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PROTOTYPE FOR VERIFICATION OF LEARNING IN CLINICAL LABORATORY DURING SUPERVISED STAGE

PROTÓTIPO PARA A VERIFICAÇÃO DE APRENDIZAGEM EM LABORATÓRIO CLÍNICO DURANTE ESTÁGIO SUPERVISIONADO

PROTOTIPO PARA VERIFICACIÓN DE APRENDIZAJE EN LABORATORIO CLÍNICO DURANTE LA ETAPA SUPERVISADA

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RESUMO

Objetivo: desenvolver protótipo de aplicativo móvel para a verificação de aprendizagem em laboratório clínico durante estágio supervisionado. **Método:** estudo descritivo acerca do desenvolvimento de aplicativo móvel para auxiliar estudantes e preceptores no processo de aprendizagem baseado na aplicação de questionário *likert*. A amostra foi selecionada por conveniência e os voluntários foram convidados por meio do *WhatsApp* a participar da pesquisa, recebendo o *link* do protótipo e o *link* do questionário. Após a verificação do protótipo e antes de iniciar as respostas ao questionário, era necessário o aceite do Termo de Consentimento. Após o aceite, os participantes eram direcionados para as respostas ao questionário. **Resultados:** grupo multiprofissional em saúde, com aproximadamente cinco anos de atuação na preceptoria, com experiência em informática, aprovou, em quase 80%, o uso do sistema em vários aspectos. **Conclusões:** a utilização de recursos digitais dinâmicos e interativos, considerando a necessidade de um instrumento norteador para os estágios supervisionados em laboratório clínico, mostra-se como alternativa para incrementar o processo de aprendizagem.

Palavras-chave: Aplicativo; Mobile Learning; Tecnologias da Informação.

ABSTRACT

Objective: develop mobile app prototype for clinical laboratory learning verification during supervised internship. **Method:** descriptive study about the development of mobile application to assist students and preceptors in the learning process based on the likert questionnaire application. The sample was selected for convenience and volunteers were invited through WhatsApp to participate in the survey, receiving the prototype link

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and the questionnaire link. After verifying the prototype and before starting the answers to the questionnaire, the Consent Form had to be accepted. After acceptance, participants were directed to the answers to the questionnaire. **Results:** multiprofessional health group, with approximately five years of experience in the preceptorship, with experience in informatics, approved, in almost 80%, the use of the system in several aspects. **Conclusion:** the use of dynamic and interactive digital resources, considering the need for a guiding instrument for supervised internships in a clinical laboratory, is an alternative to improve the learning process

Keywords: Application; Mobile Learning; Information Technologies.

RESUMEN

Objetivos: desarrollar prototipo de aplicación móvil para la verificación de aprendizaje en laboratorio clínico durante la etapa supervisada. **Método:** estudio descriptivo sobre el desarrollo de aplicaciones móviles para ayudar a los estudiantes y preceptores en el proceso de aprendizaje, basado en la aplicación de cuestionario *Likert.* La muestra seleccionada fue por conveniencia y los voluntarios fueron invitados a través de *WhatsApp* a participar en la investigación, recibiendo el *link* del prototipo y el *link* del cuestionario. Después de la verificación del prototipo y antes de iniciar las respuestas al cuestionario, era necesario la aceptación del Término de Consentimiento. Después de la aceptación los participantes se dirigían a las respuestas al cuestionario. **Resultados:** un grupo multiprofesional en salud con aproximadamente cinco años de actuación en la preceptoria, con experiencia en informática, aprobaron en casi 80% el uso del sistema en varios aspectos. **Conclusión:** el uso de recursos digitales dinámicos y interactivos, considerando la necesidad de un instrumento guía para las prácticas supervisadas en laboratorio clínico, la utilización de recursos digitales dinámicos e interactivos se muestra como alternativa para incrementar el proceso de aprendizaje.

Palabras-clave: Aplicación; Mobile Learning; Tecnologías de la Información.

