat Local, even though they have created a mobile version of WorldCat. Authentication is still an issue with accessing resources from even mobile-friendly sources.

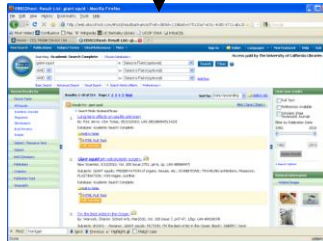
- Currently mobile-friendly
 - Mobile databases: Some mobile databases are available (such as EBSCO). CDL has activated a mobile version of EBSCO as a test case, though currently UC-eLinks has not been activated. PubMed also has a mobile version, but CDL has not activated this yet.
 - Database links: Some of these mobile databases may also be accessible by database links, though EBSCO is not a database that allows bookmarking of an authenticated URL.
- Possibly mobile-friendly
 - Some UC campuses are considering creating mobile OPACs in the future.
 - Some journals may have mobile-friendly versions of articles.
 - Some may access persistent links on mobile devices, such as in emails.

TRADITIONAL DATABASE AND UC-ELINKS DESKTOP WORKFLOW

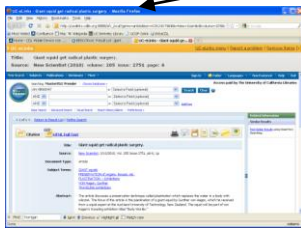
To break down the UC-eLinks/database/licensed resource relationship further, the following screenshots demonstrate how UC-eLinks functions as a bridge between vendor databases and licensed resources. A user accesses the authenticated database, searches the database, views the UC-eLinks button in either search results or within the result details (placement of the UC-eLinks buttons varies by database), and then clicks through to either the article, the menu with links to the article, or a menu with request information, depending on the electronic availability of the resource.



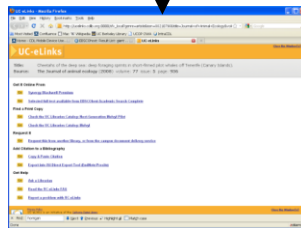
Search using EBSCO desktop version.



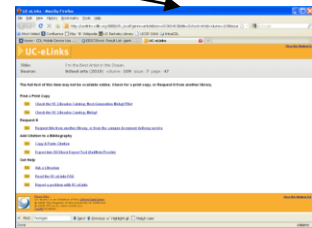
Search results in EBSCO desktop version.
UC-eLinks buttons visible.



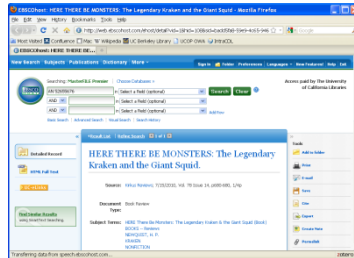
A) UC-eLinks button leads directly to electronic resource with UC-eLinks frame



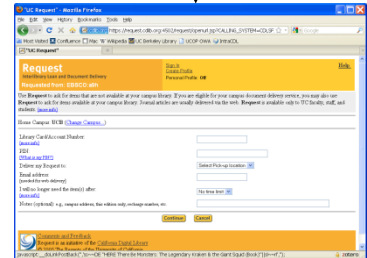
B) UC-eLinks button leads to menu with links to electronic resources



C) UC-eLinks button leads directly to menu with information on accessing print version



Click on a link to reach the full text.



Click on Request to request the print version.

CURRENT MOBILE DISPLAY

Currently UC-eLinks, Request, and Citation Linker work on some mobile devices (such as iPhone) when the user is a) using the regular (non-mobile) version of the resource and b) connected to the internet using the campus wireless system. Although this system works to some extent, using the regular versions of these are difficult to use and navigate. Furthermore, users frequently use cellular networks or other wireless networks to access the internet from mobile devices, which means these authenticated resources like UC-eLinks are not available.

