

Purdue University  
**Purdue e-Pubs**

---

Charleston Library Conference

---

## Libraries Respond to Mobile Ubiquity: Research and Assessment of Mobile Device Usage Trends for Academic and Medical Libraries

Megan M. Hurst

*EBSCO Discovery Software, EBSCO Information Services, mhurst@ebSCO.com*

Eleanor I. Cook

*East Carolina University, cooke@ecu.edu*

J. Michael Lindsay

*University of Tennessee Graduate School of Medicine, jmlindsay@mc.utmck.edu*

Martha F. Earl

*University of Tennessee Graduate School of Medicine, mearl@mc.utmck.edu*

Follow this and additional works at: <https://docs.lib.purdue.edu/charleston>



Part of the [Communication Technology and New Media Commons](#), [Graphics and Human Computer Interfaces Commons](#), [Health Information Technology Commons](#), [Instructional Media Design Commons](#), [Library and Information Science Commons](#), and the [Medical Education Commons](#)

An indexed, print copy of the Proceedings is also available for purchase at:

<http://www.thepress.purdue.edu/series/charleston>.

You may also be interested in the new series, Charleston Insights in Library, Archival, and Information Sciences. Find out more at: <http://www.thepress.purdue.edu/series/charleston-insights-library-archival-and-information-sciences>.

---

Megan M. Hurst, Eleanor I. Cook, J. Michael Lindsay, and Martha F. Earl, "Libraries Respond to Mobile Ubiquity: Research and Assessment of Mobile Device Usage Trends for Academic and Medical Libraries" (2013). *Proceedings of the Charleston Library Conference*.  
<http://dx.doi.org/10.5703/1288284315270>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact [epubs@purdue.edu](mailto:epubs@purdue.edu) for additional information.

# Libraries Respond to Mobile Ubiquity: Research and Assessment of Mobile Device Usage Trends for Academic and Medical Libraries

*Megan M. Hurst, Senior Product Manager, EBSCO Discovery Software Services, EBSCO Information Services*

*Eleanor I. Cook, Assistant Director for Discovery and Technology Services, Joyner Library, East Carolina University*

*J. Michael Lindsay, Serials/E-Resources, Preston Medical Library, University of Tennessee Graduate School of Medicine*

*Martha F. Earl, Assistant Director, Preston Medical Library, University of Tennessee Graduate School of Medicine*

## Abstract

The authors consider trends in mobile device usage for the Internet as a whole, for EBSCO Discovery Service across all client libraries, and at two specific libraries: Preston Medical Library, serving the University of Tennessee (UT) Graduate School of Medicine and UT Medical Center, and the Joyner Library at East Carolina University, serving students and faculty on the main campus. Librarians at Preston Medical Library conducted a survey to determine which mobile devices, platforms, and apps were used by their patrons in 2012. East Carolina University piloted an iPad and e-reader lending program in 2010–2011. The results of each are being used to guide service planning related to mobile applications, education, and support.

## Institutions Represented

*EBSCO Discovery Service, EBSCO Information Services*

*EBSCO Discovery Service™ (EDS)* is a unified platform used by libraries globally to access subject indexes, full text and libraries' catalogs, and collections within a customizable discovery layer experience. For the purposes of this article, EDS provides a unique view into mobile usage trends across a very large data set of libraries from January 2012 to October 2013.

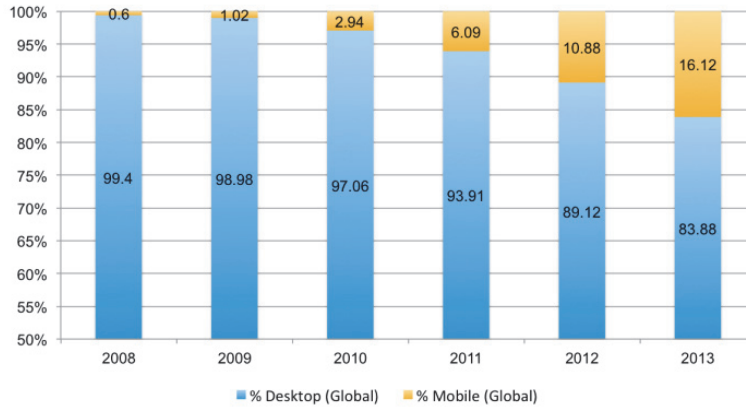
*East Carolina University*

East Carolina University is a public doctoral degree-granting institution with a medical and dental school and is the third largest university in the University of North Carolina (UNC) system (more than 26,000 students). There are a wide variety of academic programs with strengths in education (historically, ECU began as a teacher's college), marine history and sciences (coastal

