XXV Congresso de Iniciação Científica da Unicamp

October 18 to 20 Campinas | Brazil

2017

A study on hybrid frameworks for the development of mobile applications

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Abstract

Nowadays, instant information access is very important and applications for m-learning has gained space. In this paper, we investigate a way to make TelEduc e-learning environment responsive with a mobile application (m-learning). In order to accomplish this goal, we studied two hybrid frameworks to choose the best one.

Key words:

m-learning, hybrid frameworks, responsive web design.

Introduction

The use of technology in schools, especially mobile devices, is a world trend. A survey by the OECD (Organisation for Economic Cooperation and Development), formed by 34 countries, shows that more and more schools are opting for mobile devices, because they offer greater flexibility of use when compared to desktops¹.

A survey released by Exame.com² in October 2014, shows that in Brazil, 78% of young people use smartphone and 42% have tablet, numbers comparable to those of Western Europe and the United States and beyond the use of PCs (69%). With such popularity of mobile devices, e-learning environments are building solutions to offer access to their platforms via mobile devices, what we call m-learning.

M-learning solutions can be categorized as follows³:

- i) device-specific application,
- ii) website specific to mobile devices and
- iii) website for desktops and mobile devices.

The last solution considers using responsive interfaces⁴, which are adapted according to the screen size of the device. With the increased processing power of mobile devices, this solution has gained space as it is necessary to render web pages and make the necessary adjustments on the client. The great advantage is to have only one code to maintain.

The aim of this study is to investigate how best to make the e-learning environment TelEduc 5 become responsive with a mobile application (m-learning). In order to achieve this goal, we investigated two hybrid frameworks (develop only one code for multiple devices) to find out which one best meets our needs.

Results and Discussion

A framework is a kit that has several ready features for software development. As it has native functionalities, it can save time and effort spent on basic programming like database access and system templates⁵.

We studied two of the most famous hybrid frameworks, the Ionic v2 and the PhoneGap, both use HTML 5 and CSS. The main advantage of this type of technology is the fact that only one code can be developed to run in different platforms, making all the work and maintenance cheaper and easier. Because the generated programs are cross-platform, it is not necessary to have programmers with expertise in Android, IOS, etc.

Ionic v2 works with Angular (a responsive framework) and was released in January 2017. On its website there are several tutorials available. In addition, it has constant updates, which shows that the framework is getting a lot of attention from the community of web developers.

PhoneGap is a framework started in 2012. Its focus is to work with inexperienced developers, offering ready applications that may work without many adjustments. It is not easy to find documentation for full development in the web site.

Conclusions

There are some ways to develop m-learning applications. We chose a hybrid solution (item (iii) described in the introduction) because it is easier to maintain. The Ionic v2 hybrid framework is the one that best fits our needs because it is new, constantly updated, and has much documentation available in the internet. Another advantage is that it works with Angular, which is also being used for the development of TelEduc 5.

¹ OECD site. <http://www.oecd.org/about/membersandpartners/>. Accessed in June 28th, 2017.

² Exame.com, 78% dos jovens usam smartphone, mostra pesquisa. <http://exame.abril.com.br/tecnologia/78-dos-jovens-usam-smartphone-mostra-pesquisa>. Accessed in June 27th, 2017.

³ Silva, A. C.; Freire, F. M. P.; Rocha, H. V. (2013) "Identifying Cross-Platform and Cross-Modality Interaction Problems in e-Learning Environments". In: 6th International Conference on Advances in Computer-Human Interactions, 2013, Nice/França. Proceedings of ACHI 2013, v. 1. p. 243-249.

⁴ Marcotte, E. (2011) "Responsive web design". A Book Apart (Ed.), 2011. Ebook disponível em <https://abookapart.com/products/responsive-web-design>. Accessed in June 28th 2017.

⁵ Jaques, R. O que é um Framework? Para que serve?. Available at: <http://www.phpit.com.br/artigos/o-que-e-um-framework.phpit>. Accessed in June 27th, 2017.