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Medical Education and Mobile Technology: The Next 100 Years

By **Stephanie C. Kerns** (Head of Outreach and Education/Curriculum Librarian, Northwestern University, Galter Health Sciences Library) <skerns@northwestern.edu>

Introduction

Mobile technology encompasses many things in the world of medical education and clinical services in healthcare. In the past 15 years several advances in the technology have allowed for the current state we find ourselves in — patrons desiring more and more apps for their smartphones and tablets and some companies providing business models that allow for libraries to provide quality sources to our patrons.

Our users are getting more sophisticated in what they want in all formats, and they view the mobile platform as simply one more area where they do their work. It is not a different element for them; it is just an extension for their workflow. Sometimes they are on a computer researching in the journal literature. Other times they are on the hospital floors seeing patients and using a smartphone to look up a lab value, or in classrooms or meetings, using an iPad to access information or take notes.

The Technology

Technology has evolved significantly since the first PDAs or handhelds hit the market in the mid-1990s. Initially the **Palm Pilot** and the **Pocket PC** were the two devices available to the student or physician who wanted to access information on the go. The devices themselves were clunky. For example, with the **Palm**, you had to learn a special alphabet called Graffiti if you wanted to write your own notes. Neither device had much memory available for the operating system and the applications you needed to install, and synching content was often problematic.

Fast forward to today, when many elements have fallen into place that make the current times a boon for libraries and our patrons. The changes in technology have made it easier to use the devices available fitting the variety of needs that students and clinicians have. The predominant devices used by our patrons are smartphones. They no longer carry a separate device requiring them to keep track of and manage multiple things, which was a barrier to all but the most dedicated to carrying the latest gadget. The **iPhone** has become a favorite since it was introduced in 2007. Because of its power and usability (essentially it was a portable computer that could also be used as a phone), people bought it in record numbers. Other companies started copying the user interface; a new era in mobile technology started happening. Because a single operating system began to dominate the market, software developers began creating apps for the **iPhone/iPod OS (iOS)** at a fast pace. In late 2008, the first **Android** device was released, and developers started creating apps for that OS, although at a slower pace. There are many devices and operating systems out there, but these are the pri-

mary ones that have spurred the development of healthcare apps because of the convenience of having primary functions in one device. The newest device that is continuing this trend is the **iPad**. Released in 2010, its dominance in the tablet market has continued the trend for developers to concentrate on the **iOS** market, especially in the healthcare market.

Issues in Medical Education

Like changes in technology, there are changes happening in medical education. Currently there is a call for reform based on the publishing of *Educating Physicians: A Call for Reform of Medical School and Residency*.¹ Sometimes this book is referred to as “the revised *Flexner Report*.” The book calls for sweeping reforms in medical education, similarly to how **Flexner** did 100 years ago. The *Flexner Report* was published in 1910 under the title *Medical Education in the United States and Canada*,² although it became known simply as the *Flexner Report*. **Abraham Flexner**, a secondary schoolteacher, at the request of the **Carnegie Foundation** under the direction of the Council on Medical Education (CME), a newly created division of the **AMA**, visited all of the 155 medical schools that existed in the United States at that time. The purpose of the study was to survey all of these medical schools to determine the state of their educational principles and to promote the reform ideas that the CME had for medical education in this country. At the end of his survey, **Mr. Flexner** published his report, and it became the basis for drastic changes in American medical education. This reform led to what is considered normal for medical education today — two years basic science, or preclinical, education, and two years clinical rotations with patients.

Now, also under the auspices of the **Carnegie Foundation**, in 2010 **Molly Cooke**, et al. are calling for various reforms. One major reform is a financial one, that medical schools and teaching hospitals be transparent about their funding and support the teaching missions of their schools by providing this much-needed financial support among other things. This is appropriate to collecting mobile technology, as well as all library collections, because our missions and collections support the patient care and clinical education in the schools of which we are a part.

Kinds of Information Needed

Mobile technology, no matter the platform, can allow students and faculty to do a wide array of things related to the classroom and patient care. In their lectures, students can access that day’s lecture notes from the course management system in order to take their own personal notes on them. At the **Feinberg School of Medicine at Northwestern University**, the courses that teach some of their classes in a lecture-based format also use audience

response system clickers as a way to enhance the interactivity of the lectures. Some of these systems also have apps available for smartphones that students can download and use in class. These systems allow students to respond to questions posed within a **PowerPoint** presentation given by a faculty member, but they can also be used for quizzes and taking attendance.

For studying, students need to access many different kinds of information, and the mobile platform is ideal for this. Anatomy is a cornerstone of the first year curriculum at every medical school, and **Netter’s**,³ a mainstay of the anatomy atlases, has several versions of apps available. Most are in flashcard form, specifically designed for students to study before tests or before procedures. Another type of information need all students have is that for laboratory tests. In the preclinical arena, when students are learning about what each lab test means or when to use it, finding this in an app is simple. When the student is seeing a patient in a clinical context, they can easily look up a lab test to find information relevant to their context in a way that is not intrusive to the patient interaction.

In the clinical realm is where mobility really shines. There are mobile apps for things like drug guides, electronic books, calculators, clinical decision support tools, practice guidelines, medical dictionaries, and learning procedure videos. Doctors, whether in practice or in training, use mobile apps as part of their every day routine when they are available to them. Even in a clinical environment where computers are readily available because electronic medical records are used, it is often easier to use a smartphone to look up a lab value or to determine the proper dosage for a medication.