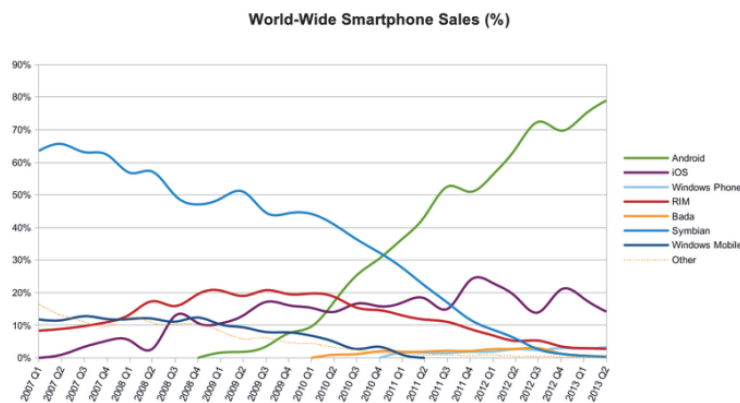
region is nearby), and strong fine arts departments. ECU is the only research institution east of I-95 and serves as an anchor for communities in that region through strong distance education services. Because ECU has been a pioneer in distance education, the institution expects faculty and staff to adopt new technologies early; a willingness to try experiment is definitely part of the culture.

*University of Tennessee*

The University of Tennessee Medical Center (UTMC) is an academic medical center located in Knoxville, Tennessee. UTMC is a 581-bed teaching hospital, a Level 1 Trauma Center, and, additionally, an ANCC Magnet certified hospital. The University of Tennessee Graduate School of Medicine is housed within the medical center, with 218 physician faculty providing training for 206 medical residents. Preston Medical Library, with five professional librarians, three professional staff, and six student assistants serves both the hospital and the residency



**Figure 1. Computers Versus Mobile Internet Traffic, 2008–2013**



**Figure 2. Worldwide Smartphone Sales by Operating System, Q1 2007–Q2 2013.**  
 Source: Based on Gartner Actuals, 14 August 2013, by Wikimedia User, Smartmo

programs. In recent years, this has meant providing access to information sources and research services not only to medical residents, but providing access to CINAHL for nurses and consumer health information to patients and their family members. Librarians serve on the speakers bureau for the medical center and perform other outreach activities; the library has served this community since 1956.

### Mobile Ubiquity and Open Web Trends

During the presentation of the data from this article at the 2013 Charleston Conference, audience members were asked how many personal computing devices they had with them. The majority of the audience had at least three devices with them, which illustrates the ubiquity of portable computing in our lives today and implies a certain complexity around how and why we use mobile devices. Internet traffic data

further underscores the growing prevalence of mobile device usage—mobile traffic globally has grown from 0.6% in 2008 to 16.12% in October 2013, as seen in Figure 1 (Global Web Stats, 2013).

As device types and device makers proliferate, the mobile landscape shifts. The Android operating system has an increasingly dominant market share, as shown in Figure 2 (Wikimedia user Smartmo, 2013), but there is a larger story to tell than this graph reveals. Researchers are beginning to more deeply understand the wide variances in our usage behaviors across device types broadly classified as “mobile” and “web-enabled.” Consumer-research agencies have begun to segment Internet usage by persona types, for example, finding distinctly quantifiable differences between their proportion of iPhone to iPad usage (Flurry, 2013). According to one such agency, across all personas, iPhone usage breaks at just over 70% of total iPhone and iPad usage, and iPad

usage at just under 30%. However, for the persona type “Bookworm,” their iPad usage is markedly higher, at approximately 45% (Gordon, 2013).

Hurst’s contextual inquiry and interview with one multidevice user reveals some of the complex factors influencing which devices we use, how frequently we use them, where we use them, and what specific tasks or activities we use them for. The user studied could be described as a “critical adopter” who often waits for mobile devices to “work out the bugs” before he purchases them. What is particularly interesting about this user is the number of mobile devices that he owns (a total of nine devices, including smartphones, e-readers, and tablets), his understanding of the

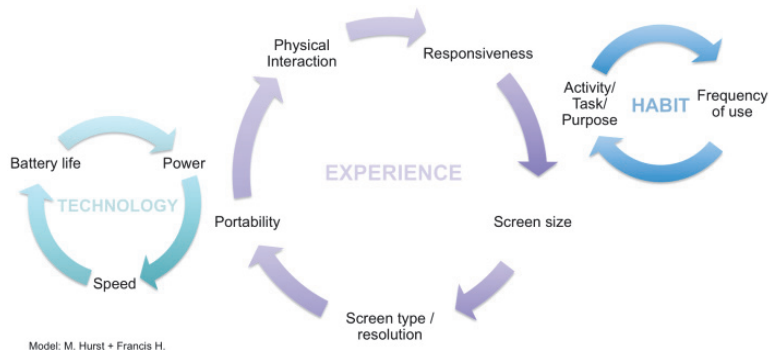
technical components of the devices, his eloquence at describing the benefits and shortcomings of each device, and how these factors influence how and why he uses each device. Videos of these interviews are available online (<https://drive.google.com/file/d/0ByPdbgp-TaT5WGdrUTNfdzNKcFk/edit?usp=sharing> and <https://drive.google.com/file/d/0ByPdbgp-TaT5SIYwLWJ6SXhyclE/edit?usp=sharing>).

