Abstract
Purpose – The purpose of this paper is to review one library’s experiences of creating mobile services and illustrate how, by developing expertise in emerging technologies, libraries can foster partnerships with other groups on campus and play a leading role in providing relevant student-centred services.

Design/methodology/approach – The paper begins with a brief summary of mobile services offered by the Ryerson Library prior to the fall of 2008, discusses the results of a mobile device survey conducted that semester, and outlines the resulting mobile services that were developed by the Library which led to a campus-wide collaboration to develop the framework for a student-led mobile initiative. The technical framework and project management issues are also discussed.

Findings – A survey performed by the Ryerson University Library in the fall of 2008 indicated that smart phones were owned by approximately 20 percent of the student population but that within the next three years this figure could reach as much as 80 percent. To remain relevant, it is important that libraries adapt their services to this new environment.

Practical implications – The paper illustrates how library services can be adapted to the mobile environment and how the library can play a role in broader campus mobile initiatives.

Originality/value – All libraries will be interested in exploring the library services that were developed and adapted for mobile devices and of particular interest to academic libraries will be the building of collaborative relationships with other academic departments to provide services to students.

Keywords Academic libraries, Mobile communication systems, Students, Information services

Paper type Conceptual paper

Introduction
The mobile revolution is upon us. For evidence one need look no further than any group of students on campus or any recent survey that reports on the pervasiveness of mobile devices. In 2009 the Horizon Report (Johnson et al., 2009), mobile devices are named as one of its top technology trends in the one year or less adoption category. Pew (Horrigan, 2008) reported that 58 percent of adult Americans have used a cell phone or personal digital assistant to perform at least one of ten mobile non-voice activities and Nielsen reported in July 2008 that the mobile internet had reached critical mass. More recently ECAR’s Study of Undergraduate Students and Information Technology (Smith et al., 2009) found that more than half (51.2 percent) of over 7,000 primarily US undergraduate students owned an internet-capable mobile device and a further 11.8 percent planned to purchase one in the next year.

How can libraries and universities capitalize on this trend to provide useful and relevant services that will both further the institutions’ goals and objectives and improve the students’ academic experience? While it is unlikely that mobile devices will become the platform of choice for a large number of scholarly research activities, (developing complex search strategies, consulting multiple documents simultaneously or analyzing large data sets), there are many services that can be adapted or created to
take advantage of devices that are always on, have a small screen and a challenging
input device, and are increasingly location aware.

In this paper, one university library's foray into providing services to mobile
devices is examined, an endeavor which ultimately resulted in it being a major
contributor to a broader university-wide mobile initiative.

Ryerson University
Ryerson University is a mid-sized urban university that is located at the core of
Canada's largest city, Toronto. From its roots as a polytechnic institute founded in the
1940s, the university has grown into a mid-sized comprehensive university with a wide
variety of programs including Journalism, Aerospace Engineering, Canada's largest
Business School and many programs that are unique in Canada such as Early
Childhood Education, Graphic Communications Management, Image Arts and Radio
and Television Arts. As of fall 2008 the student body numbered approximately 25,000
students including 1,950 Master's and PhD students.

The single-branch library has a relatively small collection of approximately 500,000
print titles, but has compensated for this limitation by investing heavily in an
extensive collection of electronic resources – over 90,000 e-books, 25,000 e-journal titles
and a wide variety of data sets. It has a staff of more than 85 including 28 librarians.

From the Library: introduction of mobile services
The Library's first mobile service was introduced in 2007. We wrote a JavaScript
program for our Innovative Interfaces catalogue that enabled users to text message the
title, call number and location of an item to themselves. This information could then be
consulted later in the stacks when the item was being located. This service was designed
at a time when the vast majority of students did not have access to an internet-capable
mobile device and took advantage of the text messaging function of regular cell phones.
In the fall of 2008 a fledgling mobile web site with modified versions of pages from our
main Library web site (hours, workshops, contact information, etc) was created. These
were our first attempts at providing services to mobile devices; however, before
allocating scarce resources to additional mobile development, we wanted a better idea of
what our students were doing with the technology.

There had been surveys of the usage of mobile devices in the broader population as
noted above, but did this translate to our students? As Char Booth notes in her
Informing Innovation report, there is a “necessity of local user research” (Booth, 2009).
To this end we decided to conduct a survey of our users.

