Best Practices in Teaching Mobile Application Development

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ABSTRACT

This paper presents best practices for teaching mobile application development across the Computing curricula. While the focus is on the BlackBerry smartphone, the best practices can be used when teaching application development for other mobile platforms. The best practices are supported by the freely available CMER Academic Kit for integrating mobile devices into the Computer Science Curriculum.

Categories and Subject Descriptors: K.3.2 [**Computing Milieux**]: Computer and Information Science Education – *computer science education, curriculum, human factors, literacy.*

General Terms: Algorithms, Design, Experimentation, Languages.

Keywords: Mobile application development, mobile devices, BlackBerry, programming for fun, teaching computer programming, teaching tools.

1. Introduction

Developing mobile applications is quite challenging because such applications are developed on platforms such as Microsoft Windows or Linux but deployed on a totally different platform such as a BlackBerry Smartphone [1]. Teaching students how to develop mobile applications can be a rewarding experience or a nightmare. This paper presents best practices for teaching mobile application.

2. Best Practices

The following best practices contribute to effective and satisfying teaching and learning experience to both, faculty and students.

2.1 Start Early, But It is Never Too Late

Teaching mobile application development can be done as early as the first introductory programming course (or even earlier) or late in the curriculum in a specialized mobile computing course, a software engineering course, or even in the capstone project. I have taught across the curriculum [2]. The unique characteristics of mobile devices and the considerations that need to be taken into account will assist students to look at traditional application development on desktop platforms from a different perspective and apply some of the strategies in mobile application development to developing applications for other platforms.

2.2 Setup a Virtual Environment

Some of the mobile platforms require several software packages to be installed, and if you're going to teaching mobile application development at the introductory level then setting up a working

environment can be challenging. For such situations, create a virtual machine with a working development environment so that students could just download the virtual machine and run it on their desktops or laptops. Other platforms, such as the BlackBerry, require a single software install such as the all-inclusive Eclipse Plugin for Java and Web development. However, students still need to download and install simulators and other packages, and hence it is recommended to setup a working development environment into a virtual machine.

2.3 Provide Students with Mobile Devices

While running applications in an emulated or simulated environment provides a good framework for testing, we believe that allowing students to experiment with the physical devices themselves provides a totally different and better experience. If students happen to have mobile devices running the platform you're teaching on then you could ask them to do that. Otherwise, most vendors have an academic program, such as the BlackBerry Academic Program (www.blackberry.com/academic) that provides devices (free of charge) to academic institutions interested in integrating mobile devices and mobile application development into their curriculum.

3. Instructor Resources

The CMER Academic Kit [3] has been created to facilitate the integration of mobile devices into the Computing curricula. The kit, which is available free of charge, takes a mobile approach to teaching Computing content with a focus on Java ME, BlackBerry application development, and Web-based Mobile Apps. The academic kit contains 30 weeks worth of teaching material including lesson slides, labs, tutorials, quizzes and assignments. The topics covered feature Java ME, BlackBerry, GUI, event handling, multimedia, security, and networking, and widgets.

4. Conclusion

The popularity of mobile devices among students is inspiring faculty to look for ways to teach students how to develop mobile applications. The best practices presented in this paper are supported by the CMER Academic Kit that is available free of charge for academic use.

5. References

[1] Mahmoud, Q.H., and Dyer, A., "Integrating BlackBerry Wireless Devices into Computing Programming and Literacy Courses", *Proceedings of the 45th Southeast Conference*, Winston-Salem, NC, USA, March 2007, pp. 495-500.

[2] Mahmoud, Q.H., "Integrating Mobile Devices into the Computer Science Curriculum". The 38th Annual Frontiers in Education Conference (FIE 2008), Saratoga Springs, NY, USA, October 22-25, 2008., pp. S3E-17-S3E-22.

[3] CMER Academic Kit: CMER.cis.uoguelph.ca, last accessed on March 10, 2011.