INTRODUCTION

The widespread adoption in Brazilian society of mobile devices (such as mobile phones, smartphones and tablets) as communication and entertainment tools is redefining the way people interact, behave and think. Applications to the weather, traffic, finance, and other applications are common for making small decisions in everyday life. The comfort of choosing where to use and the ease of moving around while maintaining connectivity seem to represent new ways of informing and communicating.[1]

The spread of this type of device has driven the development of new applications (Apps) with the potential to increase learning inside and outside the classroom. There are many types of Apps available, such as games, social media, books (including dictionaries, encyclopedias) and magazines, as well as specific applications for education, web browsing, management and organization of activities and processes.[2]

Mobile learning enables the Internet's convergence space with telecommunications, creating a wide network of communication and learning opportunities. This perspective reposition the classroom and all spaces outside it as possible places to teach and learn.[3]

Given this technological context, it is considered important to use multimedia environments through application, offering subsidy for teaching and learning verification, during internship in clinical laboratory, where, at the moment of practical activity, the student can access theoretical concepts and problem solving, as well as providing the preceptor with a new technological tool for supervising. The aim of this study is to develop and evaluate a mobile platform multimedia application for clinical laboratory learning verification during supervised internship.

METHOD

Prototype Creation

The Labhupaa prototype, developed in this project (Figure 1), is a mobile learning application that aims to assist the preceptor in verifying student learning during supervised internship, and students will be able to query information, participate in quiz and update concepts about internship in clinical laboratory. The development process was defined in three steps described below.

1. Conception and definition of the problem: essential step for the project development. The definition arose from the need to improve the learning process in the internship, due to the lack of tools to make the understanding of the contents attractive and easy to assimilate and articulate with the practice.

2. Definition and development: the prototype was built on the Marvel app website. It is an online service that aims to help build prototype smartphone applications. The screens created (Figure 1) refer to:

- Login Interface: allows control through user identification by entering a username and password;
- Central Interface: After performing the access, the user is presented with the central area of the environment. In this interface, the options for navigation are listed;
- Learning Interface: didactic material with content divided into topics;

Figure 1. Labhupaa Prototype.

Source: Elaborated by the author via MarvelApp (2019).

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- Quiz and ranking: participating in the tests, the user evaluates his knowledge while the preceptor checks the learning level and, in the end, the ranking is provided;

3. Evaluation: a likert questionnaire was built to evaluate the usability of the prototype, that is, the user evaluates to what degree the application will assist him. The questionnaire was divided into two parts: part I, which aims to profile participants and part II, with specific questions about the application.

Prototype Sampling and Evaluation With Users

The selected sample was for convenience and volunteers were invited through WhatsApp to participate in the research, receiving the prototype link and the questionnaire link. After verifying the prototype and before starting the answers to the questionnaire, the Consent Form had to be accepted. After acceptance, participants were directed to the answers to the questionnaire.

The prototype model developed should be easy to interact with and be attractive between the user and the system in order to achieve high usability. According to the International Organization for Standardization (ISO-9241-11: 20184), to determine how much a product can be usable within a context, it is necessary to measure performance (effectiveness and efficiency) and user satisfaction so that, For performance evaluation, objective measures were used and, for user satisfaction, subjective measures.

The evaluation consisted of the application of two questionnaires, a pre-test questionnaire, called pre-test, to know and determine the user's profile and training, and a post-test questionnaire to obtain information about the user's opinion regarding the system usage.

Part I of the questionnaire referred to the participant's profile and background. Composed of closed questions, it allowed the selection of an answer from a choice between alternatives. The questionnaire Part II, to obtain information about the user's opinion regarding the use of the system, was designed to reduce the effort load and time spent by participants, preventing them from completing the answers to the questionnaires.

In order not to confuse the participant, the degree of agreement of the scale was adapted to five items, ranging from one (strongly disagree) to five (strongly agree). Two open-ended questions were designed to allow the

participant to express an opinion on the positive and negative aspects of the system.

Statystical Analysis

For data analysis, a spreadsheet was initially created in the Microsoft Excel for Windows 2007 program, with typing and checking. The results of the analysis of variables were expressed as mean standard deviation and categorical variables as absolute frequency and percentage.

RESULTS

Twenty-one individuals were invited to participate, but twenty consented to participate in the research. Of the 20 participants with consent, 19 answered the questionnaire. In the questionnaire (part I), the initial variables of the sample age, gender, education (graduation), specialization and length of practice in the internship preceptorship are shown in chart 1.

Chart 1. Questionnaire Part I.