After several interviews, Hurst and the user (identified as “Francis H.”) together developed a basic model for the interrelationships between technologies, user experience, and how users form habits for conducting specific tasks/activities on specific mobile devices (Figure 3).

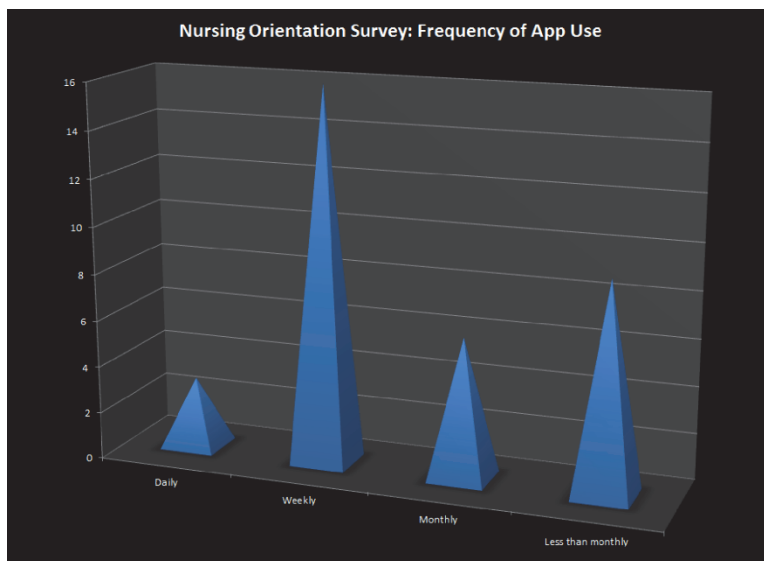
Device	Year Bought	Type	Use Frequency	Primary uses	Location of Use
Motorola Phone*	~2006	Smartphone	365 days/year	Voice communication / text messaging	Everywhere
Kindle Keyboard	~2009	E-reader	12 days/year	Reading books and technical reference	At desk at work, at home
Kindle DX	~2010	E-reader	3 days/year	Reading books	At home
Kindle Fire	~2011	E-reader/ Tablet	10 days/year and declining	Watching old TV shows / backup for iPad when recharging	At home, In bed
iPad (Gen 3)*	~2012	Tablet	365 days/year	“Do everything” / Web browsing / e-mail / photos / color magazines	At desk at work, at home
Kindle Paper White*	2013	E-reader	24 days/year	Reading and technical reference	At desk at work, at home
iPhone 5*	2013	Smartphone	365 days/year	Web browsing/text messaging/voice communications	Everywhere
Kindle Fire HDX	Nov 2013	Tablet	TBD	Web browsing, Magazines, TV Shows, TBD	TBD
iPad Mini	Nov 2013	Tablet	TBD	TBD	TBD

\* Devices that user carries daily

**Table 1. Summary of Critical Adopter/Multidevice User’s Usage. Source: Megan Hurst, November 2013**



**Figure 3. Technology Influences Form Factor and Responsiveness (User Experience), Which Influences Task Adoption and Frequency of Use. Concept by M. Hurst and Francis H.**



**Figure 4. All Mobile Device Sessions as a % of Total EBSCO Discovery Service Sessions, January 2012–October 2013.**

While these data provide an intricate understanding of one user's behaviors across multiple device types, what is currently known about mobile usage as it relates specifically to libraries?

### Implications for Libraries

In 2012, 53% of Americans, ages 16-plus, visited a library or bookmobile, 25% visited a library web site and 13% used a smartphone or tablet to do so. Among 18–49 year olds, that percentage is significantly higher at 18% (Rainie, 2012). While it is impossible to relate such self-reported usage statistics to actual Internet and library mobile usage data, these statistics are not surprisingly far off for total mobile traffic (10.88%) as a

percentage of total global Internet traffic globally in 2012 (Figure 1).

Of the 25% of Americans that visited a library web site (Zikuhr, 2013):

- 82% searched the catalog for books (includes audio- and e-books), CDs, and DVDs
- 72% got basic library hours, locations, directions
- 62% reserved books,\*CDs, and DVDs
- 51% used an online database
- 51% renewed a book, DVD, or CD
- 44% got help with research or homework

- 30% read book reviews or recommendations
- 30% checked or paid fines
- 22% borrowed or downloaded an e-book

It would be very interesting to know, of the above library user activities, what percentage are performed on mobile devices. We urge researchers to dive more deeply into these questions.

### *EBSCO Discovery Service Mobile Statistics 2012–2013*

Another view into mobile usage of libraries is available through statistics gathered for EDS sessions between January 2012 and October 2012. These statistics do not segment usage by type of library (e.g., academic, public, K–12, medical, corporate); however, at least half of the usage for the period is from academic libraries worldwide. Mobile sessions as a percentage of total EDS sessions have more than tripled between January 2012 and September 2013.