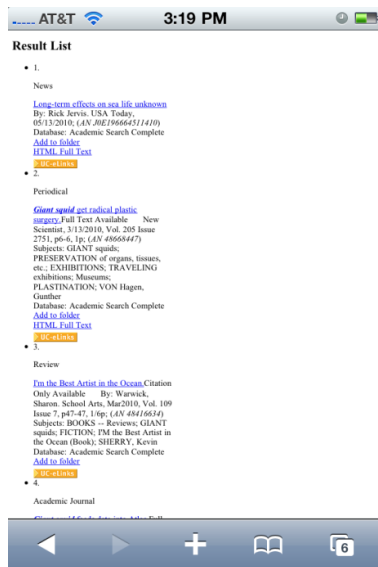


Figure 16 Using the regular version of EBSCO from an iPhone on campus network. UC-eLinks works, but the interface is hard to navigate



Figure 17 Using request from an iPhone on the campus network



Figure 18 Using citation linker from an iPhone on the campus network

D&D RECOMMENDATIONS

Some interviewees and survey respondents are interested in being able to access library databases and catalogs from mobile devices, as well as having the ability to request items from mobile devices. They are currently able to accomplish this to some extent on mobile devices like iPhones using desktop versions of these tools, but the experience is not ideal because of small interfaces and complicated navigation paths.

Despite this interest in using D&D products on mobile devices, it is difficult to create mobile-friendly tools because of the reliance and relationship between many D&D products and third-party tools and vendor-provided content. While there may be interest in a mobile version of Next Generation Melvyl, that development falls to OCLC. Even the option of adding a “text a call number” functionality within Next Generation Melvyl, though possibly desirable, falls outside of the direct control of D&D.

Two possible areas for D&D mobile projects, UC-eLinks and Request, are discussed in more detail below.

UC-ELINKS

UC-eLinks acts as the nexus to articles for many D&D services such as Citation Linker, Melvyl, and Next Generation Melvyl. While most of these services are not yet mobile-friendly, some mobile databases do exist. In order to actually be able to access resources from these mobile databases, UC-eLinks must be activated in each mobile database. It would be ideal to also have mobile version of UC-eLinks to make this experience more mobile-friendly and to emphasize mobile needs such as the ability to transfer search results. Steps toward making this happen are outlined below.

STEPS TOWARD USING MOBILE DATABASES WITH UC-ELINKS

1. **Configure web-based mobile licensed resources.** Holly is leading the effort to activate licensed mobile resources focusing on web-based resources (e.g. EBSCO, PubMed). EBSCO mobile databases have already been activated and can be accessed using a test username and password.
 - **Barriers:** Some resources are available as applications rather than web-based access (e.g. arXiview, Nature, Naxos Music Library). Some downsides to applications are:
 - Applications are device-specific. They only work on specific devices (generally iPhone).
 - Applications must be downloaded from an applications vendor (such as the iTunes app store) and the vendor often controls approval of the application and updates.
 - Some applications cost users money to download.
 - Applications change frequently.
 - Some applications require resource-intensive authentication methods (such as generating user-specific authentication codes).

Because of the limitations of applications, the current recommendation is to focus on web-based resources. If demand for particular applications increases, this plan should be re-evaluated.

2. **Activate UC-eLinks within mobile licensed resources.** Once licensed resource mobile tools have been activated, UC-eLinks also needs to be activated. This is currently the situation for the test login of EBSCO mobile databases. Even when accessing mobile EBSCO from an authenticated network, the UC-eLinks buttons are not available because this functionality has not been turned on.
 - **Barriers:** Undetermined. Each tool may have a different method for activating UC-eLinks and different ability to display UC-eLinks buttons.

