Development of a mobile application as a support tool for accessing essential information in applying the tests required by normative instruction 54/19 MS and international protocols

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1. Introduction

Currently in Brazil, the insertion of mammography devices using computerized and digital radiography technologies is increasing, where the relationship between image quality and dose optimization are objects of important studies and need to be periodically analyzed and adjusted for the best performance of the equipment for the benefit of diagnosis. Advances in digital technology in mammography have brought about a change in its radiological applications by professionals involved in the examinations. This transition from a conventional system to digital receivers requires specific knowledge from professionals and must be accompanied by a process of optimization of exposures and image quality assurance, where such benefit will only be achieved when the implementation of a rigorous program to ensure quality is established. The performance of quality control tests in mammography, associated with the acceptance criteria were developed to guarantee the performance of the mammography in its entirety. According to the methodological study carried out aiming at the practicality of accessing information about the application of quality control tests (QC) in mammography, the informama was developed, which allows its users to have an alternative source of practical knowledge about QC tests to be carried out, making it possible to assist the professional in the area in its execution. Activating it will provide information on the application of the tests directly with those who run them through the application methodology described in its database and contained in normative instruction (IN) 54/19 MS [1]. This application is part of a project to build a practical guide to carry out the tests necessary to implement quality assurance programs in mammography (PGQM) in Brazil. It is concluded that the informama is an informative tool for common users and professionals in the field of mammography, which consists of information from different technical and general aspects, about the care that must exist with the breast, routine exams, and breast tests quality control in mammography, which are required by Normative Instruction 54/19 MS [1], based on international protocols, which are good practice manuals, which, when executed and approved, guarantee the quality necessary for the proper functioning of mammography devices and image quality.

2. Methodology

The development of the mobile device application was planned by the team that experiences the mammography quality control routines of the Northeast Regional Center for Nuclear Sciences (CRCN-NE), where the options that most assist in the process of carrying out the tests were designated. are available, and a set of information relevant to breast care, distributed in the sessions: professionals, which in turn is divided into the following themes: positioning, quality control; the space for registration; The about; and the woman space. The process was then divided into three steps described below:

Step 1- Flowchart planning with application construction steps. At this stage, what content would compose each session, the texts, images, available links, and the choice of the application's presentation interface were designated. The application developed for the android system was called informama.

Step 2- Creating the initial version of the application. During the research, those responsible for the study used the App Inventor ® software, a free tool, available on the internet for programming applications via the worldwide network of interconnected computers (WEB). This tool was built from a partnership between google and the Massachusetts Institute of Technology (MIT), with the objective of developing a visual interface that allows anyone to program applications, even without knowing how to build lines of code and compile programs. Currently, this tool is managed by the team at the Mobile Learning Center at MIT, with the collaboration of the Computer Science and Artificial Intelligence Laboratory (CSAIL) of the same Institute of Education [2].

Step 3- Testing the initial version of the application by researchers. The initial version of the application was evaluated in relation to three points: application contributions in the application of QC tests, its usability and informative benefits for its users. Subsequently, a demonstration of the application and its functionalities was carried out, establishing that an electronic form link is sent by email to professionals, so that they can present their impressions regarding the application and their suggestions. It is noteworthy that the suggestions field added at the end of the instrument is reserved for professionals to contribute with new functionality suggestions for later versions. For its use, the user must download the application from the play store of their smartphone or tablet.

The conceptual tasks of the contents made available in the informama followed an approach contemplating the creation of an interface aimed at its users and covering their interests. The most adequate structure for the system was based on the analysis of its requirements. After analysis, it was possible to define the content and form of user interaction with the application.

Figure 1 presents the informama functionality flowchart. First, the construction of the application, with the design of the screens, containing the programming logic. After the application was ready, tests were carried out on different mobile devices (with android operating system), among the researchers involved in the project. The application will be made available for download, after undergoing a series of tests to ensure its proper functioning.
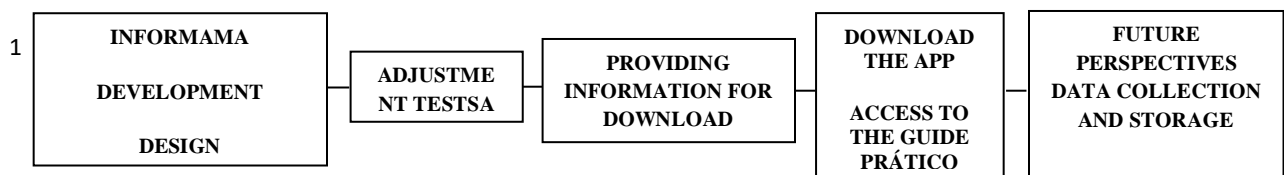
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Figure1: Simplified flowchart of informama.

3. Results and Discussion

Following are the options with information relevant to the area of mammography in the informama application, with its development plan and description of the interfaces. After downloading, the initial screen is composed of three options: about, professionals and women's space. Clicking on the button opens a screen with an explanatory text talking about the application and its purpose. When you click on professionals, another screen opens where the contents of the activation buttons are described, such as: positioning, quality control and the registration option for data storage. In positioning, it is directed to an explanatory text box detailing the positions and maneuvers used in mammography, in various topics covered.

The quality control option provides a practical guide to quality control tests in mammography that use

computerized and digital radiography technologies, which in turn are required by IN 54/19 MS and contained in international protocols, the tests refer to the mammography and to image receptors. When clicking on data storage, the registration form template must be completed and sent to the email address: informamadigital@gmail.com. Uploading images for analysis is also available and is done by following the steps below. Save the image taken using the simulator of the American College of Radiology (ACR) approved by the national health surveillance agency (ANVISA), with the identification of the institution, in rawdata format, file type without image processing, and send it to e -mail already quoted.

The women's space does not require registration, as it will only serve as an informative aid to the interested public. On the woman's space screen, there is information about existing care for the breast and various information extracted from several INCA publications where research on self-knowledge of the breasts is referenced. The final product of this work brings us as a result the informama application, whose main objective is to update the professional in the area, and informative aid to common users, about the insertion of digital equipment in mammography in their daily activities, together with the availability and dissemination of the use of smartphone or tablet as an information tool, proving to be very useful to the user, proving that the use of new technologies can contribute favorably in the area of health radiology.

4. Conclusions

It is concluded that the informama proved to be a practical tool to be used by professionals in the field of mammography, especially in radiology for the practice of applying QC tests, as a means of quick and accessible consultation, with general and technical information, offering also to the general public a source of knowledge on the subject, mammography so present in women's lives.

References

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