Additionally, more than 4,000 distinct mobile device types initiated sessions on the EDS platform during the same period. Of these, an astounding 76% were Apple devices, with 56% being iPads, 19% being iPhones, and 1% being iPod Touches. A distant second was Samsung brand devices (both phones and tablets), accounting for less than 8% of sessions. All other makers and device types accounted for the remaining 16% of mobile sessions. HTC and LG tied for the third most popular device makers with just over 1% of total mobile sessions each.

EDS has confronted the need to serve this growing mobile population of library users by examining the user experience for the top device brands and types and tailoring the EDS default user experience to each. For the 56% of incoming mobile traffic that initiates sessions from iPads, due to the high screen resolution and touchscreen responsiveness of these devices, users are directed to the standard EDS web site, which presents well and is highly usable on these devices. All users of the standard EDS web site, including these iPad users, can easily access the mobile web site (which has been

tailored with the core functionality for mobile devices that are smaller or with lower screen resolutions and touchscreen responsiveness) via a “Mobile Site” link in the footer of every page on the EDS platform. Non-iPad users on mobile devices are autodirected to the mobile EDS web site, and similarly, can access the standard EDS web site through a “Full Site” link in the footer of every page.

As this landscape evolves annually, if not daily, EBSCO continues to monitor and research how best to support people using library services from diverse mobile devices. We will now look at East Carolina University for a view into one academic library’s accommodations for mobile device users.

## **East Carolina University’s Mobile Trends**

### *Mobile Device Adoption*

Joyner Library instituted a program of circulating e-readers in 2010–2011 and iPads followed shortly thereafter. An article in *North Carolina Libraries* describes this program in detail (Barricella, 2012).

### *Bringing This Up to Date*

As of November 2013, e-readers are still circulating, but their popularity has waned a bit. Six Kindles were replaced with new versions in 2012 and there are three Nook Color readers along with the six original Nook Touch devices that were purchased. The Nook Colors continue to circulate, but the older Nooks will be taken offline once they fail and will not be replaced. Popular reading materials is the most prevalent content purchased for both types of e-readers. Other purchases include the freshman summer reading titles for the past 3 years and a few other specialized educational titles obtained at special request from faculty or students.

iPads circulated to campus users for 2 years, but the older models were taken offline once newer versions became available. Older models then were redeployed as “hand-me-downs” for library faculty and staff to use for work purposes in lieu of or in addition to laptops. At present, 20 people are using these hand-me-downs and an additional 13 are

utilizing more recent models. A few have opted for an iPad in lieu of a travel laptop.

In summer 2013, the most recent models of circulating iPads were redeployed to be utilized in a newly designed instruction room in the library since the iPad circulation figures had dropped. There are currently 20 iPad 3s and 10 iPad 4s in the classroom. They are easier to maintain than laptops or desktops, and the library saved money since no new computers had to be bought for this classroom. The use of the iPads in the instruction room will be monitored to see how effective this decision has been.

The Joyner Library IT Operations department head is currently conducting an informal survey of library staff and faculty to see how they are using their iPads and also is asking about how they use cell phones and other mobile devices. At some point, a wider survey of campus users may be conducted, but in order to do that, IRB clearance will be needed and additional care with the survey design will be required.

Here are a few academic library trends drawn from the literature and from local anecdotal reports:

- Multiplatform use is still in flux. Laptops, tablets, and smartphones are used for different applications across all campus personas.
- Comfort level with e-book formats is increasing.
- Word processing and spreadsheet applications are still not considered usable on small-screen devices.
- Hand-held, head down texting is rampant among student populations, leading to many consequences, some which are quite dangerous. According to a study at Ohio State University, pedestrian use of mobile devices has skyrocketed along with injuries due to this increasing habit. (Nasar, 2013 )

### *Mobile Versus Portable*

There is an important distinction between these concepts. It is possible to enjoy the convenience

of simple portability with a variety of devices, but true mobility is only achieved when one has access to all files and applications through all devices without the complication of syncing. Cloud computing, ubiquitous, high-performance wireless access, contextual mobile applications, and unified communication standards will make true mobility possible.

This shift away from portability to true mobility will be the biggest technology change to hit organizations since the birth of the Internet.

To prepare for this shift, IT leaders should start thinking “mobile-first.” Instead of designing a traditional application and then creating a version that is mobile, consider how the application would work if the uniquely mobile capabilities could be harnessed to their full potential. This is the start of delivering a workplace that’s mobile and not portable” (Kerravala, 2013).

In the future, within the university context as well as in the broader consumer environment, it will be imperative to develop responsive approaches to web page design so that users of all types can expect to access content fully, no matter the size of device being used.

