

The use of health applications for mobile devices as sources of information and education in healthcare

O uso de aplicativos de saúde para dispositivos móveis como fontes de informação e educação em saúde

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ABSTRACT

Applications for mobile devices are brand new sources of information heavily used by hyperconnected individuals, the so-called “thumb generation”, who, going beyond recreational use, refer to these mobile technologies in an educational context, innovating the teaching-learning process. This paper posits that university libraries should be used as spaces for teaching and encouraging the use of mobile devices as educational tools, since the pervasiveness of tablets and especially smartphones strengthen the concept of mobile learning and widen their possible functions inside the physical space of the library. Taking into consideration the reality of a university library whose patrons are health and medicine majors, our focus will be on health applications used as sources of information, communication and education. In this scenario of technological innovations that alter the ways to access and use scientific information, the librarian should take on the role of the mediator and facilitator between these technological advances and their potential users.

KEYWORDS: Mobile applications. Mobile learning. Information literacy. Mobile devices.

RESUMO

Os aplicativos para dispositivos móveis são novíssimas fontes de informação utilizadas fortemente por indivíduos hiperconectados, a chamada “geração polegar”, que além do uso recreativo recorre a estas tecnologias móveis em um contexto educacional inovando o esquema de ensino-aprendizagem. O artigo propõe que a biblioteca universitária seja utilizada como um espaço de ensino e incentivo ao uso de dispositivos móveis como ferramentas educativas, visto que o uso em massa de *tablets* e especialmente de *smartphones* reforçam o conceito de aprendizagem móvel e ampliam suas possíveis funções dentro do espaço físico da biblioteca. Na realidade de uma biblioteca universitária que tem como público-alvo alunos da área de saúde e, principalmente de Medicina, focaremos nos aplicativos de saúde como fontes de informação, comunicação e educação. Dentro deste cenário de inovações tecnológicas que modificam as formas de acesso e uso de informação científica, o bibliotecário deve assumir o papel de mediador e facilitador entre estes avanços tecnológicos e seus usuários em potencial.

PALAVRAS-CHAVE: Aplicativos móveis. Aprendizagem móvel. Competência informacional. Dispositivos móveis.

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JITA: BI. User interfaces, usability.

1 INTRODUCTION

Internet access has been changing over the last few years as desktops and notebooks have given way to mobile options, such as tablets and smartphones. A recent survey published by the Brazilian Institute of Geography and Statistics (IBGE), the National Household Sample Survey (PNAD), determined that 80.4% of the Brazilian families surveyed used smartphones as the main internet access device, surpassing PCs, tablets, smart TVs and other electronic equipment (CETIC.BR, 2016). Besides advantages such as mobile broadband, mobile devices are cheaper and more accessible to a portion of the population, they are easier to operate, they multitask and they are obviously portable.

Today, cell phones, which were used only to make and receive phone calls and to send and receive text messages, have been promoted to a new position, as their purposes have been amplified by services that allow users to watch videos, read e-books, access maps, engage in social networks, share information, etc. Riding on the coattails of the versatility offered by mobile devices and coupled with the collaboration and interactivity Web 2.0 tools provide, there came applications (apps) developed especially for these devices.

The use of mobile devices is already a reality in the everyday life of several Brazilian universities. Many institutions provide their faculties and student bodies with tablets for pedagogical uses containing didactic materials for all courses and electronic books. However, a lot of the individuals who receive this equipment still do not know how to make the most of it. Currently the concept of mobile learning is widely debated by Education researchers seeking to modernize, dynamize, widen and enrich their pedagogical experiences.

According to Carvalho (1980), university libraries (ULs) must position themselves proactively in trying to incorporate into the college environment around them. They must evaluate its services and redefine them over time, so they fit their institution's objectives and activities. From this starting point, this paper aims to bring closer mobile learning debates and library practices. How are we to manage all possibilities offered by mobile devices in university libraries?

In order to try and answer this question, we will present in the following pages a few apps that can be used in extracurricular activities. Our approach, considering the reality of a university health library, focuses on health apps, but the idea of using these tools as sources of information, education and communication is a notion applicable to various fields of knowledge.

2 MEDICAL LIBRARIANS AND THEIR ROLES IN UNIVERSITY LIBRARIES

Medicine and technology are fields of knowledge that go hand in hand throughout the years, generating relevant and indispensable advances in healthcare. Therefore, medical librarians need to be competitive and keep up with the latest technological developments in order to fulfill patrons' expectations. Health information is extremely dynamic and fluid, and librarians must keep up this pace in their daily activities.