Cell phone survey – Fall 2008
In November 2008, the Ryerson Library conducted a 12-question survey of mobile
device usage. This survey ran from Monday, November 3 until Friday, November 14.
Print surveys were available at the Circulation and Reference Desks on the main floor
of the Library, and a link to an online version of the survey was placed on the Library’s
home page. The main objectives were to find out what types of cell phones were in use,
what these devices were being used for, what services people wanted on their next
phone and what library services our users were interested in seeing. A draw for one of
two iPod nanos was used as an incentive for completing this survey. A total of 811
surveys were completed (106 in print and 705 online).
The survey indicated that approximately 20 percent of our student body had internet capable cell phones, a number similar to that reported by Pew in the USA (Horrigan, 2008). This gave us solid information about smartphone ownership at that moment, but because we were looking to the future, we wanted to get an idea as to what type of phones students would be purchasing once their current cell phone contract expired. Of the respondents who had thought about this, over half indicated that they would get an internet-capable smart phone. These results encouraged us to start adapting our services for mobile devices (Figure 1).

To get an idea of what library services might be desired, a question about mobile library services was included in the survey. A list of suggestions was provided in addition to space for respondents to contribute their own ideas. The top services requested were: booking group study rooms, checking hours and schedules, checking their borrower records and checking the catalogue. There were no wildly innovative suggestions for library services, but there was the sobering comment, “I would not use my cell phone to access the library. I already find that the library is not user friendly enough, being confined to a tiny box of text would only make matters much, much worse.” This reinforced the notion that we shouldn’t just be embracing technology for technology’s sake (Booth, 2009) and that we should also be committing resources to making our existing web-based services easier to use.

We decided to implement as many of the top requested library services as we reasonably could. The most requested service was a way to book group study rooms. This was not surprising as we already had an incredibly popular homegrown online room booking service that logged 17,062 bookings in the fall of 2008. This system was adapted for use on mobile devices and made available initially from the Library’s mobile web site and later from the campus mobile portal.

Our intent with the Hours and Schedules option was to refer students to Library hours of operation and schedules for drop-in workshops, but the popularity of this response seemed to indicate that the students wanted to consult their own schedules via their phones. Because the Library does not maintain students’ schedule, this was

![Figure 1. What type of phone will you get next?](source: From 2008 Survey)
not a service we could initially provide, but when planning started for the campus-wide Ryerson mobile project, this request was high on the list of priorities.

The next two most popular library services desired for mobile devices were the catalogue and borrower record options. Both of these were accomplished by purchasing a mobile version of our catalogue from our integrated library system. Currently this mobile catalogue is a basic text-based version of the catalogue designed for WAP browsers. An upgrade early in 2010 will include an iPhone version of the catalogue that we anticipate will be more popular.

Although not high on our respondents’ list of desired library services, we decided to implement a computer availability (laptop and desktop) service to provide real-time availability of the 100 laptops in the Library’s laptop loan program and of the desktop computers in the various labs in the Library. This information adapts well to access from a mobile device as it doesn’t require a lot of keyboard input to retrieve, it is time-sensitive, and it is the type of information needed by someone who is not currently using a desktop or laptop computer. Laptop availability was already being captured from an item record in our catalogue and repurposed on our website, so this was easily adapted for the mobile screen. As for desktop computers availability, our central computing service already had monitoring software for the Library’s and several other labs on campus which we were displaying on LCD panels in the Library. This was then optimized for mobile devices.

All these services were introduced in the winter term of 2009, the timing of which helped to solidify the Library’s position on campus as a leader in the development and deployment of mobile services.

To the campus – development of Ryerson mobile
In the winter months of 2009, the Library met with central computing to discuss the possibilities of creating mobile applications for the campus community. The Library’s survey results uncovered a need from the students to have relevant campus services available on their mobile devices. Unknown at the time, this was the birth of Ryerson mobile (Ryerson University, 2009b) (Figure 2).

As the project became more tangible, partnerships were forged between the Library and various departments and faculties across campus. Ryerson mobile has become one of the university’s better examples of the benefits of cross-campus collaborative initiatives.

Description of project
Ryerson mobile is a suite of applications that make students’ campus experience easier and more enjoyable. These two goals are accomplished by providing a way of accessing some campus services deemed important to the community, enriching the information with features that capitalize on user mobility and the capability of their mobile devices, and providing the content right to their fingertips. The applications are described in Figure 3.

