Creating a mobile APP and WEB questionnaires as teaching and assessment strategies in Dentistry

Rubens Nazareno Garcia*; João Guilherme Oliveira**; Júlia Vital Sagás**; Thamyris da Silva Ferreira**; Betsy Kilian Martins Luiz***

* PhD in Dental Materials, professor, Dental School, UNIVALI and UNIVILLE
** Undergraduate student, Dental School, UNIVALI
*** PhD in Materials Science and Engineering, professor, Dental School, UNIVALI

ABSTRACT

The present study reports the experience of creating the RUBOND mobile application (APP) and the use of WEB questionnaires as teaching and assessment strategies in Dentistry. The creation of the mobile application took place through the Fábrica de Aplicativos platform, with the theme of Universal Adhesive Systems being defined as a central subject. The preparation of questionnaires to assess the knowledge acquired through the material available in the APP occurred in the Online Pesquisa platform. The questions used were taken from tests of the National Student Performance Exam (ENADE). The questionnaires were accessed via a direct link attached to the mobile APP. The creation of the RUBOND mobile application and WEB questionnaires as a teaching and assessment strategy in Dentistry can be a viable tool in student and teaching practice, as long as they are correctly used. Further studies are needed to confirm the benefits of mobile APP and WEB questionnaires in teaching and assessment in Dentistry.
Descriptors: Mobile Applications. Learning. Dental Informatics. Internet. Teaching.

1 INTRODUCTION

The modernization of technology has introduced a series of tools that are able to promote comfort and leisure to human life. However, these technological resources must be used safely and bring advantages for the users. For this, people must be aware of its benefits and harms. Regarding the didactic aspect, it is interesting for teachers to explore this subject and employ these new techniques in their classes, as the use of mobile devices by academics is very common[1].

Today's society experiences the transition from the Information Age to the Knowledge Age, in which technology enables the expression of new activities, new ways of social interaction, diversification of places, formats, and structure of the teaching-learning process, expanding the perception of classroom and student-teacher and student-student interaction, adapting to the need for work[2].

The figure of the teacher seems to reveal new

concepts, starting to present a new profile: he must be able to recognize the reality and build new ways of acting in his teaching practice, respecting diversity and the free debate of ideas, in favor of society with better quality of life, health and a full citizenship experience[3].

It is justifiable, therefore, to propose the use of mobile devices with internet connection as a strategy and auxiliary tool in teaching and assessment, to approach subjects in an interactive way, promoting student autonomy when studying, more participation, and understanding about the addressed topic.

This article reports the experience of creating the RUBOND mobile application (APP) and its use associated with the WEB Questionnaires platform as teaching and assessment strategies in Dentistry.

2 EXPERIENCE REPORT

The creation of the RUBOND mobile application took place through the Fábrica de Aplicativos platform (São Paulo, SP, Brazil), already widely used by researchers from different areas to promote mobile learning. At first, the topics to be addressed in the APP were defined, with the theme of Universal Adhesive Systems being defined as a central subject. Adhesive techniques, materials, and manufacturers are described in chart 1.

Chart 1. Adhesive techniques that were described in the RUBOND APP, materials and manufacturers

MATERIAL / TECHNIQUE	MATERIAL / TECHNIQUE	MATERIAL / TECHNIQUE
- ADPER SINGLE BOND 2, 3M ORAL CARE **2-STEP WET TECHNIQUE:** After cavity preparation, wash and dry the cavity; - Apply phosphoric acid for 15 seconds on enamel and extend another 15 seconds on dentin; - Wash for 10 seconds, place a cotton ball on the dentin and dry enamel for 10 seconds; - Apply a good layer of the adhesive system and wait 20 seconds, plus a jet of air for 10 seconds; - Light cure for 10 seconds.	- CLEARFIL SE BOND, KURARAY NORITAKE DENTAL **2-STEP DRY TECHNIQUE:** - After cavity preparation, wash and dry the cavity for 10 seconds; - Apply the acid primer and wait 20 seconds, plus air jet for 10 seconds; - Apply the adhesive, plus a jet of air for 10 seconds; - Light cure for 10 seconds.	- SINGLE BOND UNIVERSAL, 3M ORAL CARE **1 STEP DRY TECHNIQUE:** - After cavity preparation, wash and dry the cavity for 10 seconds; - Apply the product and rub for 20 seconds plus air jet for 5 seconds. Repeat this application and air jet for 10 seconds. - Light cure for 10 seconds.

