

BlackBerry Mobile Learning Environment For Higher Education Institute



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Abstract: BlackBerry mobile device application tools for higher education are about much more than wireless email. It also offer ways to assist faculty, staff and students stay in touch and better informed, both on and off campus. They're about providing anytime access to critical information and communications through a combination of applications, services, and student's interaction.

Keywords: mobile devices, BlackBerry, m-learning, education

1. INTRODUCTION

Research In Motion (RIM) is the designer, manufacturer and marketer of wireless solutions, such as the BlackBerry smartphone for the worldwide mobile communications market. The BlackBerry wireless device is a well-engineered general purpose communication device that presents numerous opportunities for educators and students in computer science [4]. RIM is based on open standards such as the Java platform, allowing developers to create state-of-the-art mobile applications that leverage the BlackBerry features. The BlackBerry is a unique device because it includes a Java ME virtual machine on every device, and RIM provides free Java development tools.

The BlackBerry is becoming an integral tool of many business users and consumers [3]. As more and more individuals are opting to use mobile phones as their primary communication device and using them as the computing platform of choice, it is important for students in computer related fields to become equipped with the skills to allow them to take advantage of this industry.

The BlackBerry provides a great platform for teaching and learning about computer science concepts at introductory and advanced levels [5]. With the widespread use of mobile devices such as the BlackBerry smartphone, there is a great need for innovations in computer science education to reflect today's reality. Students in introductory programming courses, for

example, usually develop and test their programming assignments on a platform similar to the one on which they will be tested by the instructor. But this is not the case for mobile applications, which are developed on one platform such as Microsoft Windows or Linux and deployed on a totally different platform such as the BlackBerry [2]. Hence, there is a great opportunity for introducing students to different programming models, since such an experience will not only be practical but also inspire students to learn. These students could play a key role in driving innovations in the mobile market space [4].

This paper provides an overview of the BlackBerry platform and the tools that are available for students, and discusses how this platform can be integrated into a computer science curriculum.

2. THE PROBLEM STATEMENT

The African academic vision is to ensure the highest possible quality of education in a changing Africa. The modern African citizen is born in the era of digital resources. African citizens need optimal access to digital mobile device and academic resources and current information to promote effective decision making. Research reveals that almost 99% of student teachers in any given African teacher educational institution own advanced mobile phones [2]- a tool that could be used for teaching and learning. It is argued that the use of cell phones in the curriculum may transform education by providing a wealth of resources, new forms of communication and virtual learning environments. Moreover, it emphasizes that mobile devices also promote social networking, which encourages collaborative learning. Social networks involve peers, colleagues and parents.

3. OVERVIEW OF THE BLACKBERRY

3.1 Overview of the BlackBerry

The BlackBerry wireless device was first introduced as a means for voice and instant messaging. Today, it is becoming an integral tool of many business users and consumers. It is not

only used as a cellular phone, but also provides organizer functionalities and is capable of executing Java-based applications based on Java ME [3]. More recent models are even equipped with built-in digital cameras, media players, Bluetooth and Wi-Fi. With so many features, it is not surprising to see the BlackBerry as one of the most popular mobile devices today, especially in South Africa. The BlackBerry is continually evolving with more innovative models released every year ([8], [13]). Furthermore, RIM has thousands of third party vendors developing applications for this device. With this growth and expansion of subscribers, more developers will be needed to create the applications for this platform. Learning about mobile devices in today's classrooms will be beneficial to students as well as the industry.

RIM provides tools that software developers may use to program the BlackBerry. The majority of these tools are provided free to encourage development of the BlackBerry. Of these tools, perhaps the most popular one is the BlackBerry Java Development Environment (JDE), which is an integrated development environment (IDE) for the BlackBerry platform [4]. This IDE is also equipped with a device simulator that can be used to load and test programs written for the BlackBerry. Other popular tools include the BlackBerry Email and the Services Simulator Package, which can emulate certain aspects of the BlackBerry Enterprise Server. When used in conjunction with a BlackBerry Device Simulator, users can simulate browsing web content, sending and receiving email messages or application data traffic ([5], [7]). RIM also provides plug-ins for developers who are comfortable with existing tools such as Eclipse and Microsoft Visual Studio.

3.2 Java on the Blackberry

While some BlackBerry devices are based on C++, all new ones support Java ME primarily because Java technology makes developing applications much easier.

Its platform-independence eliminates many porting woes and its automatic garbage collector lets developers concentrate on application logic rather than memory management. RIM's support for Java ME includes development of its own Java Virtual Machine (JVM), which supports the Connected Limited Device Configuration (CLDC), and the Mobile Information Device Profile (MIDP). BlackBerry devices also come with additional BlackBerry specific APIs that enable developers to create applications that have the BlackBerry-native look and feel and are more sophisticated than standard MIDlets developed using Java ME MIDP. These APIs also provide access to many of the device's functions such as the phone, media player, browser, messaging system, Bluetooth, Wi-Fi, wireless radio, USB, and sockets. These classes can be easily integrated as part of any other application.