The first stage of the project launched on Monday September 14, 2009 in line with Toronto’s inaugural Mobile Innovation Week, a series of events, workshops and symposiums showcasing global mobile development. The initial release contained seven mobile applications, one configuration profile and an about page expressing the goals of the project, a brief description of the applications and a feedback mechanism providing a way for users to comment on the project.
Campus collaboration

Ryerson mobile is a truly collaborative project, with many hands working in many capacities, bringing the most current, accurate and relevant information to students on their mobile device.

The key groups that have been involved in the project into the first stage of the project have been: the office of the President of the University, the Library, Computing and Communications Services, School of Management, and the Faculty of Engineering, Architecture and Science. The following outlines the key roles each collaborating group performed.

Library

Despite the fact that the majority of the applications developed for the Ryerson mobile project are not Library-centric, the Library was heavily involved in many aspects of the projects development; managing the project, writing the code, and coordinating the other operating units involved. There are a few reasons why the Library was so involved in the Ryerson mobile project:
<table>
<thead>
<tr>
<th><strong>Campus Directory</strong></th>
<th>allows users to look up Ryerson staff and faculty phone numbers, e-mail address and office locations.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class Schedule</strong></td>
<td>lets students view class information for the current and following semester. Schedules can be viewed by daily or weekly time periods or by course code.</td>
</tr>
<tr>
<td><strong>Campus Map</strong></td>
<td>shows the location of Ryerson buildings based on selections from a drop-down menu. This action places a push pin on the desired location and indicates the street address.</td>
</tr>
<tr>
<td><strong>Book a study room</strong></td>
<td>lets students search and reserve study rooms in the Library.</td>
</tr>
<tr>
<td><strong>Library</strong></td>
<td>provides patrons with the ability to search the mobile catalogue, place holds, renew books and check fines.</td>
</tr>
<tr>
<td><strong>Find a Computer</strong></td>
<td>shows real-time status of computers available in the Library and across campus. It also provides availability information of the laptops that students are able to borrow from the Library.</td>
</tr>
<tr>
<td><strong>News</strong></td>
<td>allows one to see the top news stories coming from various sources on campus including the Library’s own news feed.</td>
</tr>
<tr>
<td><strong>Profile Configuration Settings</strong></td>
<td>provides personalization options for users to customize their experience.</td>
</tr>
<tr>
<td><strong>About</strong></td>
<td>describes each application, shows who has been involved in the project and provides contact information to generate feedback about the project.</td>
</tr>
</tbody>
</table>

- We had already created mobile versions of some services: a mobile catalogue, a mobile study room reservation system and the ability to text message bibliographic information to their phone.
- The Library has always been service-oriented and had begun implementing student suggested services that were reported in the results of the mobile survey.
- Persistence of the Library’s technical team in developing innovative services and its excellent relationship with Computing and Communications Services.
All of these factors created the perfect atmosphere to spark the development of this mobile initiative and put the Library in a position of leadership for the project.

**Additional partners**
The Office of the President played an advisory role in the direction and focus of the project as well as relating Ryerson mobile to a larger, emerging technologies initiative called the Digital Media Zone (DMZ) (Ryerson University, 2009a).

Computing and Communications Services provided the technical infrastructure for the project and provided access to the data stores of user information all necessary to make Ryerson mobile useful. The programming staff provided view access to this information through various databases, web services and component files, assisting with the encryption process to maintain privacy of information during the transfer. The facilities group provided ongoing maintenance of the physical servers that the project is hosted on.

The School of Management, specifically the Students In Free Enterprise (SIFE Ryerson) group performed stakeholder analysis and user focus groups with various Ryerson student groups from across the faculties. SIFE Ryerson also led the marketing campaign, creating posters, flyers, and videos to publicizing the project.

The Ubiquitous Computing Lab, part of the Computer Science department in the Faculty of Engineering, Architecture and Science, provided advice regarding best practices in terms of the programming and systems architecture of the project based on their experiences developing large scale mobile applications.