Photographs were taken of each step of the adhesive protocols (Apple Inc., Cupertino, CA, USA) with the iPhone 8 cell phone camera to prevent the APP from becoming cumbersome and/or sluggish. With the definition of the images, the search for the theoretical reference for the APP creation was carried out. The APP is made available via direct link and QR Code (DENSO Corp.) to its target audience – mainly academics, professors, and dentistry professionals (figure 1).

The elaboration of the questionnaires to evaluate the acquired knowledge was performed by using an online platform that offers many options for creating questions, with the possibility of adding images, graphs, different ways of correlating questions to answer, varying the methodology of

Figure 1. QR Code to access RUBOND

application of knowledge (onlinepesquisa.com). The questions used were taken from tests of the National Student Performance Exam (ENADE). Access to the questionnaires was made via direct link attached to the RUBOND mobile application. On the APP homepage, there are three rotating images and by clicking on them, the user will be directed to a WEB questionnaire, which was developed on the Google Forms / Google LLC platform.

Several studies in multiple areas of knowledge have shown great acceptance by academics for new technologies and teaching methodologies, with an emphasis on mobile learning, which is the centerpiece of this study.

The interconnection, associated with interactivity and innovative methodologies make the teaching-learning process more adequate to the profile of the current student. With the internet the world has changed, world views have changed and it is up to teachers and educational institutions to integrate these new tools into their teaching and assessment practices. Teaching institutions - in pedagogical meetings - encourage teachers to create active learning methodologies, which are a broad process and have as their main characteristic the insertion of the student as the main agent responsible for their learning; and the teacher being the encourager and motivator of this learning.

The globalized world and the flow of information associated with the emergence of new tools have changed the profile of academics and teachers, and with that comes the need to adapt teaching didactics and performance assessment to this new profile. Some authors[4] have indicated alternatives that have been designed to change the reality of the school. To this end, methodologies more aligned with contemporary reality, which promote student autonomy, have been developed[5]. The creation and development of new technologies have included new tools in people's daily lives that have become indispensable, such as smartphones, which currently appear as part of people's personalities. Dick's (2019) [6] findings show that participants claimed to take their smartphone to the university and use it while they are at the institution, including during classes. These devices, which are already part of the academics` lives and society in general, therefore, can and should be used to serve as tools to support teaching and assessment.

There are limitations when using mobile learning as a teaching strategy, some of them linked to the academic itself, such as the interest in the search for knowledge and focus on what one is doing. There is a great tendency to disperse attention after a few minutes of performing a certain activity. With the smartphone connected to the internet in hand, greater efforts in academic concentration can happen. Mussio (2020)[7] pointed out that education must be linked to the preparation of the user so that he/she sees technology as a means by which one learns and not as means capable of minimizing cognitive efforts. In the same study, the author also points out

difficulties in accessing different platforms, possible excess of information, in addition to ergonomic difficulties as potential limitations to mobile learning. Martins and Gouveia (2020)[8] also pointed out as emerging challenges the possibility of resistance from academics and institutions in the face of the new pedagogical model, problems related to the internet connection, and the responsibility of the academic to accept their duties.

Innovations in the market are constant, fueled by the lifestyle of capitalist societies. The competitiveness and the search for market dominance of the great technology providers bring to the consumer a wide variety of products according to their needs and purchasing power. Currently, some mobile devices have a higher capacity than many desktop computers in terms of data processing speed, as reported by Khaddage and Lattenman (2013)[9]. Melo and Carvalho (2014)[10] pointed out that, among the main potentialities offered by mobile devices for teaching and learning, the expansion of access to pedagogical content and the possibility of creating active, interactive and collaborative learning communities stand out. Participation in learning communities provides multicultural exchange between different people and cultures that enhance the construction of knowledge inside and outside the classroom[5].

In all scientific fields, the use of online tools makes it possible to practice the acquired knowledge in illustrative and dynamic ways, encouraging logical thinking and the construction of competencies about the objects of study.