PART 1				
1-Age				
2-Sex	( ) F ( ) M			
3- Education (graduation)				
4- Specialization				
5- Acting time at internship preceptorship				
6- Computer experience:	**Frequency of use**			
Use of computerized health or medical systems	Daily	Weekly	Eventual	Never
	( )	( )	( )	( )
Use of electronic mail (email)	( )	( )	( )	( )
Internet use (research, entertainment)	( )	( )	( )	( )
Use of text editors (Word) or spreadsheets (Excel)	( )	( )	( )	( )
Mobile App Usage	( )	( )	( )	( )

In the item (Computer Experience) of the questionnaire Part I, 100% of the sample demonstrated computer experience with daily internet use for research / entertainment. Regarding the use of health systems or computerized doctors, 42.1% use it daily.

In the use of e-mail, 89.5% use it daily and 57.9% use text editors (Word) or spreadsheets (Excel) daily.

In part II of the questionnaire, regarding the participant's opinion of the system, the answers ranged from one (strongly disagree) to five (strongly agree), and the overall average of the responses of those who fully agreed with

the functions asked was 77. , 8% and 0.23% totally disagreed, as shown in table 1.

Table 1. User Opinion Regarding System Usage.

		5	4	3	2	1
A – SYSTEM REACTION				**%**		
Q. 1	Easy understanding	94.7	5.3	0	0	0
Q. 2	Easy use	84.2	10.6	5.2	0	0
Q. 3	Features are clear	84.2	15.8	0	0	0
B – SCREEN						
Q. 4	Shape and size of letters are easy to read	89.5	5.3	5.2	0	0
Q. 5	Information organization is clear	89.5	10.5	0	0	0
Q. 6	Screen sequence is clear	78.9	21.1	0	0	0
Q. 7	Screen items are easy to find	89.5	10.5	0	0	0
C – LEARNING						
Q. 8	It was easy to learn how to operate the system	84.2	15.8	0	0	0
Q. 9	The app can contribute to learning	94.7	5.3	0	0	0
Q. 10	Activities can be performed quickly and / or logically	68.4	26.3	5.3	0	0
Q. 11	The conclusion of the final quiz - Quiz - was clear	57.9	21.1	15.8	5.2	0
D – SYSTEM CAPACITY						
Q. 12	System speed is fast	63.2	21.1	10.5	0	5.2
Q. 13	It is easily designed for all levels of users (novice and experienced)	63.2	36.8	0	0	0
E – IMAGES						
Q. 14	Image quality is good?	89.5	5.3	5.2	0	0
Q. 15	Image size is appropriate?	73.7	21.1	5.2	0	0
F – TERMINOLOGY AND SYSTEM INFORMATION						
Q. 16	Messages that appear on screen are clear	63.2	36.8	0	0	0
Q. 17	The location of the information on the screen is clear	73.7	21.1	5.2	0	0
Q. 18	User instructions are clear	65	15	15	5	0
G – SYSTEM USAGE						
Q. 19	This system would enhance my work as a preceptor	72.2	22.2	5.6	0	0
Q. 20	This system would make working as a preceptor more interesting	79	10.5	10.5	0	0
Q. 21	I would like to have this system in my daily life as preceptor	73.7	15.8	10.5	0	0
Q. 22	I would use this system if it were available	78.9	21.1	0	0	0
GENERAL TOTAL		**77.8**	**17.0**	**4.5**	**0.47**	**0.23**

In the open-ended questions about the positive aspects of the system, the most repeated words were “easy to use” and “practicality”. On the negative points, the word that was repeated most often was "system speed (screens go too fast)".

DISCUSSION

Until the late 1990s, buying a book or learning a new language depended on physical space for setting up a store or school. The evolution of information technology, however, has enabled new ways of selling products and providing services. Thus, the facilities brought by the evolution of technology allowed the creation of new business models as well as new ways of study and learning.[5]

The use of Information and Communication Technologies (ICT) has significantly transformed professional fields. In the area of education, this technological evolution has driven the learning process. Today, virtually everyone has a cell phone. With the advancement of the internet, the possibilities of using digital technologies have been expanded as a way to obtain information of the most diverse. The devices are portable, affordable and offer many features that can be leveraged for learning as well.

