

# Chapter 7

## Cross Platform M–Learning for the Classroom of Tomorrow

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### ABSTRACT

*Mobile devices are becoming more and more commonplace across all walks of life from the workplace to leisure activities and even the classroom. Many schools shun the use of devices such as mobile phones in the classroom environment, but this will have to change as they become a more integral part of our daily lives. The ever increasing capabilities of these devices allow for opening up on new application domains. The ubiquitous use of mobile technology in the classroom may provide new and interesting ways for students to interact with subject matter. This chapter discusses the use of cross platform Bluetooth enabled mobile devices within the classroom setting to allow students to interact with subject matter in a new and interactive way using the ICT resources that are ever present in our daily lives.*

### INTRODUCTION

The revolutionary Irish writer Thomas Osborne Davis born in Mallow the crossroads of Munster, Ireland is renowned for the saying “Educate that you may be free”. At the time of his birth in 1814 the primary tools of the classroom were books and writing tablets. Little has changed in almost 200

years as students still heavily rely on written text in print format, and copy books to answer solutions to questions proposed by the teachers. The majority of schools on the island of Ireland are equipped with at least one computer laboratory capable of facilitating about twenty or so students at any given time, both at primary and secondary school level. These facilities are however extremely under utilised, a class may expect to see the lab for as little as one

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hour per week, and many classes may go through school without ever seeing the lab.

This is where mobile technology can be used to reinvent the way in which classroom based learning is carried out. This can prove advantageous for both the teacher and student, and provide new and interactive ways to learn that can help to engage and entertain the students. In early 2008 the mobile phone market penetration rate for Ireland stood at well over 111% and in November 2007 it was announced that world wide mobile phone subscriptions surpassed 50% of the world's population. One can say that every school going student is an expert in the usage of a mobile phone, from the sending of text messages to the use of more advanced features such as video messaging. They therefore require little or no training in how to use a new application designed for the mobile platform. Given this, the mobile platform is the perfect mechanism to engage and interest students in topics that many may otherwise find boring and uninteresting.

To allow the teacher to interact and deliver content with the student's mobile, one may readily think of using SMS messages to transmit questions and answers to and from the student's phones. This however is hindered by the fact that each transmission would incur a financial cost. Similar financial costs are also incurred if one was to use a mechanism such as WAP or simple html pages to deliver content and collect feedback. One viable alternative is the use of Bluetooth technology. There are presently over two billion Bluetooth enabled devices in existence, with this being added to every day. A considerable proportion of all mobile phones now sold come with Bluetooth as standard, often conforming to Bluetooth 1.2, but more and more are we seeing low to moderately priced phones shipping with Bluetooth 2.0 as standard.

Bluetooth provides an excellent transmission mechanism as there are no financial costs incurred for inter-device communication. Many teachers may have access to devices such as laptop or PDA's

which they can use to drive the cross-platform, mobile teaching/learning student experience. A perfect example of this is in the subject area of mathematics where by the teacher could send out a problem to be solved to the student. The students in turn would have to solve the problem and transmit the solutions back to the teacher's device. Such a mechanism can provide the teacher with accurate feedback as to how well each individual student is performing, as well as the class as a whole, with just a single glance of their master terminal.

Bluetooth application programming generally requires substantial development time, primarily due to the searching for the devices, creation of connections and maintenance of those connections. The Mobile Message Passing Interface (MMPI) provides the developer with a simple to use mechanism that abstracts them from all of the underlying Bluetooth application development necessary for even the simplest of programs. It allows for rapid application development with minimal code development. It is therefore the perfect development architecture to employ for the efficient development of a Bluetooth enabled application. The multi-platform Student/Teacher mathematics tool presented in this chapter makes use of this library to provide the end user with a simple and engaging application that allows for classroom based learning to move the traditional booked based paradigm into 21<sup>st</sup> century technology based pedagogy.

## **BACKGROUND**

To facilitate the effective development of Bluetooth based applications it is necessary to provide the developer with some form of framework that abstracts them from lower lying Bluetooth specific code development. This allows for Bluetooth applications to be developed in a more efficient manner, simplifying the development process and reducing potential errors. A number of such frameworks are in existence providing the devel-

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