### **Health Sciences App Usage Surveys in University of Tennessee’s Medical Library**

At the 2011 Charleston Conference, there were several mentions of a report by Mary Meeker, then of Morgan Stanley Research, in which she predicted that within 5 years (by early 2014), the global numbers of mobile Internet users would exceed the number of desktop Internet users (S. D. Mary Meeker, Liang Wu, 2010). Whether this prediction holds true for the global market or not, this has already happened in China, according to an updated report from Ms. Meeker (L. W. Mary Meeker, 2013).

The implications for libraries of these trends, while less murky now than they were even a short time ago, still hold a certain amount of uncertainty. While it seems safe to say for now

that most serious research is done from a desktop computer, libraries still must go to where our users are to continue to be of use to them. On a daily basis, librarians see residents, nurses, and other health professionals using smartphones, and carrying tablets with them, and became intrigued as to how these technologies fit in with their work. It was with this trend of increased mobile use in mind that the library began investigating mobile device use, with the major goals of investigating health-related mobile app usage by our patrons and to determine the impact of the library's training initiatives in this area.

Prior to beginning this investigation, the library had assembled information on a number of mobile device resources, eventually developing a LibGuide focused on providing mobile access to major library subscriptions. Since beginning our research on mobile device use, these resources have been incorporated into library training sessions for health professionals and students. In addition, information on mobile devices has been expanded to include guidance on finding high quality health-related mobile apps for the general public. This was developed into a class that the library presented as part of outreach efforts to professional and consumer groups. While most training sessions were provided by the librarians, in some cases, vendor representatives were available to provide training to library patrons on using subscription databases on a mobile device.

The library has long provided orientation training for incoming residents, of which there are generally around 60 each year. Librarians also have provided orientation training to new nurses; the hospital generally hires 40 new nurses each month. In

addition, librarians occasionally provide training to members of the general public through outreach activities, some of which are organized through the hospital's Network Development office as part of their speaker's bureau. All of these training classes provided opportunities to survey our primary patron groups regarding their mobile device use and preferences. These surveys were not designed to meet the rigors of scientific research or to be representative statistically, but offered librarians with a way of knowing users better and knowledge that would be used to improve the services the library offers. It is also important to note that the library's approach did not require librarians to make significant changes to workflow; there were already surveys in place for the incoming residents and new nurses. Librarians simply needed to add a few questions to existing surveys to begin to learn a great deal about user preferences.

#### *Medical Residents*

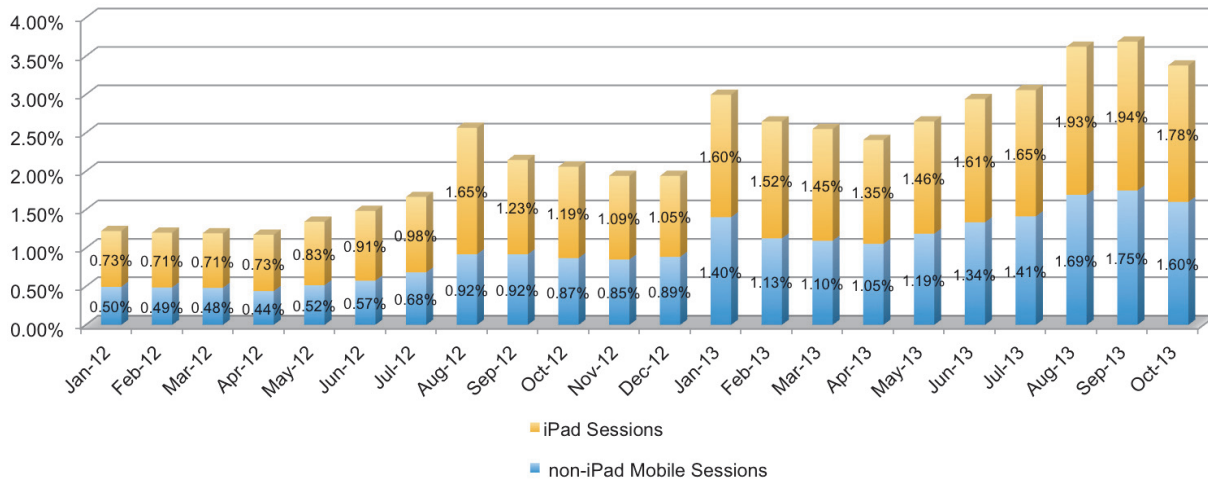
In 2012, the library added four new questions to the Incoming Residents Survey. Incoming residents were asked: (1) Do you use mobile medical apps?, (2) What are your favorites?, (3) What platform do you use?, (4) What kind of device do you use?

Out of a total of 56 new residents in 2012, 51 reported being app users, while 5 reported they did not use apps. In 2013, more residents reported being mobile app users; out of a total of 57 residents, 53 reported being app users. Mobile app users increased, and the number of nonusers decreased. When asked their favorites, residents consistently reported using drug databases (Epocrates and Micromedex), point-of-care tools (UpToDate, Dynamed), and medical calculators (MedCalc).