Technological developments in the medical field in the last twenty years have radically changed the way we consume and manage this kind of information. Therefore, “[this] has put less emphasis on the physical space of health library and more on the health librarian.” (LAWTON; BURN, 2015, p. 85)

This information professional cooperates in medical prognosis, carries out academic research in health databases, assisting students, professors and researchers, and disseminates information to users referring to varied sources of information. In the last decades, following advances in health information prompted by the advent of the internet, the medical librarian takes on a new role: that of educator.

Research on the topic of information literacy posits that the librarian is the professional with the right proficiency to take on the role of educator in this case. This information professional must participate in the teaching-learning process, enabling users to search and use data. Skills that render data retrieval efficient, accurate and effective must be compulsory when dealing with health information, which becomes urgent and vital in the case of human lives.

This type of education and training must take place from the very beginning of the undergraduate course, preparing students to lead masterfully a medical staff to perform clinical investigations actively and independently, since, according to the American Library Association:

To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. (1989; apud. CUNHA; ORELO, 2013, p. 1)

The roles of medical librarians are redefined to fit the information needs of their patrons. Since the technology field has been highly beneficial to how research and work is done in the health field, we have observed the emergence of a trend, especially among undergraduate students, towards a medical science rich in electronic resources, web-based,

and full of Web 2.0 functionalities, with widespread use of mobile devices. Hence, it is possible to foresee that the next expertise medical librarians will need to develop is mobile learning, with attention to audiovisual content, and mainly using information sources deriving from health apps.

3 MOBILE LEARNING

According to the definition adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO),

Mobile learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere. Learning can unfold in a variety of ways: people can use mobile devices to access educational resources, connect with others, or create content, both inside and outside classrooms. Mobile learning also encompasses efforts to support broad educational goals such as the effective administration of school systems and improved communication between schools and families. (UNESCO, 2013, p. 6)

Mobile technologies are always evolving and cover a wide range of devices, such as smartphones, tablets, e-readers, audio players, and handheld video game platforms. In general, they share some specificities: these are mobile digital devices owned and used by one individual, they can access the internet, and they are multitasking, multimedia pieces of equipment.

Mobile learning can be widespread if we consider the possibilities opened by these devices to reach geographical areas lacking schools, books and computers. As mobile device prices decline, especially for smartphones, it is possible to envision a landscape of equality and wider educational offer. Another compelling aspect of this modality is immediacy. While in the past students had to wait until the following class to solve their doubts, receive feedback and guidance, now it is possible to get answers from teachers or even classmates nearly in real time.

Another favorable feature is mobility. Mobile devices allow us to learn anytime, anywhere, in or out of physical teaching spaces. This provides greater autonomy in learning, by respecting students' restrictions and availability, allowing them to choose which task to perform according to their time schedule and space limitations.

The advantages and benefits of mobile learning are innumerable, but it is required to adopt guidelines to make the most of this educational alternative. With educators in mind, UNESCO's Policy Guidelines for Mobile Learning was produced, from which we highlight the following:

- a) Create or update policies related to mobile learning;
- b) Train teachers to advance learning through mobile technologies;

- c) Provide support and training to teachers through mobile technologies;
 - d) Create and optimize educational content for use on mobile devices;
 - e) Ensure gender equality for mobile students;
 - f) Expand and improve connectivity options while ensuring equity;
 - g) Develop strategies to provide equal access for all;
 - h) Promote the safe, responsible and healthy use of mobile Technologies;
 - i) Use mobile technology to improve communication and education management.
- (UNESCO, 2013, p. 30-38)

The current state of affairs in teaching practices is highly digital, student-oriented, interactive and collaborative. Digital natives are active agents in the educational system, from elementary school well into the university. The mobile generation of students, commonly referred to as the “thumb generation”, suffer the lack of curricular programs that encourage the use of mobile technologies for learning and knowledge acquisition. It is noteworthy that faculty and staff members themselves must be offered the opportunity to recycle their knowledge and make good use of this new teaching modality, since most of them are “digital immigrants”, as they were not born into the digital world and are still learning to use the brand new information and communication technologies.

In this scenario, libraries must be a present and active partner, providing all the necessary support for issues of information and use of these devices, developing training programs aimed at exploring the functionalities and potentialities of these innovations.

4 APPLICATIONS FOR MOBILE DEVICES

Apps belong to the so-called New Information and Communication Technologies (NICT) and are new technological tools that made good use of Web 2.0 ingenuity to capture, store, restore, analyze, receive and share information. Since app technology is developed for mobile devices, it offers the possibility of being customized or individualized. Users are able to tailor downloaded apps according to their own preferences and particularities.

Apps are extremely versatile and their purposes are quite diverse. Many of them join audio and visual resources in a single tool capable of stimulating studying with the assistance of appealing, friendly and intuitive interfaces. These apps are made for different platforms, in order to reach users of different operating systems and models.