**Technical framework**
A decision was made early into the project’s life cycle that there would be no native application development (i.e. creating applications specifically for one particular type of mobile device such as the iPhone) for a variety of reasons. First, the amount of resources required to write code for different mobile operating systems was too great. Second, the staff would need to develop expertise in the programming languages required to take advantage of the unique capabilities of each device. Third, the costs associated with licensing frameworks and development kits would be too great. Finally, not all mobile devices with Internet capabilities have the ability to install applications through an online application storefront.

We chose to create a web site accessible by any mobile device with Internet access that would allow the pages to render the content and associated graphics based on the capabilities of the mobile device’s browser. This device-agnostic approach allowed the developers to focus on one platform for delivering all of the services. Where one mobile device had greater capabilities than another, a simple UI customization could be applied based on information supplied by the device’s web browser.

**Varied viewing experience**
Three unique user interface templates were created for the project with varied level of graphical detail depending on the type of mobile device. The reason for implementing three was so that older model mobile devices would be able to render the basic information, while high-end mobile devices would be able to utilize their higher capabilities and render more visually appealing information. The browsers on newer higher-end mobile devices use WebKit, an open source web browser engine, to render web pages. WebKit enabled mobile devices benefit from being able to view the highest graphical version of the system as it supports JavaScript, Ajax and XHTML, which
through WiFi or on a 3G data network allow for faster throughput. Other mobile devices that are able to render graphics, but do not run WebKit, such as current model BlackBerry devices, will receive a viewing experience with a medium amount of graphics displayed. By default, if the user agent on ones mobile device browser does not detect a device with the ability to render graphics, a text version of Ryerson mobile complying with the WAP standards will be displayed for the user. This varied viewing experience allows any device with web access to have some level of usage with Ryerson mobile.

Network and security
The system runs in an N-Tiered client/server environment. A ColdFusion web application server handles the interaction from the mobile devices through their web browsers. The data for the system comes from a variety of sources, including an Oracle DBMS, SQL Server, and a few other web services invoked through SOAP connections.

Some of the applications within the suite require authentication to view sensitive information, such as class schedules and library borrowing records. We have implemented session management with verified user credentials through the campus Lightweight Directory Access Protocol (LDAP) server and encrypting all data interchanges between the user devices and the server.

Reversion control software (Subversion) was implemented for this project since the developers are distributed around campus, working for different departments. This code repository allows for the maintenance of a single, centralized code base for staff to share which minimizes errors associated with overwriting or reverting code changes and maximizing the programming collaboration efforts.

Pitfalls and emerging issues
The biggest issue encountered while developing Ryerson mobile concerns the wide spectrum of devices that are available and the inability to adequately test each one. The wide variation in screen resolution, browser configuration and scripting capabilities has made it impossible to create a streamlined experience for each device type. To account for this, we have tried to create custom interfaces that cater to devices with the widest market appeal on campus (in our case, iPhones and BlackBerry smartphones). Although we decided not to create native applications for each device, we did want to provide customization of the user interface. Even this was challenging as the wide variety of screen resolutions, browser configurations and scripting capabilities made it impossible to create a streamlined experience for each device. In the end we decided to cater to devices with the widest market appeal on campus (in our case, iPhones and Blackberry smartphones). Also, as we continue to promote the services around campus, we are asking for feedback regarding display issues or other user interface anomalies that our users are experiencing in the hopes of solving issues on each device on a case-by-case basis.

Assessment of mobile services usage
An important aspect of providing new services is the subsequent assessment and evaluation of their usage and effectiveness. Since introducing both the Library’s and Ryerson’s mobile services statistics have been gathered for many of the services. These statistics reveal that mobiles still represent a very small percentage of overall usage of Library services, but usage is increasing. Currently less than one percent of visits to the non-mobile version of Library’s home page and the Library’s catalogue are from mobile devices, but visits to the catalogue from iPhones have increased five fold between the
fall of 2008 and the fall of 2009. The study room booking service, which has a mobile
optimized interface, has a much higher mobile usage rate of 5 percent.

Since its inception in 2007, the text-messaging from the catalogue service, which
actually includes both text-messaging and emailing, has been used a total of 8,095 times;
on average 30 percent of these uses have been for text-messaging and 70 percent for
e-mailing. The rate of texting fluctuates from month to month with no clear trend that it
is increasing or decreasing. While unlimited texting is included in some plans, wireless
carriers in Canada impose charges on both sending and receiving text messages for those
consumers who do not have unlimited texting included in their plan. Text-messaging
from the catalogue might prove to be more popular if this were not the case.

