Technical Note

General pathologist-helper: The new medical app about general pathology

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Abstract

Introduction: Smartphone applications (apps) have become increasingly prevalent in medicine. Due to most pathologists, pathology trainees, technicians, and medical students use smartphones, apps can be a different way for general pathology education. “General pathologist-helper (GP-HELPER)” is a novel app developed as a reference tool in general pathology and especially for general pathologists, developed for Android and iOS platforms. Materials and Methods: “GP-HELPER,” was created using Mobincube website platform. This tool also integrates “FORUM GP-HELPER,” an external website created using Miarroba website (http://forum-gp-helper.mboards.com) and “COMMUNITY GP-HELPER” a multichannel chat created using Chatango website platform. Results: The application was released in July 2015, and it is been periodically updated since then. The app has permanent information (offline data) about different pathology protocols (TNM latest edition, protocols regarding management of tumors of unknown primary origin, and flowcharts for some of the most difficult tumors to diagnose) and a database with more than 5000 immunohistochemistry results from different tumors. Online data have links to more than 1100 reference pathology video lectures, 250 antibodies information, more than 70 pathology association websites, 46 pathology providers, and 78 outstanding pathology journal websites. Besides this information, the app has two interactive places such as “FORUM GP-HELPER” and “COMMUNITY GP-HELPER” that let users to stay in touch everywhere and every time. Expert consult section is also available. Conclusions: “GP-HELPER” pretends to integrate offline and online data about pathology with two interactive external places in order to represent a reference tool for general pathologists and associate members.

Key words: Application, cell phone, digital pathology, pathology, smartphone, tablet

INTRODUCTION

Mobile applications (commonly referred to as apps) are designed for mobile devices such as smartphones and tablets. Today, devices with faster processors, smaller batteries, improved memory, and highly efficient operating systems are capable to process many different advanced functions, especially apps, which currently affects our personal and work environments. In
medicine, from patient monitoring and diagnostics to more efficient medical education and communication, smartphones serve a pivotal role in the practice of medicine today.\textsuperscript{[2]} Furthermore, the Food and Drug Administration estimates 500 million smartphone users worldwide will use a health care app by 2015.\textsuperscript{[3]} Medical apps usually include education, consultation, and reference tools and can be focused in many different medical specialties such as family medicine, dermatology, cardiology, and surgery.\textsuperscript{[4‑7]}

Pathology education has been traditionally done with stored glass slide sets, textbooks, and journals. However, increasing the number of specific online material such as video lectures, pathology journals, and reference textbooks, all together with the always difficult to use glass slide teaching sets because of some usual problems such as haphazardly organized, occupy workspace, faded stains, and broken slides makes apps a very straightforward way for learning and being up to date in pathology.

The main benefits of developing a smartphone application that organize pathology online information is to offer an interactive reference resource with the potential to be viewed anywhere at any time. In this light, apps are by definition a reference resource that includes practical portability, widespread accessibility, and useful organization.

Until date, there are few number of smartphone pathology-related applications available, and most of them are focused on dermatopathology.\textsuperscript{[8]} The goal of this article is to relay the benefits of “General Pathologist-Helper (GP-HELPER),” in creating a reference tool for general pathologists and associate members.

MATERIALS AND METHODS

Application Development
The aim of developing the application was to organize online pathology material in order to be user-friendly, comprehensive, timesaver and an interactive resource for pathologists, a pathologist in training, technicians, and medical students. The app was designed for Android and iOS devices (a superior bar was included with a specific navigation system). In addition, app appearance was customized using pink and violet colors as H & E staining.

The app’s data required an active, hard-working online search looking forward to finding the best pathology information available. Credibility and the accuracy of contents from every website included in the app are constantly evaluated by users, experts and the creator of the app. Offline data were obtained from different reference pathology textbooks. Support information such as contact details of the creator and manager director are shown when touching logotype bars.

In summary, the app has permanent information (offline data) about different pathology protocols (TNM latest edition, protocols regarding management of tumors of unknown primary origin, and flowcharts for some of the most difficult tumors to diagnose) and a database with more than 5000 immunohistochemistry results from different tumors. Online material shows more than 1100 links to free available pathology videos from YouTube website; about 250 links regarding information about the most important antibodies managed in Pathology Departments; more than 70 websites about pathology and cytology societies; 46 websites about different pathology providers; more than 75 links to the most outstanding International Journals of Pathology; more than 60 links to online reference textbooks in pathology and cytology; 17 links regarding interesting pathology websites; more than 10 links to websites containing information about how to obtain a certification in Pathology; 9 links to websites with pathology unknown cases and quiz questions; and one link to http://www.news-medical.net/tag/feed/Pathology.aspx, a website that keep us up to date in scientific upcoming news. Expert consult section is also available and provides E-mails and websites from more than two experts in 18 pathology fields from around the world.

The appearance of the app has been implemented following the “clean” look found in modern Apps. The design was performed with three-dimension buttons in every menu. A vertical scroll bar will only be displayed if it is necessary. That is if the list box is not sufficient to show the whole links in every section.

This entire project took 7 months to complete. The app design and development were done in parallel. Development was done using Mobincube platform that is suitable for Android and iOS. Beta versions were distributed to colleagues for feedback using Google Play Developer Console. After incorporating their feedback, the final master version of the app was released. Eventually, GP-HELPER integrates two external interactive places such as FORUM GP-HELPER and COMMUNITY GP-HELPER, with complex development.