Mobile devices with wireless and touch-screen interface, such as tablets and smartphones, associated with different applications, have provided changes in how people relate to information and produce significant potential to transform the way we teach and learn.[2] They provide teachers and students with easy-to-use mobility and interface and can help implement different teaching and learning strategies.

Thus, for today's students, the so-called digital natives, it becomes more attractive to study using such devices, since modern technology accompanies them from birth.[5] Thus, mobile learning or mobile learning emerges as a possibility. educational, favoring access to information and learning through connected activities, such as training, courses, virtual classes, among others, providing multidirectional communication with participants.

Little by little, the learning environment is no longer just the classroom, expanding everywhere, in a sync of hybrid educational, presential and virtual / digital teaching, turning to a digital age associated with computing, computers, cybernetics and connectivity.[6]

The diversity of practice scenarios (internships) has become increasingly important in recent years for the training of human resources in health, becoming essential for teaching and learning, and educational institutions are increasingly using technology to teaching support, providing exchange of knowledge among students, teachers and preceptors. Therefore, it is understood that mobile learning enables greater control and autonomy of the student over

their learning, in a context of continuous connectivity, spontaneously and conveniently, favoring the teaching-learning process, assessment and feedback in an innovative way.

As exposed, this paper presents a proposal for the development of a mobile application prototype aimed at the evaluation of clinical laboratory learning during supervised internship. This prototype aims to facilitate and assist students 'learning, enabling the preceptor's learning to follow up, which can assess, in a simple and quick way, the students' learning level, providing a better interaction and knowledge exchange for better use of the internship.

CONCLUSION

The use of dynamic and interactive digital resources is shown, considering the need for a guiding instrument for supervised internships in a clinical laboratory, as an alternative to improve the teaching-learning process. Constructivist learning theory has been the most widely used approach to guide the development of computerized educational resources. In this sense, the proposal for the construction of the application emerged, which may offer the student the opportunity to improve the theory / practice relationship, establishing a correlation between what he learns and the real, experimental situations, making learning enriching. In another perspective, it is a pedagogical tool that supports the preceptor in the monitoring and evaluation of the internship.

REFERENCES

1. Pina F, Kurtz R, Ferreira JB, Freitas A, Silva JF, Giovannini CJ. M-Learning adoption in higher education: the professor's point of view. Read Rev Eletrônica Adm. 2016 May/Aug; 22(2):279-306. Doi: http://dx.doi.org/10.1590/1413-2311.0262015.54352.

2. Nichele AG, Schlemmer E. Aplicativos para o ensino e aprendizagem de Química. Rev Renote- Novas Tecnologias na Educação. 2014; 2:01-09. Doi: https://doi.org/10.22456/1679-1916.53497

3. Melo RS, Carvalho MJS. Aplicativos educacionais livres para mobile learning. XI Evidosol e VIII Ciltec [Internet]. 2014 June [cited 2018 Aug 10]; 2: 1-6. Available from: http://www.periodicos.letras.ufmg.br/index.php/anais_linguagem_tecnologia/article/view/5809/5098

4. Associação Brasileira de Normas Técnicas. NBR ISO 9241-11. Define usabilidade e explica como identificar a informação necessária a ser considerada na especificação ou avaliação de usabilidade de um dispositivo de interação visual em termos de medidas de desempenho e satisfação do usuário. Orientação é dada sobre como descrever o contexto de uso do produto (hardware, software ou serviços) e as medidas relevantes de usabilidade de uma maneira explícita. A orientação é dada na forma de princípios e técnicas gerais, em vez da forma de requisitos para usar métodos específicos. Rio de Janeiro: ABNT; 2011.

5. Martins WS, Allevato NSG, Dias KM, Schimiguel J, Pires CMC. M- learning as a method of education: the use of the Estatística Fácil application in High School. Ensino da Matemática em Debate [Internet]. 2018 [cited 2018 Aug 10]; 5(1):01-17. Available from: https://revistas.pucsp.br/index.php/emd/article/view/32882

6. Santos TS. Tecnologia e educação: o uso de dispositivos móveis em sala de aula [dissertation] [Internet]. Londrina: Universidade Tecnológica Federal do Paraná; 2016 [cited 2018 Aug 10]. Available from: http://repositorio.roca.utfpr.edu.br/jspui/bitstream/1/7491/1/LD_ENT_II_2016_18.pdf