3.3 Blackberry Solutions for Higher Education

BlackBerry solutions for higher education are about much more than wireless email [1]. They are about offering ways to help faculty, staff, and students stay in touch and be more informed. They are about providing anytime access to critical information and communications through a combination of applications, services, peripherals and BlackBerry product offerings ([5], [7]). BlackBerry solutions for higher education can also help institutions to enhance their leadership image, improve safety and attract top faculty members and students. Along with on-the-go access to email, personal information management, voice and web, BlackBerry solutions for higher education can also offer small and large institutions wireless access to learning management portals, back-end systems and third-party applications such as research and polling tools [8]. Advanced security features are designed to ensure the confidentiality and integrity of wirelessly transmitted information like student records and financial data. Collaborating with colleagues, talking to publishers, researching online, consulting or managing appointments, all contribute to make life easier for the educator

Today, attracting top talent means providing the tools students need to be successful and perform at the highest level. It also means demonstrating an advanced strategy for on-campus safety. For these reasons, post-secondary schools are increasingly expected to deliver services, content and media to mobile devices ([4], [5]). Students equipped with a BlackBerry smartphone can have an all-in-one tool that works on both cellular and Wi-Fi networks. They can interact with their peers and professors more easily and can access class discussion sites or multimedia material from virtually anywhere.

3.4 Related Work

Mobile learning systems have demonstrated the usefulness of context-awareness support, providing appropriate information to support a student's university life at the right time and in the right place [12]. In addition, use of mobile devices as an interactive tool in education has proven useful for increasing the communication between learner-learner and learner instructor.

3.4.1 Abilene Christian University

Abilene Christian University (ACU) in Texas will be the first university in the nation to issue an iPhone or iPod Touch to all students. This innovative learning experience will be closely followed to see how these converged media devices will be incorporated into both the classroom and the daily mobile life of the faculty and students.

3.4.2 Montclair State University

Montclair State University Campus Connect is a relatively new initiative that was initially created for communication purposes, but is beginning to add learning support. All incoming students

receive a GPS-enabled phone as part of their tuition/fees. The phone has been preloaded with tools for learning, safety, community, and campus navigation.

3.4.3 Duke University

Duke University has devoted an entire department to integrating mobile technology into many of its classrooms, curricula, and knowledge sharing. The Duke Digital Initiative (DDI) has enabled students to gain access to equipment such as ultra mobile tablet PCs, and allowed them to use their own technology (such as Apple iPods and cell phones) to listen to class podcasts, be contacted via text messages about school alerts, and to access Webcasts that update students about new and upcoming features to the DDI. Furthering the partnership with Apple, Duke is one of the first universities to customize iTunes to distribute lectures, symposiums, class materials, school news, and of course, music. The program is called iTunes U and enables faculty and students to make/take course materials with them on their iPods using Apple’s simple and popular interface. Courses have made extensive use of iTunes.

4. PROPOSED BLACKBERRY APPLICATIONS PLATFORM FOR EDUCATION

The Vaal University of Technology department of Information Communication and Technology has recently started a project to improve the learning of students, by incorporating mobile technology in the classroom to support the instructional process and assessment of educational content. As researchers, we have thus started to actively explore further capabilities of mobile devices, specifically considering how mobile devices can be made to be more efficient in improving learning in a mobile society.

A smarter educational experience provides students and educators with limitless access to the information they need, when they need it, almost anywhere they are. By creating a technology-enabled learning environment in and out of the classroom, we provide a full mobility experience that supports education. In Fig 1, the basic architectural layout of the system currently under development is depicted.

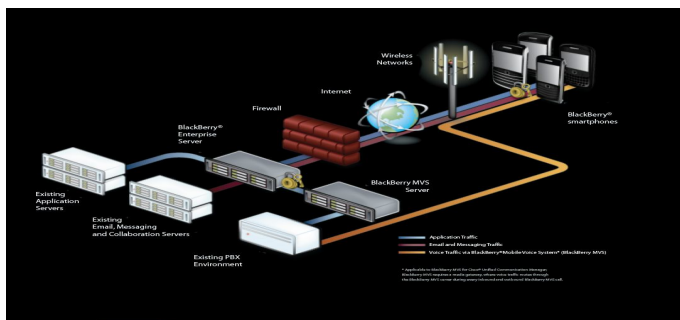


Fig 1: Implementation architecture of blackberry mobile voice system



Fig 2: Apps under development tool

In Fig 2, the applications (apps) currently under development are depicted.

4.1 Future Proposed BlackBerry and HTC Applications Development for Education using BMLES (BlackBerry Mobile Learning Environment Software)

It is important to note that mobile learning provides features like the publishing and sharing of lectures, participation in discussion forums, integration of campus life, access of campus maps, viewing courses online and campus safety alerts. Panic buttons can also alert campus authorities of a student’s location.

A notable value for students is to have instant access to course resources whenever needed, they are able to return assignments and receive feedback, and are able to communicate with the course staff and other students. A value for lecturers and course staff is that lecture presentations and materials are accessible to all students regardless of time and place. Furthermore, lecturers using the system are able to provide instant feedback to students’ assignments. By having direct access to the feedback database, the lecturer can evaluate the learner’s progress in courses.