Statistics for Ryerson mobile indicate that it has had 2,525 unique users to date,
representing approximately 10 percent of the total student population. The most
popular applications are Student Schedules (32 percent of usage), User Profile (16
percent of usage) and Study Room Booking (12 percent) (Figure 4).

Much of our statistics gathering is in its early stages as most of the services have
been available for less than a year, but we hope to build a solid baseline against which
we can measure future use. To further augment these statistics we decided to run a
second mobile device survey in November 2009.

Survey Fall 2009
This Fall’s survey was a few questions longer than the one run the previous year as the
focus was slightly different. Again we were interested in device ownership and usage, but
we also wanted some feedback on our existing mobile services. The 16-question survey,
which ran between November 3 and November 14, 2009, was available in print at the
Circulation and Reference Desk, online from the Library’s home page and it was featured
as a link in a campus-wide email newsletter. Again a draw for two iPod nanos was offered
as an incentive. In total 760 surveys were completed (32 in print and 728 online).

In 2008, 20 percent of respondents indicated that they owned a smart phone and
additional 9 percent said that they owned WiFi enabled PDAs; a year later the
percentage of respondents who owned an Internet-capable handheld device (smart phone
or WiFi enabled device such as an iPod Touch) had risen to 65 percent. Along with the
increase in ownership of internet capable device, there was a similar but slightly smaller
increase in the number of respondents who indicated that although they had internet
access, they chose not to use it – increasing from 11 percent in 2008 to 25 percent in 2009.
Although we did not ask specifically, in 2008 many students commented that the cost of

Figure 4.
Relative usage of Ryerson
mobile applications
(September 14-December 9,
2009)
access prevented their use of the internet. ECAR’s survey did pose the question and found that at 76 percent of those who had internet capabilities but chose not to use it cited cost as the primary factor. This finding seems to be backed up by the response we got to the question about the importance of free WiFi, to which 76 percent of respondents said that this was very important to them (Figure 5).

What mobile library services are being used?
Since we have been offering several mobile library services, we wanted to know which ones were being used. The responses to this question revealed a worrying fact: almost 60 percent of the survey respondents were unaware that the Library provided mobile services (despite the fact that the home page has had a prominent “Mobile Library” link since the beginning of the fall term). A significant portion (40 percent) of the respondents was also unaware of Ryerson mobile, a service that launched with an extensive advertising campaign and press coverage in the fall. Low usage of mobile services can, in part, be attributed to students’ ignorance of these services (Figure 6).
What is next for the Library?
In 2009 we again asked what library services the respondents would like to see available from mobile devices. The top four responses were (in order): searching for articles, reading eBooks, checking out books, and contacting a librarian/getting research help. Many of the “other” suggestions listed services that are already available on mobile devices such as renewing books, booking rooms, and putting holds on books. This suggests that one of our next priorities, before developing more mobile services should be to more aggressively market our existing services.

Two of the top suggestions for new services, mobile access to articles and eBooks are dependent in large part on the development by the vendors of this content. As with any mobile development, there seem to be two paths for that these vendors are following. Several vendors (e.g. Ebsco and IEEE Xplore) provide mobile versions of their article interfaces and other publishers (such as the American Institute of Physics) are creating native applications that are specific to a phone type. We plan to add links to and provide appropriate supplementary information about these resources as they become available.

The provision of mobile versions of eBooks represents a large challenge to academic libraries. Currently we are heavily invested in eBooks many with proprietary reader software that are optimized for desktop and laptop computers; these are not going to display well on the wide range of mobile devices owned by our users. A recent study at Yale University (Thomas, 2009) indicated that iPhones/iPod Touches were able to access 84 percent of Yale’s eBook titles from 25 different vendors, but that other dedicated eBook readers were only able to access 24 percent. Very few of our students will be impacted by the shortcomings of dedicated eBook readers in rendering our current selection of eBooks as only 2.6 percent of the respondents indicated that they owned such readers; however, iPhones and/or iPod Touches are owned by just over a third of our survey respondents. This leaves a large proportion of our student population who will have difficulties viewing these eBooks on mobile devices.

The next most requested new mobile service was Contacting a Librarian/Getting Research help. This needs to be explored further to determine how this is envisioned on a mobile device. Currently librarians may be reached by phone and via a chat reference service. Integrating a mobile component of these services would be a logical next step.