The beauty of the mobile platform is the organization of the real estate on the screen. Developers are forced to be economical with how they use a small screen, and this actually helps in displaying certain kinds of information, particularly that needed in the clinical realm. Things like drug information, lab tests, and dictionaries are ideal for this format. Even when the information contained within them is lengthy, it is all organized with the same subject headings, so it can be parsed out for display very nicely in a mobile format.

Issues for Libraries

At the **Galter Library** we consistently get requests for mobile materials to support these activities. We, like all libraries, face several issues in dealing with these requests. Perhaps the biggest is financial. These mobile apps, regardless of the platform, are not inexpensive.

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The mobile marketplace is designed for the individual purchaser, and most companies treat these downloads in the same way, even if the library is purchasing it for the end user. There are two models for libraries to purchase mobile downloads at this time. One is an add-on to a Web product that the library has already purchased, where the end user downloads the app to their mobile device. The other is where the library specifically purchases the mobile products for the end user. The add-on model is acceptable provided what you want on your handheld is part of the library's Web collections. It is not acceptable if you simply want the mobile product and the publisher is trying to make you buy something you don't want to get something you do. Nor is it acceptable if you don't want the mobile product and the publisher charges you for it anyway.

The preferred model is the one where we purchase individual titles in mobile format, treating those titles just as we would any other title. This gives us greater control over our collections, allowing us to respond to user needs, and permitting us to control costs as much as possible. These titles are just like any others, and it's best if publishers treat them as such. As with any collection, we want to be able to control what we offer to our users, respond to what they ask for, what is required in the curriculum or in our particular clinical specialty treatment areas, and respond to our particular technology environment.

The other key issue when it comes to purchasing by libraries is to have site licensing available. Most of these apps are marketed to individuals and are available for purchase individually. Very few companies who do sell to libraries change their business model to adjust for our needs to control costs and to easily manage user subscribers by providing site licensing. At the **Galter Library** we can only consider titles we can purchase in this way because we cannot maintain individual user logins that would be required without IP authentication. For budget purposes we cannot consider titles that are priced by individual download. With that model, we cannot control for costs since we don't know how many people will choose to download an individual title. Because this is not how any other electronic title is priced, it doesn't make sense to do it for a mobile title simply because of the platform. The technology is available to allow for IP authentication and site-licensed pricing, so more publishers should allow libraries to do this with their purchases.

Another issue involving these titles is accessibility. Some publishers put the content of the

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BORN AND LIVED: Originally from Indiana, I've lived in Washington, DC, California, and Illinois.

PROFESSIONAL CAREER AND ACTIVITIES: I've been in medical and science libraries my whole career, primarily as in reference and teaching roles.

HOW/WHERE DO I SEE THE INDUSTRY IN FIVE YEARS: In five years I think the industry will continue moving more toward electronic content with the silos for format not mattering as much as it does now. I think the market will adjust to the technology needs of our users, and there will be more alignment within our environment. Mobility will become more the norm in healthcare, and libraries will respond to that need with the appropriate collections. 🌱

app on the device itself, which means the user can access the content no matter where they are. This is appealing because many hospitals have restrictions on their wireless networks, and 3G networks are often inaccessible. The downside of this is that the content can take up a lot of memory, limiting how many apps a user can potentially download. And if they are putting this on a smartphone with other objects like audio and video competing for that memory, it may not be the optimal situation. Therefore, some publishers keep the information content in the cloud. The app is installed on the device, but to access the information, the user must have an active wireless or cellular connection. This can be good in that it allows for more apps to be installed on one device, but as pointed out above, many hospitals restrict access to their wireless networks.

Deciding on the best way to support these titles is also an important consideration for any library. Most universities have departments to provide technical support, but when providing these kinds of titles, you should be prepared to answer specific questions about the kinds of mobile operating systems your users may have. We have found that the generic questions like those about connecting to the university wireless network can easily be passed on to the technical support department. But we answer the questions specific to downloading the software we purchased and how that is done. This requires

that that at least some reference staff be familiar with some of the more popular mobile operating systems. This has not been a problem since we all use smartphones in our own lives, and learning how to use the mobile software we purchased was just like learning how to use any other resource we buy for our users.

Conclusion

Constant changes with mobile technology are allowing our library to become more relevant to our users' lives by bringing resources to where they need them — at the bedside and in the classroom. Reform in medical education will hopefully make the needed funding available for this and other library collections as well. If more publishers are willing to work with the mobile platform, and make that content available on a site-licensed basis, we would be better able to support our users with the resources they need in the format they want. 🌱

Endnotes

1. **Cooke, Molly Irby David M., and Bridget C. O'Brien.** *Educating Physicians: A Call for Reform of Medical School and Residency*. 1st ed. The Preparation for the Professions Series; the Jossey-Bass Higher and Adult Education Series; Variation: Preparation for the Professions Series.; Jossey-Bass Higher and Adult Education Series. San Francisco, CA: Jossey-Bass, 2010.
2. **Flexner, Abraham.** *Medical Education in the United States and Canada Bulletin Number Four (the Flexner Report)*. Boston: Merrymount Press, 1910. <http://www.carnegiefoundation.org/publications/medical-education-united-states-and-canada-bulletin-number-four-flexner-report-0>.
3. **Netter, Frank H.** *Atlas of Human Anatomy*. 1 vols. 5th ed. Philadelphia, PA: Saunders/Elsevier, 2010.

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corporate purposes including the reduction of debt levels in line with the company's stated objectives and investments in the business." <http://www.bookbusinessmag.com/photo/springer-logo>

Hope y'all will read the interview with **Springer's Thijs Willems, Wouter van der Velde, Jennifer Kemp** in this issue, p.47. As we all know, **ProQuest** has reorganized into six business units focused on specific customer needs. There are a lot of people we know in leadership positions. One of my all-time favorites
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