5. TOOLS

Although deploying learning content for multiple devices is not without some challenges, there are tools available to make this process easier. Those organizations with standardized deployment of mobile devices definitely have a much easier time ([3], [4], [5]). Development tools from established vendors such as Adobe offer templates and tools available for mobile, as well as testing tools. XML-based Learning Content Management Systems (LCMS) are also making mobile deployment options available for existing eLearning content.

The ultimate goal for most development organizations is to develop once and deploy everywhere, but we are not quite there yet. Vendors such as Giunti Labs and Instancy are moving quickly in that direction. Although we continue to work with the tools and technologies available today, as researchers we also

need to continue to follow and explore future capabilities for having access to information and communication methods available to us anytime and anywhere. And at the same time, not forgetting the basics, such as voice and text, and how they are most effectively used to improve learning in a mobile society.

6. METHODOLOGY

A quantitative research approach is usually used in studies intended to measure lecturer and student attitude towards mobile learning, specifically based on the BlackBerry environment [14]. Additionally, if the research problem is identifying factors that influence an outcome, the impact of an intervention, or to understanding the best predictors of outcomes, a quantitative approach is preferable.

This study examines the factors that influence the adoption of BlackBerry technology for educational purposes among the students of the Vaal University of Technology. A survey instrument was developed with five questions that addressed various aspects of Mobile Learning Environment Software Tool using class room(see Table 1).

S.no	Question	Agree	Disagree	Strongly Agree	Strongly Disagree
1	Is it useful PL/SQL Video lessons interacting with mobile device	40%	20%	10%	20%
2	Is it useful to teach through mobile application software	25%	25%	30%	20%
3	Is it useful upload lessons through mobile device	50%	10%	30%	10%
4	Is it useful for under prepared students using mobile device	60%	5%	30%	5%
5	Is it useful Black Berry Mobile Learning Environment Software for Diploma students	0%	50%	0%	50%

Table 1: Main questions in survey instrument

The questions were designed to collect the students’ impressions of the ease of use of the BlackBerry, comfort with the device and its usefulness to them. A five-point Likert Scale (i.e., "strongly agree" to "strongly disagree") was used. A pilot study was conducted to ensure the survey questions were easily and correctly understood. The sampling frame was all students in Diploma/BTech IT/MTech who own a BlackBerry mobile phone (we have done experiment with five mobile device). All participants were asked to complete a questionnaire which measured students’ attitudes towards the topic, the perceived usefulness as a learning tool , subjective norm, perceived ease, perceived financial impact and prior use of technology for educational purposes.

Factor analysis techniques were used for data analysis. Factor analysis is designed to group variables into a smaller number of factors by looking at the correlations between variables [15]. It

is often used to determine whether a set of variables is related to an underlying dimension;in this study, specifically whether users’ behavioral intention is to adopt BlackBerry mobile learning. The statistical package SPSS was used to assist with this data analysis. SPSS (originally, Statistical Package for the Social Sciences, later modified to read Statistical Product and Service Solutions) was released in its first version in 1968 after being developed by Norman H. Nie, Dale H. Bent and C. Hadlai Hull. SPSS is among the most widely used programs for statistical analysis in social science. It is used by market researchers.

7. RESULTS AND DISCUSSION

The purpose of this study was to determine the key factors influencing the behavioral intention for adoption of BlackBerry Technology among Vaal University of Technology students’ learning.

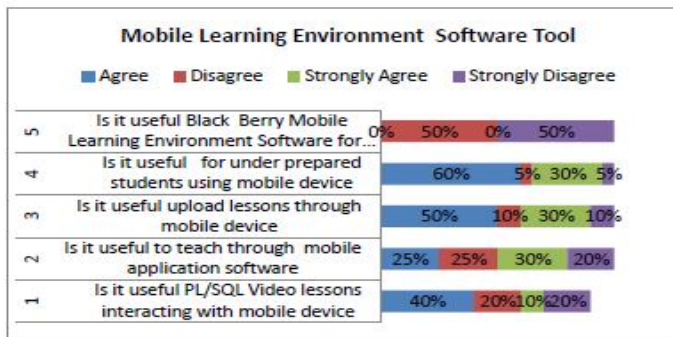


Fig 3: Mobile Learning Environment Software Tool

The data (Fig. 3), showed that most students consider mobile learning as beneficial to their studies. Uploading of video lessons is considered most beneficial. Also noteworthy is the use of mobile devices to prepare, which had unexpected results. Since this study is still continuing, more relevant and practical applicable results are expected.

8. CONCLUSION

As we all know, today every career path open to a computer science bachelor’s student encompasses aspects of mobile devices and mobility. System administrators need to configure email servers for mobile users; programmers need to build applications to run on mobile devices; web developers need to port an interface for mobile users; and project managers must understand the cost and benefits of porting a system to a mobile device. The BlackBerry wireless device represents an ideal platform for introducing and teaching mobile application development in the computer science curriculum. Mobile application development needs to be introduced in early courses and discussions should continue across the curriculum.

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