Developing A Mobile Web Application For Multiple Phone Platforms

A Proposal to the University of Waterloo

Submitted by **Modo Labs Inc.**

Content

Executive Summary

The University of Waterloo is seeking a mobile-specific technical solution to deliver particular content to students via mobile devices. The University of Waterloo's Request for Proposals (RFP) states that the goal of this technical solution is to improve students' life at the University by providing them with better access to the information they need while studying at the University.

The specific content to be accessed via mobile devices is: email, personal course timetable, campus map, dining places, bus schedule, university news, university events calendar, and a virtual tour of modern university facilities.

There are two mobile-specific technical solutions that can best address these requirements:

1. A mobile web application for multiple phone platforms, or

2. Native applications for each phone (Apple, Android, Google and Blackberry) platform.

We recommend that the University of Waterloo proceed with the development of a mobile web application for multiple phone platforms, instead of native applications for each phone (Apple, Android, Google and Blackberry) platform, because the:

1. Cost to develop the application is lower;

2. Time to deploy the application is shorter;

3. Process to update the application is faster.

We estimate that this project will cost **$38 000.00** and will take **760 resource hours spread over a period of five weeks to complete**. The University will host the application on its own server.

Introduction

This proposal is a response to an RFP by the University of Waterloo to provide a mobile-specific technical solution for delivering particular content to students on mobile devices.

The University of Waterloo is seeking a mobile-specific technical solution to deliver particular content to students via mobile devices. The University of Waterloo's RFP states that the goal of this technical solution is to improve students' life at the University by providing them with more access to the information they need while studying at the University.

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This proposal contains four major sections:

1. The first section examines the current situation and an ideal solution.

2. The second section describes our recommended solution and an alternative solution.

3. The third section evaluates the solutions discussed in the proposal;

4. The last section concludes with our recommendations for the university.

The Current Situation

Seeking A Mobile-Specific Technical Solution

While the University of Waterloo's website works across mobile devices, the University is seeking a mobile-specific technical solution to deliver particular content to students via mobile devices. The goal of this technical solution is to improve students' life at the University by providing them with more timely access to the information they need.

The content that students specifically want to access via their mobile devices is: email, personal course timetable, campus map, dining places, bus schedule, university news, university events calendar, and a virtual tour of modern university facilities.

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An ideal solution

This ideal solution has three benefits, including the:

1. Cost to develop the application is lower;

2. Time to deploy the application is shorter;

3. Process to update the application is faster.

The Solutions

Ideal solution: a mobile web application for multiple phone platforms

A mobile web application for multiple phone platforms is an Internet-enabled application that is developed for any smartphone device. It is accessed through a smartphone device's web browser and it does not need to be downloaded and installed on the device. A mobile web application for multiple phone platforms is based on HTML5 and is written in JavaScript (see **Figure 1**).
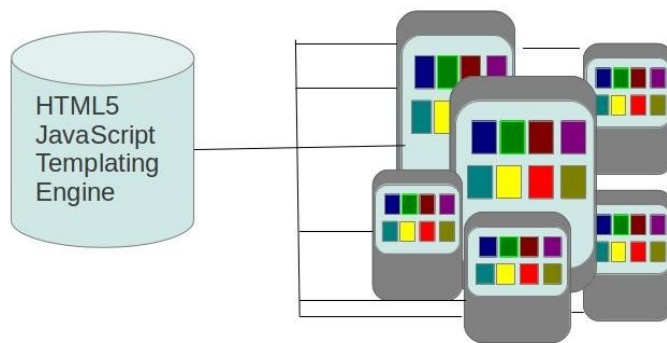

Figure 1. A mobile web application for multiple phone platforms

A mobile web application for multiple phone platforms can best meet the University's requirements for a mobile-specific technical solution and successfully deliver particular content to students' mobile devices. As you will see further in the proposal, proceeding with a development of a mobile web application for multiple phone platforms can economize development cost and can save deployment and updating time.

Alternative solution: a native mobile application for each phone platform

A native mobile application for each phone platform is an application that is developed specifically for a particular device and its operating system. It is not accessed over the Internet, but is downloaded from a web store and installed on the device. Different native mobile applications for each type of phone platform with a different operating system are written in different programming languages. For example, a mobile application on iPhone is written in Objective C, whereas a mobile application on Adroid is written in Java (see **Figure 2**).