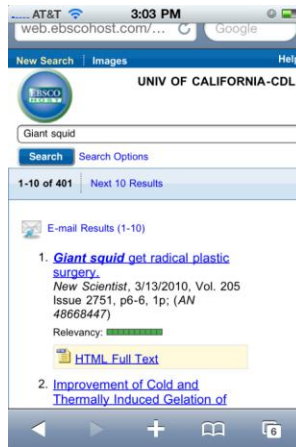


Figure 19 Test mobile version of EBSCO, without mobile UC-eLinks activated

3. **Track usage.** Track patron usage of current and mobile versions using web analytics. Determine what kinds of devices and browsers patrons are using to access licensed resources and UC-eLinks. Determine what items are used most frequently and what navigation paths mobile users follow.
 - **Barriers:** Margery has been able to gather some data about mobile device usage by analyzing server logs, though more robust web analytics tools may need to be implemented for further details.
4. **Inform campuses of availability of mobile tools and provide best practices for implementation.** Campuses are currently requesting best practice information regarding implementation of mobile licensed resources. Some campuses have already made mobile library sites (such as UC Irvine). Each campus will need to configure its own access to mobile tools, including figuring out authentication via various network configurations. Ideally resources should be accessible on campus wireless, off-campus wireless, and on cellular networks. Campuses that already use a rewrite proxy will be in a better position to provide mobile access, though mobile authentication may be possible using proxy or VPN systems as well. Campuses would likely benefit from best practices for each of these scenarios for each kind of authentication system. Licensed resources is pursuing some campus communication, so any campus communication efforts regarding mobile UC-eLinks should be coordinated with this effort.
 - **Barriers:** There will not be a one-size-fits-all solution. Campuses are taking different approaches to mobile library sites and will want to offer a variety of resources. Furthermore, each campus has different infrastructure for authentication. Creating clear routes to authentication will be a key factor in making mobile resources usable, so this is an important issue on which campuses may need guidance.

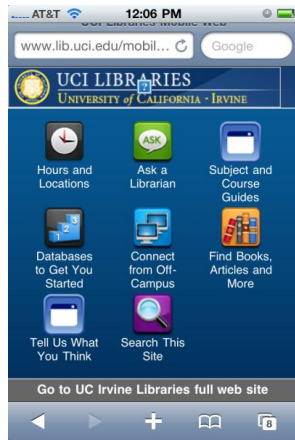


Figure 20 UC Irvine has a mobile library site

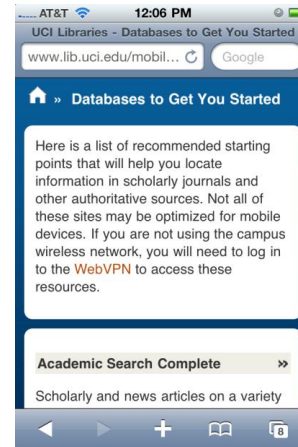


Figure 21 UC Irvine mobile library site links to select databases, though not the mobile versions of these databases. They provide instructions for rewrite proxy access.

5. **Design a UC-eLinks menu that is easy to use on mobile devices.** Although not absolutely required for using UC-eLinks on a mobile device, a mobile-optimized menu will improve the user experience. In addition to being sized appropriately for a small screen, the menu should take into account a mobile user's needs, such as making it simple to transfer information to another computer or device by email.
 - o **Barriers:** UC-eLinks infrastructure is not configured to recognize the user's devices. This would require major underlying system changes in order to enable this functionality. This may be out of D&D's control, so letting the vendor know that this functionality is desired may encourage this development.

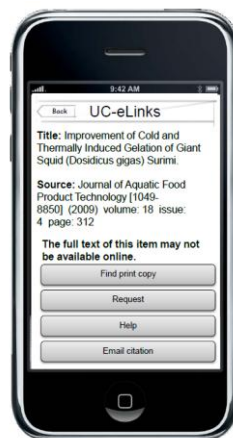


Figure 22 Sample design of a mobile UC-eLinks page for an item that is not available online. The "email citation" button makes it easy to transfer this information to another device.