Faleiros et al. (2016)[11] concluded that the use of virtual environments to carry out research in the health area represents an economic possibility, with greater speed of information and scientific production, capable of overcoming barriers such as languages, making it possible to carry out international multicenter comparative studies. The possibility of exercising knowledge from anywhere, at any time, in the palm of your hand, breaks the paradigm of "boring study", making the study/learning/practice process more pleasant and less stressful, in addition to generating savings and dispensing with impressions.

Additionally, Costa et al. (2015)[12] revealed that students are very interested and receptive to using mobile learning strategies. In the reflective evaluation, the students themselves highlighted the success of the proposal, realizing the contributions of the stages of construction, use, and evaluation of the application. In addition, the service used for the construction of the APP at Fábrica de Aplicação, proved to be adequate to the needs of this research, meeting the demand of the students and, at the same time, the objectives of the researchers.

According to Bispo (2016)[13] adhesives can be classified according to the form of treatment of the smear layer or the number of clinical steps. The classification by generations presents divergence in the literature, as it can lead to a misunderstanding that an adhesive belonging to a higher generation is more efficient and advantageous than another from a lower position. Therefore, the classification regarding the clinical steps and treatment of the smear layer was considered.

It is common the negligence of steps of the adhesive process by academics and professionals of Dentistry. The adhesive system can be represented by a chain that needs all its links to be equally strong. Failure in the clinical steps can lead to the failure of the technique and, consequently, of the procedure as a whole since restorations with

composite resins and many cementation techniques require an adequate application of the adhesive system. Recently, the so-called Universal Adhesive Systems appeared on the market, with the indication of use in different substrates in just one clinical step. Soares et al. (2020)[14] concluded in their study that universal adhesive systems are versatile and easy-to-use products, since the same product/bottle has several technical possibilities, thus reducing operative time and technical sensitivity. In this context, the creation of the application that involves the protocol for the use of universal adhesive systems for teaching and evaluation also seems to be appropriate and pertinent to the current moment in which adhesive dentistry is practiced.

The advancement of technology has introduced a series of tools that make life easier for human beings. However, technological resources must be used safely, and people need to be aware of their benefits. In the didactic scope, it is essential that teachers explore the contents, use new technologies and frequently obtain feedback from academics if these active methodologies are being correctly used[1,2]. During the stages of creation and testing with the mobile application in theoretical-practical activities of a Dentistry course in the State of Santa Catarina, students showed interest in participating in the activities and a lot of motivation to learn the contents of APP RUBOND.

3 FINAL CONSIDERATIONS

The creation of APP RUBOND and WEB Questionnaires as a teaching and evaluation strategy in Dentistry proved to be a viable strategy in student and teaching practice, provided they are correctly used. The interconnection, associated with interactivity and innovative methodologies make the teaching/learning process more appropriate to the profile of the current student.

RESUMO

O presente estudo relata a experiência da criação do aplicativo móvel (APP) RUBOND e o uso de questionários WEB como estratégia de ensino e avaliação em Odontologia. A criação do aplicativo móvel ocorreu por meio da plataforma Fábrica de Aplicativos, sendo definido a temática dos Sistemas Adesivos Universais como tema central. A elaboração dos questionários para avaliação dos conhecimentos adquiridos por meio do material disponibilizado no APP se deu por meio da plataforma Online Pesquisa. As questões utilizadas foram retiradas de provas do Exame Nacional de Desempenho dos Eestudantes. O acesso aos questionários aconteceu via *link* disponível no aplicativo móvel. A criação do aplicativo móvel RUBOND e questionários WEB como estratégia de ensino e avaliação em Odontologia podem ser uma ferramenta viável na prática docente e discente, desde que corretamente utilizados. Sugere-se que mais estudos sejam realizados para confirmar as vantagens dos aplicativos móveis e questionários WEB no ensino e avaliação em Odontologia.
Descritores: Aplicativos Móveis. Aprendizagem. Informática Odontológica. Internet. Ensino.

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Correspondence to:

Rubens Nazareno Garcia
e-mail: rubensngarcia@gmail.com
Curso de Odontologia da UNIVALI
Rua Uruguai, 458   Bloco C5
88.302-202 Itajaí/SC Brazil