A native mobile application for each phone platform can be an alternative solution to meet the university's requirements and successfully deliver particular university content on student mobile devices.
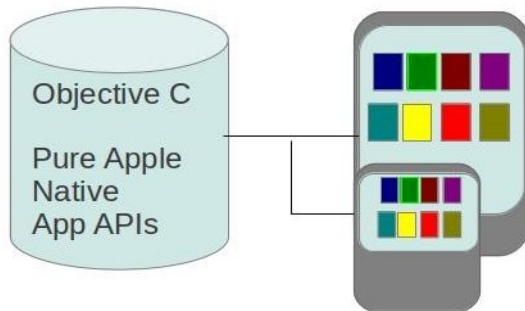

Figure 2. A mobile native application for each phone platform

A mobile web application for multiple phone platforms economizes development cost

The key benefit of a mobile web application for multiple phone platforms over a native mobile application for each phone platform is cross-platform compatibility.

The university will pay for the development of a mobile web application once, and then will run it on all devices that support web standards.

The cost charged for development of a mobile web application for multiple phone platforms will be lower than for development of four native mobile applications, as the University will be forced to pay for the development of native mobile applications for Apple, Android, Windows, and Blackberry phone platforms to reach as many students as possible. **(**See **Table 1)**

As you can see from the Table 1, the estimated cost for developing a mobile web application for multiple phone platforms ($760.00) is nearly half as much as the estimated cost for developing native mobile applications for each phone platform ($1 408.00)[1]

Table 1. Estimated Cost Breakdown for Developing a Mobile Application

Task	Mobile Web Application For Multiple Phone Platform		Native Mobile Application For Each Phone Platform	
	Time (hours)	Cost ($)	Time (hours)	Cost ($)

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[1] **The cost given is on the condition that the mobile application will be hosted on a server at the University of Waterloo.**

Identify the content to be delivered via mobile devices	160	8 000	160	32 000
Design mobile user interfaces (UIs)	120	6 000	72	24 000
Code	320	16 000	80	16 000
Test	96	4 800	24	4 800
Deploy	64	3 200	16	3 200
TOTAL	760	**38 000**	1 408	**80 000**

A mobile web application for multiple phone platforms saves deployment time

The other top benefit of a mobile web application for multiple phone platforms is fast deployment. The application can be deployed and run on the University's web server without any approval from the app store.

To deploy a native mobile application for each phone platform, the University needs to go through an app store approval process for each of the phone platforms: Apple, Android, Google and Blackberry. New applications are usually reviewed for approval by an app store within 7 days (168 hours). (See **Table 2**).

Table 2. Estimated Time Breakdown for Receiving App Store Approval for Deployment of a Mobile Application

	Deployment Time (hours)	
Task	**Mobile Web Application For Multiple Phone Platform**	**Native Mobile Application for Each of Phone Platform**
Get approval from app stores	0	168
TOTAL	**0**	**168**

A mobile web application for multiple phone platforms saves updating time

The University will not need to release a new version of a mobile web application for multiple phone platforms or update it. The latest version of the application will always run on users mobile devices.

With a native mobile application for each phone platform, the University will have to release a new version or update the current one. On top of that, users will have to always download and install updated versions on their mobile devices.

Disadvantages of a mobile web application for multiple phone platforms

A mobile web application for multiple phone platforms has issues with some functions, such as 3D graphics, file management, address book access, taking pictures, etc. However, there are ways to overcome this inconvenience.

Appcelerator (paid) and Phonegap (free) are two development tools that would let the University run a mobile web application using 3D graphic and file management services. Having access to JavaScript APIs for the accelerometer will enable use of address book and camera functionality.

Evaluation Of Solutions

We recommend that the University proceed with a mobile web application for multiple phone platforms to deliver particular content to students' mobile devices.

If the recommended solution is adopted, the:

- Cost ($38 000.00) is charged for development of one application;

- Application deployment process bypasses an approval from the app stores;

- Ability to update the application requires an update to files on the University's server;

- Latest version of the application always runs on users mobile devices.