	2012	2013
Epocrates	38	33
Medscape	14	17
MedCalc	14	5
UpToDate	8	3
Micromedex	5	4
Dynamed	4	3
SkyScape	4	2

**Table 2. Favorite Apps: Medical Residents**





**Figure 5. Favorite Devices: Incoming Residents 2012 and 2013**

2012–2013	
Micromedex	23
WebMD	19
epocrates	19
Medscape	14
Itriage	9
Baby Center	3
CINAHL	3

**Table 3. Favorite Apps for Nurses, 2012–2013**

While both Epocrates and UpToDate were consistently popular, Medscape, a medical news and updates site, was the only app that increased in popularity from one year to the next. This would seem to suggest that there is a lot of volatility in the apps that are popular among the hospital’s residents. This makes sense given the variety of choices that smartphone users have, and in particular Apple iOS users, some reports show the total number of active apps in the App Store as just shy of 1 million (Scott, 2013). In terms of favored platforms, the results were clear in both years that Apple iOS is the strongest platform for medical residents, and it keeps getting stronger. Android runs a distant second, staying flat from 2012 to 2013 with at best one-fourth the number of Apple users. Windows and Blackberry were only barely visible in the surveys, there were two Windows Phone users in 2012, and zero in 2013, while there was a single Blackberry user in each of the 2012 and 2013 incoming resident classes.

The popularity of the iPhone is clearly visible in the chart of survey results for favored devices. There were 40 iPhone users in both the 2012 and 2013 classes, making it by far the most popular smartphone. A particularly interesting development from the 2013 surveys was the surge in iPad users. iPad users nearly doubled from 2012 to 2013.

In terms of explaining the popularity of Apple’s smartphones and tablets with resident physicians, some of it is clearly due to the amount and quality of apps that are available. Some residents have even reported that while being Android users currently, they knew that they would need to switch to the iPhone as they progress in their resident program. Further, some faculty members are beginning to use iPads at UTM, in some cases distributing iPads that are preloaded with recommended apps for medical residents. Another possible contributor to the trend of increasing iPad use is the fact that Apple’s tablet is making its way into the literature of medical resident education

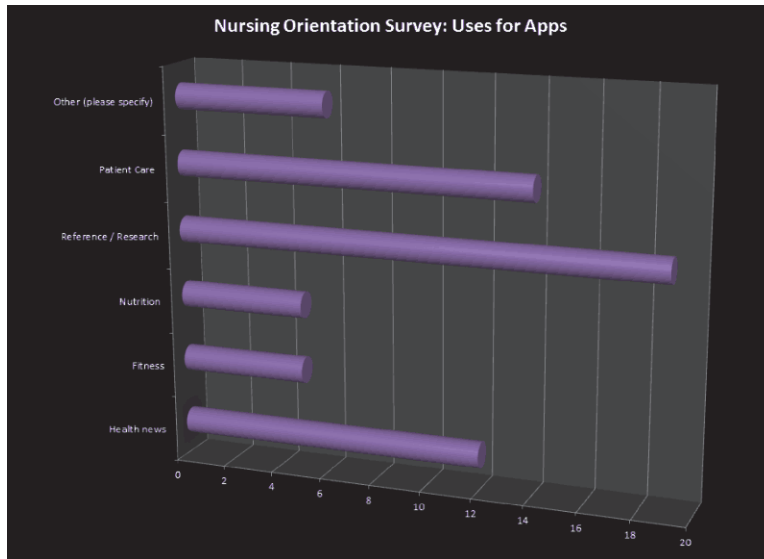


Figure 6. Nursing Orientation Survey: Device Ownership

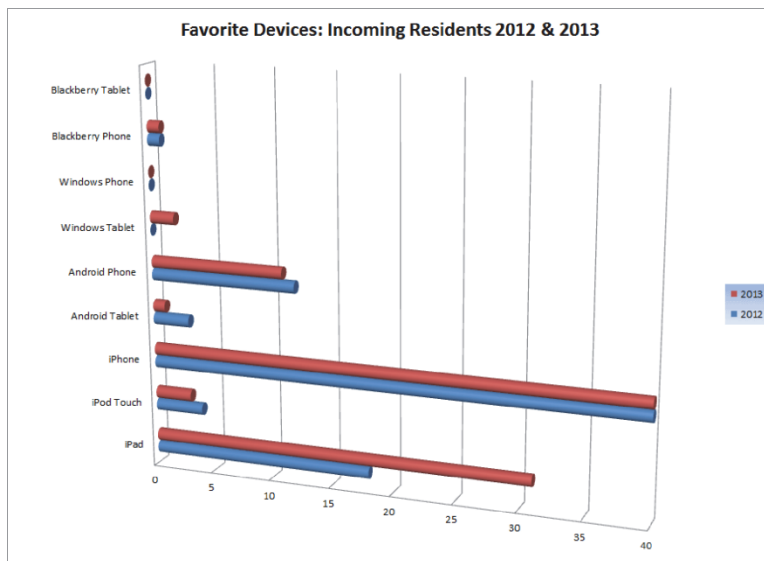


Figure 7. Nursing Orientation Survey: Sources of Apps

(Korbage & Bedi, 2012). Librarians are just beginning to scratch the surface on an exciting trend.