The app market has been rapidly growing in recent years, and the forecast is that it will establish itself in the digital content industry for many years to come. Every day countless apps are created and updated, apps whose purposes range from entertainment, finance management, business, urban transportation, health, well-being, fitness, travel, among others. It is important to highlight that some apps are free, others are paid. Usually paid apps are relatively low-cost, and their content and quality do not make them better than free ones, but some of their features are more complete.

4.1 Health apps

Health apps are usually conceived in the minds of health professional teams and brought to life by the hands of information technology professionals. In general, apps are developed after thorough academic research, which would provide them with the necessary credibility. However, the so-called Mobile Health field is still deeply deprived of regulatory mechanisms to legitimize the use of this technology in healthcare.

Out of the millions of health apps available for download today for the main platforms, one finds tools that have the potential to be effectively used in health information and education. There are anatomy atlases and books fully adapted to mobile devices in which one can learn in an interactive and pleasant way. There are games developed for teachers and students to test their knowledge of clinical cases and keep them up to date to the latest medical procedures. There are reference books as well, such as medicines compendia full of patient information leaflets for consultation anytime, anywhere.

Through consultation of scientific journals, rankings compiled by specialized websites and online app stores, we have chosen some of these apps for their potential educational use by faculty and student body.

Our proposition is that university libraries take on the role of mediators between information sources and their potential users. What we suggest herein is that libraries be used as monitoring observatories of these data sources, as well as teaching spaces for addressing how and to what ends these apps can be utilized. What is being posited here is that we are past the information literacy frontier, so now there is a need to focus on app literacy.

According to Cerigatto (2016), in the 21st century society, mainly in educational environments, all contexts have learning potential, and new kinds of literacy arise from them. The number of individuals using these apps as information sources rise, as these tools are developed in such a way as to deliver most of the information desired. A recent United Kingdom-based survey on information use habits of medical residents and students attests that most of them consider apps a valuable tool for clinical support and educational resources (CHAMBERLAIN et al, 2015). Based on this assertion, we understand it is essential to enable health app users to acknowledge and make the most of these information sources.

Every day new apps are launched in the market, and the numbers are huge, causing the appearance of the app overload (VAN VELSEN et al, 2013), which end up flooding and confusing their users. Out of the millions of available apps, health apps get a large slice of this market. Therefore, it is paramount to follow these developments in order to identify and evaluate the best and most comprehensive of these tools. Moreover, it is fundamental to assess the quality of the information provided by these apps, so they are sufficiently

trustworthy to be included as information sources in the study programs proposed by universities.

4.2 Health information and education apps

The following table lists apps that can and should be explored as extracurricular activities. Twenty-five information sources have been selected to illustrate the vast array of possibilities these tools are capable of reaching in the field of health education.

TABLE 1. List of health education apps

Name	Brief description
BMJ OnExamination	Medical knowledge quiz
Bulário Digital	Medicines compendium
Bulário veterinário	Veterinary medicines compendium
Calculate by QxMD	Medical calculator
CID 10	Smart and quick check of ICD-10 codes and descriptions
Clinical Key	Evidence-based clinical search
Clinical Sense	Clinical decision-making game
DailyRounds – Doctor’s App	Sharing and testing of clinical cases
Epocrates Plus	Clinical information reference
Figure 1 – Imagens médicas	Medical image sharing
Human Anatomy Atlas	Human anatomy atlas in 3D
JoVE – Journal of Visualized Experiments	Peer-reviewed video journal
Leia por QxMD	Medical literature online journal
Medical News Online	Up-to-date medical news from various sources
Medscape	Clinical information reference
MedQuiz Residência Médica	Medical residency quiz
Prognosis: Your Diagnosis	Clinical cases simulation game
PubMed Mobile	Scientific publications reference
Sobotta Anatomy Atlas	Human anatomy atlas
Terminologia médica	Medical dictionary
The Lancet	Scientific journal
Touch Surgery	Surgery simulator
UpToDate	Evidence-based medical decision-making
WebMD	Health information and support to clinical decision-making
WhiteBook: clinical decision	Guide for medical prescriptions, clinical conduct and decision-making

Source: Authors’ survey, 2016.

There still is in the Information Science field a shortage of research on new information sources, because, according to Cerigatto (2016), there is a lack of studies addressing and reviewing the use of sources outside the strictly scientific realm, and those are oftentimes accessed by the population on a daily basis.

In recent years there have been efforts by several health libraries and librarians to develop training programs, tutorials and workshops customized to their patrons, considering each group's literacy level. And, as new information sources arise, fresh measures must be taken to address new informational needs of users, as it happens with health apps.

The following screenshots, as presented in figures 1, 2 and 3, were chosen to illustrate how the apps work.