What’s next for Ryerson mobile?
The seven web applications that currently comprise Ryerson mobile are just the starting point in the types of services we want to make for our campus community. We are still in the process of promoting Ryerson mobile to our 26,000 students and hoping to generate interest from other operating units within the institution who would benefit from a presence on the mobile platform.

The next stage of this project is to create more applications for specific user groups on campus and to provide an application framework that will allow public connections to our web services. This will expose our data beyond our development team to the campus community to let potential developers take ownership of the project and create their own Ryerson mobile apps.

The creation of an application storefront will let these developers share their app with their fellow students, enhancing the quality and versatility of the project. By constructing an environment where collaboration and innovation are highly encouraged, the students (through re-purposing data and creating mash-ups) will be able to create truly imaginative applications that can directly benefit their peers.
Although there are many obstacles that will need to be tackled before we can get to this stage in the project’s lifeline, this is how we envision the future of the project.

**Conclusion**

Students are mobile and have expectations about the availability of university services while they are on the go. The Library and the University need to be cognizant of this and integrate mobile development into their strategic planning exercises. As the mobile marketplace is in constant flux, monitoring of these broad trends and augmenting this with local research is critically important as the mobile services that are popular one day may be irrelevant the next. Although the challenges of mobile devices – small screens, difficult to use input devices and data plan costs – tend to be at the forefront when considering mobile development, it is the devices’ other attributes – portability, convenience, built-in cameras and GPS capabilities – that will generate exciting possibilities for imaginative new services.

**References**


**Further reading**


Appendix 1

The Ryerson Library would like to start providing some of its services via cell phones and mobile devices. To help us with our planning we would like to know how you use and intend to use these devices. An online version of this survey is available at: www.ryerson.ca/library/msurvey/

1. Which of the following mobile devices do you own (check all that are applicable)?:
   - Smart phone (Blackberry, iPhone, HTC, etc.)
   - Cell Phone
   - iPod Touch
   - other iPod or MP3 player
   - None of the above (skip to question 6)

2. What do you currently use your mobile phone to do (check all that are applicable)?:
   - Communicate with friends and family
   - Browse the internet
   - Watch videos/TV programmes
   - Text/instant message
   - Send/receive e-mail
   - Listen to music
   - Take pictures
   - Record video clips
   - Play games
   - View maps
   - Other  Please specify ____________________________

   ____________________________

   ____________________________

3. If you currently have internet access via your phone, what do you use that access for?:
   ____________________________

   ____________________________

   ____________________________

4. When does your current phone contract expire?:
   - 2008
   - 2009
   - 2010
   - 2011
   - no plan

Figure A1.
Call phone/mobile internet device survey – 2008

(continued)
5. What type of phone will you be getting next?
   - Regular cell phone
   - Smartphone with internet access (for viewing YouTube videos, using Facebook, checking movie listings, etc.)
   - Haven't thought about it
   - Getting rid of phone
   - None of the above. So what are you doing? __________________________

6. Which services would you like to have on your phone that you don't currently have or would like to have if you had a phone (check all that are applicable)?:
   - Text-messaging
   - Web-access
   - E-mail
   - Music
   - Video
   - Camera
   - GPS/GIS
   - Happy with what I have
   - Other Please specify __________________________

7. Do you plan to purchase a non-phone mobile internet device such as an iPod Touch or PDA in the next year? Y __ N __

8. What Library services would you like to be able to access on your cell phone/mobile device? If you don’t have a phone, which do you think you would like?
   - Check borrower record for fines, to renew books, check holds
   - Read Library News
   - Read ebooks
   - Check out books from the Library
   - Check hours and schedules
   - Check catalogue for books, reserve items
   - Search for articles
   - Book a study room
   - Contact a Librarian/Get research help
   - Get directions
   - Other Please specify ____________

(continued) __________________________

Figure A1.
9. How often do you use the Library services via the web?
   - Daily
   - Weekly
   - Monthly
   - Rarely
   - Never

10. What is your status at Ryerson?
    - 1st year
    - 2nd year
    - 3rd year
    - 4th year
    - Graduate student
    - Continuing/Distance Education
    - Faculty/staff
    - Other Please specify: ______________________

11. How old are you?
    - under 20
    - 20-23
    - 24-29
    - 30-39
    - 40+

12. What gender are you? __________

Comments:

Figure A1.
Appendix 2

To help with planning services, the Ryerson Library would like to know how you use and intend to use handheld mobile devices. An online version of this survey is available at: www.ryerson.ca/library/m survey2009/ Participation is voluntary.