COMMUNITY GP-HELPER
Multichannel Chat Development
One specific issue worth discussing was the creation of the multichannel chat called COMMUNITY GP-HELPER. Chatango website was used to host the data. Furthermore, chat moderators are supported by the host page in collaboration with GP-HELPER administrator. Discussions were organized into 13 rooms taking into account different user’s interests: Chats for the general pathologist, a pathologist in training, technicians, and students are in English but also in Spanish language, however, chats for associate members, dermatopathologist, hematopathologist,
molecular pathologist, and neuropathologist are only in English. Guest access is available in order to allow users to quickly start chatting without creating an account first. However, users can create an account with a username and password within your chat room and edit profile. Wi-Fi connection should be required. The chat room allows the user to instant messaging and upload, or exchanged data pictures and videos either taken by phone’s camera, or from phone’s gallery. Whole slide images should be uploaded at low to moderate quality. Play sounds are also available. Emoticons are also available to bring your chat room to life with graphical smilies that users can insert into their messages. The database must be managed by Chatango Corporation.

**FORUM GP-HELPER**

**Website Development and App**
The forum (http://forum-gp-helper.mboards.com) was developed to offer interactive and permanent information about pathology and closely related themes for users. Register and login are available. The website was developed using Miarroba, a popular open source content management system platform that host the information on MySQL. (Oracle Corporation; https://www.mysql.com/).

**RESULTS**
The application was accepted by Google Play App Store on July 2015, and it is freely available. Submission for Apple’s App Store is still in process. The Hospital Universitario de Araba altogether with the Spanish Society of Pathology supported this app. They have also collaborated in the spreading throughout the medical world.

Logotype of the app shows a background composed by squamous cell carcinoma of the lung stained with H & E [Figure 1]. This logotype is in progress to be registered as a national mark.

**Accessibility**
The application was intended for logical. The home screen has the star button that links the user to the main index, and the exit button as a shortcut to way out [Figure 2]. Majority of information in the app is written in capital letters in order to facilitate reading. Navigation bars were included for iOS devices.

**Layout**
The application was designed to be user-friendly with all accessible pages available on the main index [Figure 3]. The main index includes many buttons such as protocols, tumors database, societies, journals, providers, antibodies, videos, bibliography, interesting websites, practicing websites, certification, forum, expert consult, breaking news, and community (Wi-Fi connection required). Each button links to a page respective to its name.

**Educational Assessment**
Many different Pathology lecture videos and websites with pathology quiz features are shown after linking on the specific button displayed on every list. For instance, clicking on “neoplasia (gross specimens)” in gross
examination of human specimen's page, the user will be able to watch this free available video on YouTube website. This enables the user to learn and evaluate their ability to render a diagnosis on macro and microphotographies. Furthermore, offline content such as in tumors database section, you will be able to introduce either a partial or full name of a tumor and the app will show you its immunophenotype [Figure 4]. Pathology protocols (TNM latest edition, protocols regarding management of tumors of unknown primary origin, and flowcharts for some of the most difficult tumors to diagnose) are also included [Figure 5].

Comprehensiveness

GP-HELPER was intended to be a comprehensive pathology platform for pathologists, a pathologist in training, technicians, medical students, and associate members. Easy to handle, the main goal of the app is to organize the Pathology information that is sometimes randomly shown on The internet. FORUM GP-HELPER and COMMUNITY GP-HELPER will be able to show us much different information, not only to get a feedback opinion about the app but also to enhance professional connections, a better way of working in the 21st century.

DISCUSSION

Apps are software programs that have been developed to run on a computer or mobile device to accomplish a specific purpose. The introduction of mobile computing devices (personal digital assistants, followed by smartphones, and tablet computers) with more advanced features, such as global positioning systems, sound recorders, web searching, high-quality cameras, as well as faster processors and improved memories, smaller batteries, better operating systems, and high-resolution screens, mobile devices have essentially become handheld computers. In this light, mobile computing devices are able to facilitate the development of huge amounts of mobile device apps for both personal and professional use, with greatly impacted in many fields, including medicine. While recent studies have demonstrated their efficacy, more studies are needed to validate formally these apps in this emerging mobile health (mHealth) era.

Apps are being increasingly used in many medical specialties such as dermatology, family medicine, surgery, anesthesiology, radiology, In Pathology, most of the apps are focus on dematopathology. Due to visual pattern recognition is of vital importance for the pathologist, video and image-based apps are of great benefit. There are many good ideas and different uses for medical applications in Pathology. For instance, they can be used for educational, with the integration of quiz features and eventually, focusing on clinical purposes. However, one of the main barriers to use apps in Pathology is more related with a properly Pathology Department location, due to they usually are in lower floors of the hospital, without internet connectivity, where web-hosted data in the application may not be available. Regarding this affirmation, the offline material is usually mandatory in every medical apps.

CONCLUSION

I describe hereby GP-HELPER app, one of the few apps developed thinking for every professional worker from every Department of Pathology. Besides, I anticipate that in the future many more smartphone apps will become available for the pathology community. Finally, this technical note highlights the importance of technological developments in healthcare, and it is an example of how pathologists can also contribute in this matter.
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Conflicts of Interest
There are no conflicts of interest.

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