The alternative solution is to proceed with native mobile application for each phone platform. Like a mobile web application for multiple phone platforms, they can deliver particular content to students' mobile devices. However, we do not recommend this solution, because:

- The cost ($80 000) is charged for development of four native mobile applications;

- The application deployment process takes up to seven days minimum to receive four approvals from four different app stores;

- To update the application requires the release of a new version of the application or an update to the old one;

- The latest version of the application has to be downloaded and installed each time by users on their mobile devices.

Conclusion and Recommendations

The requirements by the University can be met with:

1. One mobile web application for multiple phone platforms, or

2. Four native applications for each phone platforms.

We recommend that the University of Waterloo proceed with the development of a mobile web application for multiple phone platforms instead of four native applications for each phone platform because the:

1. Cost to develop the application is lower;

2. Time to deploy the application is shorter;

3. Process to update the application is faster.

We estimate that the project will cost **$38 000.00** and will take **760 resource hours spread over a period of five weeks to complete**. The University will host the application on its own server.

Appendix 1

About Modo Labs Inc.

Modo Labs Inc. offers mobile solutions and support services to help universities and enterprises take advantage of the fast growing Kurogo Open Source Mobile Platform. Our technology integrates with and transforms data and content from any source, and presents it on any mobile device.

Modo Labs Inc. created mobile applications and websites for many of the world's leading universities and businesses. Our clients include: Harvard University, University of British Columbia, Villanova University, China Europe International Business School, Massachusetts General Hospital, Brigham and Women's Hospital, and many more.

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Glossary

Application distribution platform – a platform defined as a place to launch a software. The platform provider offers the software developer an undertaking that logic code will function consistently as long as the platform is running on top of other platforms.

Computer hardware – a set of physical elements that comprise a computer system. It refers to the physical parts or components of computer such as monitor, keyboard, hard disk, mouse, etc. Refers to objects that you can actually touch, like disks, disk drives, display screens, keyboards, printers, boards, and chips.

Computer software – a set of programs (instructions, procedures and algorithms) and related data (qualitative or quantitative variables) that provides the instructions for telling a computer what to do and how to do it. Software refers to one or more computer programs and data held in the storage of the computer.

Custom/ native mobile application for each phone platform - an application that is developed specifically for a particular device and its operating system. It is not accessed over the internet, but is downloaded from a web store and installed on the device. Different custom/ native mobile applications for each phone platform with different operating systems are written in different programming language.

Deployment of application – a set of activities that makes an application available for use.

Development of application – a process of creating an application.

HTML (Hypertext Markup Language) is a formatting language that programmers and developers use to create documents on the Web. You view a Web page written in HTML in a Web browser such as Internet Explorer, Mozilla Firefox or Google Chrome.

JavaScrip - a programming language that supports the writing of **scripts**, programs written for a software environment that automate the execution of tasks which could alternatively be executed one-by-one by a human operator.

Mobile application - a software application designed to run on a smartphone device. A mobile application is available through an application distribution platform, which is operated by an owner of a mobile operating system. There are four owners of mobile operating systems: Apple, Android, Windows, and BlackBerry.

Mobile operating system - the set of software that operates a hardware resources of a smartphone or other digital devices and provides common services for its programs.

Mobile web application across all phone platforms - an Internet-enabled application that is developed for any smartphone devices. It is accessed through a smartphone device's web browser and it does not need to be downloaded and installed on the device. A mobile web application across all phone platforms is based on HTML and are written in JavaScript.

Smartphone - a cordless device that can make and receive telephone calls over a radio network while

moving around a wide geographic area. It is built on a set of computer software that manages computer hardware resources and provides a common sequence of instructions written to perform a specified task with a device.

Programming Language – an artificial language that is designed to communicate instructions to a machine, particularly a computer.

Updating application - replacement of an application with a newer version of the same application.

Web browser – a software application for retrieving, presenting and traversing information resources on the World Wide Web, which a system of interlinked hypertext documents accessed via the Internet. With a web browser, a person can view web pages and navigate between them via hyperlinks.

Web store – on-line store for free and paid applications.

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