1. Do you own a handheld device that is capable of accessing the internet (whether or not you use that capability)? Examples of these devices include iPhone, BlackBerry, Palm Pre, other internet-capable cell phones, iPod Touch, PDA, etc.
   - No, and I don’t plan to buy one in the next 12 months (Go to question 12)
   - No, but I plan to get one in the next 12 months (Go to question 7)
   - Yes
   - Don’t know (Go to question 12)

2. What type of internet-capable handheld device do you own? (Check all that are applicable.)
   - iPhone
   - iPod Touch, PDA etc.
   - BlackBerry
   - Google Android phone (eg. HTC Dream, Magic)
   - Palm Pre
   - Nokia N or Samsung Smart Phone
   - Other Please specify ________________________

3. What do you use internet access on your handheld device to do? (Check all that are applicable.)
   - E-mail
   - Download videos
   - Get directions/maps
   - Facebook/Twitter updates
   - Check info (News, Weather, Sports scores, quick facts)
   - Stock quotes
   - Mobile banking/financial transactions
   - Browse internet
   - Play online games
   - Download e-books
   - Instant message
   - Don’t use internet access
   - Other Please specify ________________________

(continued)
4. In the next three years, I expect my use of the internet from a handheld device will:
   - Greatly decrease
   - Decrease
   - Stay the same
   - Increase
   - Greatly increase

5. How important is free wifi to you?
   Not Important  Very Important

6. What non-internet activities do you use your handheld device to do? (Check all that are applicable):
   - Talking to friends and family
   - Alarm clock
   - Calculator
   - Take photos
   - Text messaging
   - Listen to music
   - Watch video
   - Record video clips
   - Read books
   - Play games
   - Personal calendar/schedule
   - Other  Please specify __________________________

7. Which services would you like to have on your handheld device that you don’t currently have? (Check all that are applicable.)
   - Make phone calls
   - Text-messaging
   - Web-access
   - E-mail
   - Friend locator
   - GPS
   - Purchasing/credit card/financial transactions
   - Music
   - Video
   - Camera
   - Happy with what I have
   - Other  Please specify __________________________  (continued)
8. What Ryerson Library services do you currently use on your handheld device? (Check all that are applicable.)
   ○ Check borrower record for fines
   ○ Check Library hours
   ○ Check the catalogue for books, reserve readings, etc.
   ○ Book a study room
   ○ Check for available laptops and computers
   ○ Text message call numbers and locations from the catalogue
   ○ None of the above
   ○ I was unaware that the Library had mobile services

9. What other Library services would you like on your handheld device? (Check all that are applicable.)
   ○ Read ebooks
   ○ Search for articles
   ○ Contact a librarian/get research help
   ○ Check out books
   ○ Don't want library services on my handheld device
   ○ Other Please specify ____________________________

10. Have you used Ryerson mobile http://m.ryerson.ca?
    ○ Yes
    ○ No
    ○ Not aware of it

11. If you have used Ryerson mobile, what services would you like to see added?
    ____________________________

12. Do you own a dedicated e-book reader such as the Sony Reader?
    ○ Yes
    ○ No

13. Which of the following best describes you?:
    ○ I am sceptical of new technologies and use them only when I have to
    ○ I am usually one of the last people to know to use new technologies
    ○ I usually use new technologies when most people I know do
    ○ I like new technologies and use them before most people I know do
    ○ I love new technologies and am among the first to experiment with and use them

(continued)
14. What is your status at Ryerson?
   - 1st year
   - 2nd year
   - 3rd year
   - 4th year
   - Graduate student
   - Continuing Ed/Distance Ed student
   - Faculty/staff
   - Other  Please specify ____________________________

15. How old are you?
   - Under 20
   - 20-23
   - 24-29
   - 30-39
   - 40+

16. What gender are you? ____________

Other comments and suggestions:

---

**Figure A2.**

---

**Corresponding author**

Sally Wilson can be contacted at: swilson@ryerson.ca

---

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: [www.emeraldinsight.com/reprints](http://www.emeraldinsight.com/reprints)