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Editorial: scientific apps: design, considerations, and functions

Samuel Ken-En Gan[1,2]

Abstract

Creating mobile apps is an uphill task. The challenge is more pronounced for making scientific research apps. In fact, a successful scientific app bears dozens of difficulties from the development and design to the actual app release, process of which proper consideration for design, release and publication are required.

Keywords: Smartphone apps, Design, Considerations, Functions

Mobile apps and devices have revolutionized many aspects of daily life. The "Scientific Phone Apps and Mobile Devices" (SPAMD) journal aims to document those impact on scientific research and education for the scientific community. Making and publishing apps are fraught with many challenges, and this is more so for scientific devices and apps (see "Use of Smartphone Apps for Biomedical Research" - BioSpectrum Asia 2015). For example, the process of publishing apps on the mega app stores (Google Play Store and Apple App Store) have requirements that are similar to academic publishing, yet there remains little scientific recognition to a published app in comparison to a research article or patent. Though scientific articles often require two of more peer reviewers before acceptance, it is arguable that an app published on the mega app stores undergoes more peer-review than any journal article.

"Application notes" is the current track for apps publication and is only issued by a few journals. In those app notes, the app store published apps or peripheral devices show less significant "discovery" or little "scientific" elements; hence are not qualified for full research articles. However, "application notes" provides a convenient track for commercial apps, where methodology needs to be protected, yet allowing for advertisement and communication within the community.

All featured apps should be made available in the respective mega app stores (Google or Apple), which ensure the apps work and operate within legal means (e.g. data privacy and spyware). In recognition of the mega app store's criteria, ScPA merely acts to review the scientific uses of the mobile devices and the apps.

Functionally, a scientific app or mobile device displaces existing scientific equipment. Any app that replaces the function of a desktop software or webpage for reasonably comprehensive use on the smartphone or mobile device warrants recognition. Examples of these can be ab1 analyzer (DNAApp, see Nguyen et al. 2014), Gel image analyzer (GelApp, see Sim et al. 2015) to partially displace the Gel Documentation system, sequence manipulation and analysis (DNA2App), or simpler response to research surveys (PsychVey, released in this issue of the journal). So long these apps increase the efficiency and productivity of scientists and research processes, they meet the criteria to be communicated to like-minded scientists in the community.

Before the creation of an app can start, certain considerations must be worked out. In general, smartphones have limited processing power and screen size. While one has the luxury of display space and processing power on a larger device like the desktop, smartphone apps are limited by the relatively small screen of the latest smartphone, that is currently around 5 in. Given the limited display size, menus have to be utilized in apps with many functions to prevent excessive display of buttons. Thus unlike desktop software, aesthetics should be kept at a minimal and simple.

Given the limitation of the smartphone, the interior chips are generally lower in processing speed than its larger desktop or laptop counterparts. Similarly, this typically restricts the connectivity to wireless connections. Since the smartphone has to function as a phone and is

Correspondence: samuelg@bii.a-star.edu.sg
[1]Bioinformatics Institute, Agency for Science, Technology, and Research (A*STAR), Singapore 138671, Singapore
[2]p53 Laboratory, Agency for Science, Technology, and Research (A*STAR), Singapore 138648, Singapore

also limited by battery life, it is not suitable to run multiple intensive processes or be connected to multiple peripheral devices. Consideration must then be made that the app and peripheral devices do not consume large amounts of processing power or drain the battery.

Linked with the functionality of the app, consideration on the nature of the app (hybrid or native apps) should be made. Functionality dependent on large databases would benefit from being a hybrid app with certain features operating locally. There is little advantage of a webapp that functions nothing more than a webpage bookmark on the mobile phone browser. Naturally, a native app with key functions inbuilt would be faster and data plan friendly for on-the-go analysis.

As with every software and instrumentation, user guides are a necessary component. The Google and Apple app stores allow for videos pertaining to the usage of the apps to be uploaded. These videos are particularly useful for apps that are not intuitive in the usage, and where a detailed user guide may not be as illustrative. Although there will always be users who use the app/device without reading the user guide, and thereafter write a bad review, it is the onus of the maker to provide a comprehensive user guide. Similarly, videos are necessary to demonstrate the use of peripheral devices which may not be otherwise easily available for assessment.

In conclusion, the making of smartphone apps poses different challenges to typical software development. Nonetheless, with a clear benefit in convenience, efficiency and productivity, a well-designed and planned app could help turn smartphones into a necessity in Biomedical labs, effectively displacing certain equipments.

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