6. **Link to mobile-accessible resources when possible.** The UC-eLinks menu should link to a complete list of resources but suggest mobile-friendly resources whenever possible. The menu page should indicate whether the resource is mobile friendly before the user clicks on a link.
 - o **Barriers:** URLs for mobile resources are different than traditional resources. UC-eLinks is not currently configured to display different URLs based on device, nor is it configured to indicate

whether the resource is mobile or non-mobile. Again, a vendor controls this infrastructure, so D&D may need to lobby for this functionality.

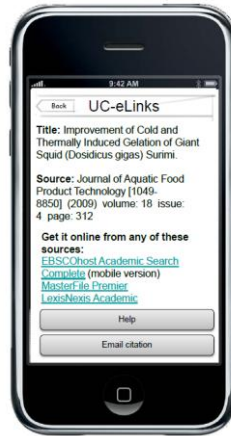


Figure 23 Sample design of a mobile UC-eLinks page for an item that is available online from mobile and non-mobile sources

7. **Test these tools and systems on a variety of devices.** The resources should be tested on major smartphone devices: iPhone, Blackberry, and Android. They should also be tested using a variety of network conditions: on campus networks, on other wireless networks, and on cellular networks.
 - **Barriers:** Various devices need to be obtained (and kept current with technology) for testing purposes. Devices should be able to access the internet both through a data plan (cellular network) and wireless networks. Although emulators exist for top platforms, they do not always represent true mobile experiences because emulator default settings are often different than those of real users. Furthermore, emulators cannot simulate using campus wireless systems (only cellular), so it is difficult to access resources that require authentication.

REQUEST

REQUESTING MATERIALS ON A MOBILE DEVICE

Another area in which D&D might be able to pursue mobile tools is Request. Though it would be ideal to have a mobile version of Request, most avenues to Request are not currently mobile friendly, including the UC-eLinks access points and menu. If more of these access points become mobile friendly, it would be ideal to create a mobile version of the request form.

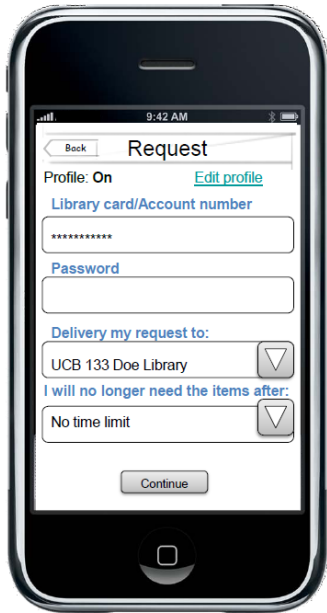


Figure 24 Sample design of a mobile-friendly request form

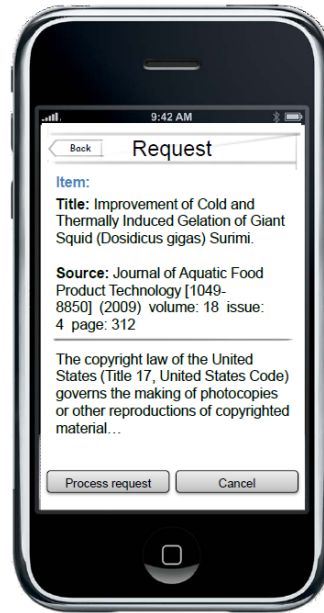


Figure 25 Sample design of a mobile request form, part 2

REQUEST NOTIFICATION AND TEXT MESSAGING

While it is an option to offer text message notification when requested items are available, our participants were not particularly enthusiastic about this feature. Some may use it, however, so if it is relatively easy to implement text message notification for request materials, provide this on opt-in basis in addition to email notification. This service would likely have low usage, so it should only be pursued if it is easy to implement and maintain.

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- Walsh, A. (2010). Mobile phone services and UK Higher Education students, what do they want from the library? *Library and Information Research*, 34(106), 22-36.
- Weimer, K. (2010). Text Messaging the Reference Desk: Using Upside Wireless' SMS-to-Email to Extend Reference Service. *The Reference Librarian*, 51(2), 108. doi:10.1080/02763870903579729