Mobile Technology in Education – A Multimedia Application.

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Abstract

This paper is the result of collaboration between a company involved in mobile media and an academic institution. It outlines some of the driving forces behind learning using mobile technologies, or mobile learning (m-learning) as it is known. The progression of mobile media from current entertainment services to future learning services is outlined. The process of developing an m-learning application for what is currently the most advanced 3G mobile phone is presented. The application has been short-listed in a worldwide competition for advanced 3G mobile applications by a major network provider. Some conclusions are also discussed.

Introduction

M-Learning refers to the use of mobile devices (PDAs and mobile phones) in teaching and learning. As computers and the Internet become more essential educational tools, the technologies become more portable, affordable, effective and easy to use [1]. A paradigm shift is occurring in the access people have to educational materials due to the ubiquitous availability of these materials brought about by the mobility and pervasiveness factors which are inherent to mobile technologies, thus allowing learning at any time and in any place.

Benefits of M-Learning

The potential for mobile technologies in education is enormous and research is being conducted into an effective pedagogical model for m-learning [2]. Some of the key benefits identified by BECTA Research in the UK were the general student learning gains derived from increased enthusiasm, motivation, confidence and a sense of ownership. M-learning supports shared assignments and collaborative working. Other benefits of m-learning were the increased independence and self-initiated learning in students, and the extension of learning beyond the classroom. M-learning is ubiquitous asymmetric learning. M-learning is also an assistive technology for learners with learning difficulties and/or disabilities.

It has been established now that mobile on-line lectures are a viable alternative to paper-based lecture notes [3]. The Leonardo Da Vinci project has shown that m-learning gives students more flexibility and choice in where and when they learn outside of the classroom. Students would be using technology in their college study that would enhance their readiness for tomorrow's workplace where employers want graduates who know how to use technology for learning and working. Given the trend to lifelong learning, many "students" are working adults with full-or-part-time jobs. Mobility offers them an opportunity to maximise learning while commuting or during what might otherwise have been "down time."

From Entertainment Media to Educational Media

The main driving force behind m-learning is the pervasiveness of mobile devices. The mobile market has grown considerably in recent times. Over 50 percent of all employees spend up to half of their time outside the office. The average employee had less than three days of training in 2003. More than 525 million web-enabled phones will be shipped by 2003. Worldwide mobile commerce market will reach $200 billion by 2004. There will be more than 1 billion wireless internet subscribers worldwide by 2005.

It is important to look at the evolution of mobile entertainment media and consider the impact this may have on mobile educational media. Currently, mobile devices are being used extensively for multimedia.

Students may purchase advanced media phones for reasons which have nothing to do with education, but may then use them for educational purposes. So mobile entertainment media may be considered an enabling factor in terms of mobile learning take-up.

Mobile learning is being experimented with in different universities and flexible teaching solutions are being created [4]. Research has been conducted as to how SMS technologies would be used to support the students in Universities [5]. Papers have also been written on the details of the experiences and technical issues encountered in supporting the use of handheld mobile devices by educators and administrators [6].

M-Learning Application

The creation of the m-learning application involved the conversion and adaptation of an e-commerce pocket book. This book is commonly used as training material by companies and educational institutions both as a printed book and as an electronic PDF file. The application was designed for the new 3G Motorola A925 mobile phone supplied to the authors by 3UK.

The e-commerce pocket book was converted to an interactive Flash animation format, capable of being run on the phone. Special consideration had to be paid to the design constraints imposed by the mobile environment. Compared to development for a PC environment the application had certain specific design constraints, namely:

1. File size had to be kept to a minimum to minimise memory storage space on the phone, download time and cost of download (mobile users typically pay per kilobyte downloaded)
2. Minimal use of colour and sound were necessary due to processing power and battery life.
3. It had to conform to the size of the display area on the new A920 phone (208 x 227pixels) and be readable.
4. The finished application had to be totally compatible with a standard Flash 5 emulator.

The core of the application development focused on making the content of the e-commerce book easy to read and understand, while enhancing the educational value of the material. The content is presented in an easy to use, interactive and graphically aesthetic environment. The user interface is easily navigated and self explanatory.

Figure 1: The Motorola A920 displaying the Contents Page

Conclusions

A major factor that needs to be considered when choosing a media technology is whether the media type can be easily created and used by the mass market. Currently, few of the media technologies work on what might be termed a mass-market mobile phone. Most will however work on higher end devices. Java is currently the only common denominator amongst today's phones, and this makes it very attractive in terms of application development.

Other factors include the size of the downloaded media files and associated cost and also the delivery mechanism for delivering the media content to the phone. Also, interactive content conversion to a format suitable for mobile can be very costly and time-consuming.

The method of content delivery is of the utmost importance for m-learning. Lessons should be learnt from the evolution of mobile entertainment media.

The market for mobile devices is dominated by small-screen mobile phones. To ensure maximum take-up, m-learning should be orientated towards these devices. Consideration should also be given to the inevitability that mass-market devices will in the future incorporate capabilities only now available in advanced devices such as PDAs and advanced larger-screen mobile phones.

References

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Acknowledgements