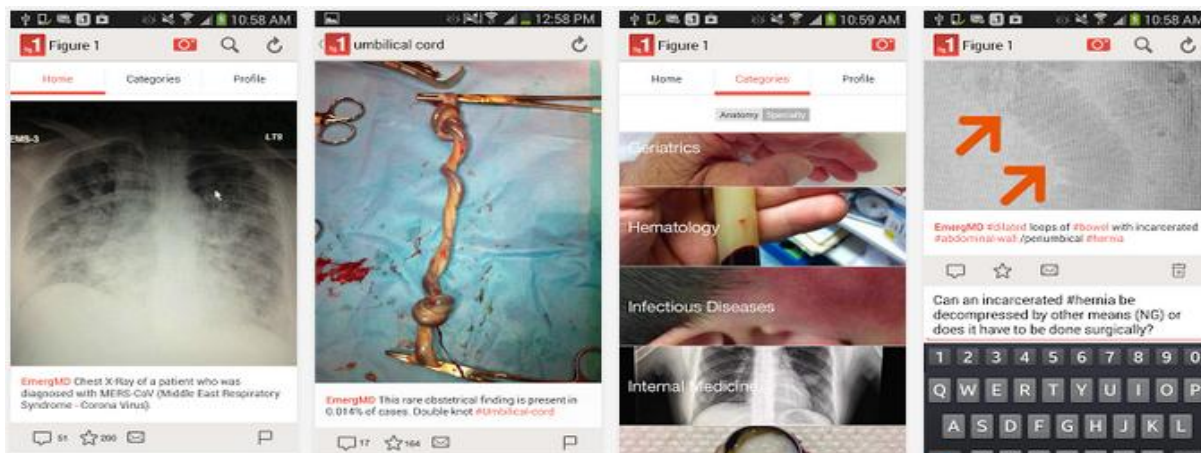


FIGURE 1. Figure 1 screenshots
 Source: Google Play Store, 2016.



FIGURE 2. Prognosis: Your Diagnosis screenshots
 Source: Google Play Store, 2016.



FIGURE 3. CID 10 screenshots

Source: Google Play Store, 2016.

We can observe on the screenshots above that these apps are intuitive, educational tools that allow easy access to information. These are a few examples of tools for knowledge acquisition that must be accurately investigated in order to be used effectively, in a more socially acceptable way, and it is the responsibility of information professionals to provide education and guidance so that their customers can distinguish and use the best options in the best possible ways.

5 CLOSING REMARKS

The new information and communication technologies used in mobile devices are currently the best advantage towards renovating the educational scenario to benefit a generation of students that was literally born into technology. With the emergence of new information sources that Web 2.0 technologies allowed, as is the case of apps, it is required that we contribute to a new type of literacy, that is, we must train individuals to be able to “learn how to learn” and make effective use of these new data sources that pervade the current information ecosystem. University libraries must serve as a bridge between these tools and their potential users, making use of their spaces and qualified professionals to build an environment of discovery, monitoring, training, and why not of creation of unique digital content?

Librarians, as effective agents in the pedagogical practice, must make the most of mobile technologies and their instruments, enabling faculty and student body so they can fruitfully benefit from these advances and incorporate them to the best advantage of the teaching-learning process. This field still needs thorough research, experience exchange and innovative practices.

When we expose students and teachers to educational technological novelties, both acquire new abilities that will be successfully applied in their work environments. Moreover, using apps in their educational practices enhance educators and students’ efficiency by optimizing exam and evaluation distribution, gathering, verification and documentation.

EL USO DE APLICACIONES DE SALUD PARA DISPOSITIVOS MÓBILES COMO FUENTES DE INFORMACIÓN Y EDUCACIÓN EM SALUD

RESUMEN

Aplicaciones para dispositivos móviles son nuevas fuentes de información fuertemente usadas por individuos hiperconectados, llamados "generación pulgar", que además de su uso recreativo se haga uso de estas tecnologías móviles en un contexto educativo innovando el esquema de enseñanza-aprendizaje. El artículo propone que la biblioteca universitaria se utiliza como espacio de enseñanza y fomenta el uso de los dispositivos móviles como herramientas educativas ya que el uso masivo de las tabletas y especialmente de los teléfonos inteligentes, refuerzan el concepto de aprendizaje móvil y amplían sus posibles funciones dentro del espacio de la biblioteca física. De hecho, una biblioteca universitaria que se centra en los estudiantes de la área de la salud y, principalmente, de la Medicina, se centrará en aplicaciones de salud como fuentes de información, comunicación y educación. Dentro de este escenario de innovaciones tecnológicas que modifican las formas de acceso y uso de la información científica, el bibliotecario debe asumir el papel de mediador y facilitador entre estos avances tecnológicos y sus potenciales usuarios.

PALABRAS CLAVE: Aplicaciones móviles. Aprendizaje móvil. Alfabetización informacional. Dispositivos móviles.

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