### Nursing Orientations

The library began surveying nurses in July 2012; the survey in use at that time was a short, Likert scale instructor evaluation form. The sole modification made was to request the nurses to provide any health-related mobile apps that they use, particularly if those apps were used at work. This was a good way to begin to quickly and easily gather data on the preferences of UTMC's new nurses.

Drug resources, including Micromedex and ePocrates, popular with physicians are also very popular with nurses. General health references, such as WebMD and medical news services, like MedScape, are also not surprising to find in nurses' lists of favorite apps. However, the popularity of an app like iTriage was an interesting find. iTriage includes drug information, a symptom checker, and has some basic diagnostic functions, in addition to helping patients to find doctors and medical facilities. The download screen for this app indicates that it was designed by two Emergency Room physicians. Other interesting apps mentioned by nurses include those designed

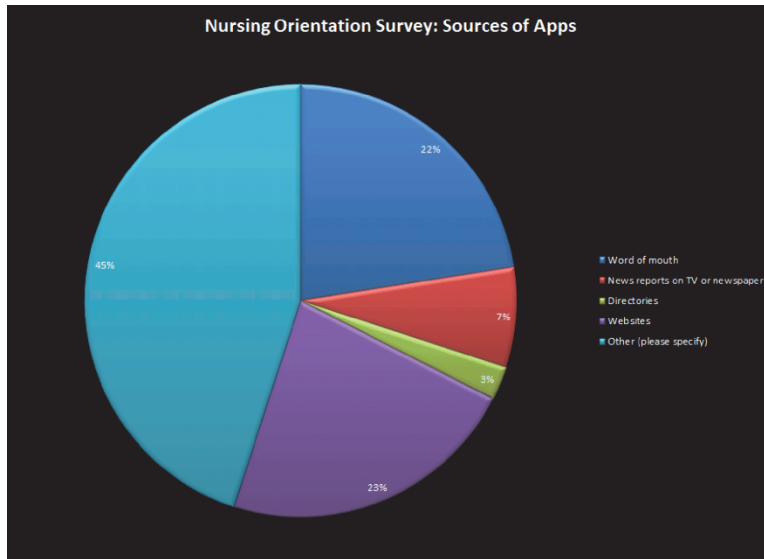


Figure 8. Nursing Orientation Survey: Frequency of App Use

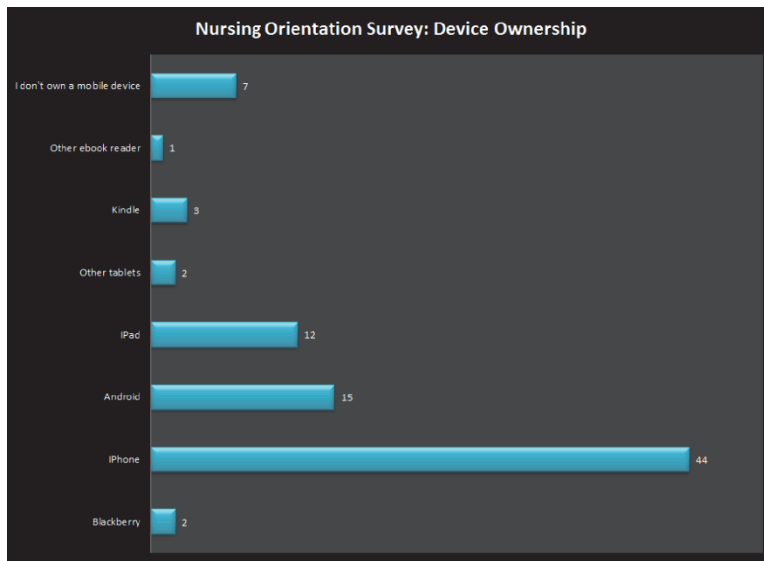


Figure 9. Nursing Orientation Survey: Favorite Uses for Apps 2012 and 2013

to provide information resources for expectant mothers. Apps in this category are Baby Bump and Baby Center. It is also becoming clearer that iPhones and iPads are becoming useful additions to the nurse's toolkit; more than one mention was made of drip timers for IV drugs.

In the past 5 months, the library has redesigned the nursing orientation survey using SurveyMonkey. This provided librarians with an opportunity to re-examine what the survey was intended to accomplish; to really begin to get at answers to our questions. In addition to asking about favorite health-related apps, the survey also

asks: (1) "Do you have a mobile device, and if so, what kind?"; (2) "How did you find these apps?"; (3) "How frequently do you use these apps?"; and (4) "For what purposes have you found these apps to be useful for?"

As with the medical residents, the iPhone has been consistently the most popular smartphone, with most respondents reporting owning one.

However, in terms of mobile devices as a whole, nurses' second favorite mobile device was the Android phone, running just slightly ahead of the iPad. Amazon's Kindle and other tablets took fourth and fifth places in popularity, respectively.

These patterns have continued to hold true in the most recent survey results.

Significant nurses found their favorite apps through web sites they frequented or through word of mouth. Building free text fields into the survey turned out to be fortuitous for librarians researching app use, as the vast majority of nurse respondents chose “other” as their favored source for mobile apps. This category encompassed, in order of preference, the App Store, School, Professors, Search, and some even discovered apps by accident! The answers “school” and “professors” are particularly interesting, as these show that mobile devices and apps are really becoming accepted, not simply as toys or utilities, but as tools for learning and work.

The next question, regarding frequency of app use, was also very interesting; app users reported using their favorite apps at least once per week. This indicates that, for many, mobile device use and apps are a part of a regular routine.

An area of particular curiosity for our researchers was in regard to how nurses used mobile apps.

Librarians were excited to learn that the top two categories that nurses used mobile apps for were for Reference and Research and for Patient Care. Both of these uses clearly indicate a role for librarians, in suggesting research sources and reliable point-of-care databases that are accessible on mobile devices.

### Results

Librarians at UTMC are already responding to these trends by producing research guides for finding and evaluating mobile apps and through outreach, education, and liaison activities. A dedicated research guide to resources for mobile devices continues to be updated, and consumer health apps have been added to the library’s consumer health research guide. Results from librarians’ research into user preferences are now included in research guides for nursing and for the various residency programs so that incoming nurses and residents can benefit from what their peers are using. Clearly, more research is needed in this area, as user preferences continue to change and technology to develop.

### References

- Barricella, L., Cook, E., James, R., Mayo, J., Sanders, M., & Scott, R. (2012). E-book readers come to Eastern North Carolina. *North Carolina Libraries*, 70(2), 1421. Retrieved from <http://www.ncl.ecu.edu/index.php/NCL/article/viewFile/353/442>
- Flurry. (n.d.). *Flurry Personas*. Retrieved from <http://www.flurry.com/flurry-personas.html>
- Gordon, M. E. (2013, August 16). *The who, what, and when of iPhone and iPad usage*. Retrieved from <http://blog.flurry.com/bid/99859/The-Who-What-and-When-of-iPhone-and-iPad-Usage>
- Kerravala, Z. (2013, June 7). Mobile vs. portable and the changing nature of the office. *NetworkWorld*. Retrieved from <http://www.networkworld.com/community/blog/mobile-vs-portable-and-changing-nature-office>
- Korbage, A. C., & Bedi, H. S. (2012). The iPad in radiology resident education. *Journal of the American College of Radiology*, 9(10), 759–760. <http://dx.doi.org/10.1016/j.jacr.2012.05.006>
- Meeker, M., Devitt, S., Wu, L. (2010, April 12). Internet trends [Presentation]. Retrieved from <http://www.scribd.com/doc/29850507/internet-trends-mary-meeker-04-12-2010>
- Meeker, M., & Wu, L. (2013, May 29). *Internet trends: D11 conference* [Presentation]. Retrieved from <http://www.slideshare.net/kleinerperkins/kpcb-internet-trends-2013>

- Nasar, J. L., & Troyer, D. (2013, August). Pedestrian injuries due to mobile phone use in public places. *Accident Analysis and Prevention*, 57, 91–95. <http://dx.doi.org/10.1016/j.aap.2013.03.021>
- Rainie, L., Zickuhr, K., & Duggan, M. (2012, December 31). *Mobile connections to libraries*. Retrieved from <http://libraries.pewinternet.org/2012/12/31/mobile-connections-to-libraries/>
- Scott, J. (2013). *App store metrics*. Retrieved from <http://148apps.biz/app-store-metrics/>
- StatCounter. (2013). *StatCounter global stats: Comparison from 2010 to 2013*. Retrieved from [http://gs.statcounter.com/#mobile\\_vs\\_desktop-ww-yearly-2008-2013](http://gs.statcounter.com/#mobile_vs_desktop-ww-yearly-2008-2013)
- Wikimedia user, Smartmo. (2013, August 14). *World Wide smartphone sales share* [Graphic]. Retrieved from [http://en.wikipedia.org/w/index.php?title=File%3AWorld\\_Wide\\_Smartphone\\_Sales\\_Share.png](http://en.wikipedia.org/w/index.php?title=File%3AWorld_Wide_Smartphone_Sales_Share.png)
- Zickuhr, K., Rainie, L., & Purcell, K. (2013, January 22). Library services in the digital age. *Pew Research Center's Internet and American Life Project*. Retrieved from [http://libraries.pewinternet.org/files/legacy-pdf/PIP\\_Library%20services\\_Report.pdf](http://libraries.pewinternet.org/files/legacy-pdf/PIP_Library%20services_Report.pdf)