Student Experience
Issues of Wireless Access and Cloud Deployment in Higher Education

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Abstract: Universal move to wireless learning enabled through mobile apps has been evident over the last eighteen months in the higher education (HE) sector. Penetration rate of smart phones amongst students have reached a record high. Universities are investing in mobile applications enabling wireless access to current Learning Management Systems (LMS), while carefully considering benefits of the cloud for secure and flexible provision of LMS services. Capabilities of wireless devices present issues of access, presentation and compatibility of e-learning materials, while cloud infrastructure as a service raises concerns of security as data is hosted by third parties outside of the corporate firewalls. The research questions are presented for discussion through the lens of the student experience. A case of a successful move to mobile learning enablement and cloud deployment concludes the paper and opens a discussion on critical success factors in wireless e-learning operations.

1 A REALISTIC APPROACH TO ACHIEVING STUDENT EXPERIENCE BENEFITS THROUGH MOBILE PLATFORMS AND THE CLOUD

With the growing number of mobile devices in the hands of the younger population, it is only a matter of time before HE students will be expecting wireless access to learning materials to complement and/or replace current Internet-based Learning Management Systems (LMS). The trend in HE today, mobility, is driven by the advanced capabilities and wide availability of mobile devices, from smart phones to tablet computers.

Mobile platforms for e-learning are an attractive solution to help engage student community, enrich learning and help students throughout academic life. Blackboard Mobile Learn app, available on Android Marketplace, Blackberry App World or Apple App store, is one of the leading mobile platforms for e-learning. Students gain mobile access to their lecture materials, create discussion forums and posts, blog and comment on learning progress and resources.

In search of efficiency and flexibility, higher education institutions are putting cloud computing, another current trend in HE sector, into practice. Infrastructure as a service presents an attractive cost effective option for learning management system (LMS) provision. The concept of cloud computing and wireless access to e-learning application leaves several areas to consider. Capabilities of mobile devices present issues of access to learning and teaching resources, presentation of learning materials, navigation and compatibility of e-learning materials. On the other hand cloud as infrastructure as a service presents new challenges to HE in terms of security and compliance as data is being hosted by third parties outside of the corporate firewalls.

The 'digital natives' (Prensky, 2001) in higher education today are used to and surrounded by technology and increasingly expect mobile forms of communication.

For HE professionals mobile learning is a way of extending the campus and offering students the opportunity to learn in whatever situation or context they prefer. What is unclear is to what extent they can and will learn in this increasingly informal and opportunistic mode. Social networking services are seen by many as the next level of learning management systems (Benson and Tennakoon, 2012) promising convergence of social and learning tools. At present, though, mobile learning apps are

offering another media for access of LMS repositories, doing the old things with a new tool. The paper presents research questions in wireless learning and teaching for discussion through the lens of the student experience. A case of a successful move to mobile learning enablement and cloud deployment concludes the paper and opens a discussion over the critical success factors in wireless e-learning operations.

2 FROM WIRED TO MOBILE LEARNING: A UNIVERSAL MOVE TOWARDS WIRELESS LEARNING

Wireless technology is now entwined with every day lives; according to a recent survey (LSE Focus, 2007) mobile devices are perceived as a significant contributor to maintaining quality of life. While for university students (BlackBoard.com, 2012) a smart phone represents a 'key social connector and a learning tool'. Higher Education institutions consider provision of mobile services to students to be an indicator of performance and better quality of student experience. Earlier approaches to integration of wireless devices into e-learning process (e.g. see (Benson, 2008) for overview) focused on access enablement to online content. Emergence of powerful and user friendly smart phones and tablet computers led to proliferation of mobile apps, both from established elearning systems providers (e.g. BlackBoard) as well as independent companies and in house developments by Universities.

Current mobile apps from popular LMS providers are less than a year old. Blackboard Mobile Learn 2.0 offers a rich range of functionality with advanced usability features. Direct interface to the learning resources is a key feature of the app which enables students and instructors access, create and upload content to LMS. Blogs supporting media attachments, discussion forums and learning journal media features promise to bring interactive mobile learning to a new level. The user interface of the latest version of BlackBoard Mobile Learn supports adding most frequently accessed classes to favourite lists, this bookmarking feature helps manage and organise learning and teaching process. The latest version of the app offers threaded hierarchy to improve the user interface while managing multiple tasks.

While the new features of the mobile apps are evolving, it is important to gain a better understanding of how ubiquitous access to study materials can improve learning outcomes. The impact of wireless technology on higher education is likely to be driven by student experience. Universities take on investment in the mobile technology to improve student learning through wireless devices already at the fingertips of current students and beat the competition by demonstrating the importance of staying ahead of the technology curve.

2.1 Some of the Critical Success Factors to Consider

Smartphones are effectively accepted by students either as a link to their social community or a favoured learning tool, mobile apps have become a way of life for today's students. When making a choice of which university to apply for studying, whether or not an HE institution supports easy access to services or information in a way meaningful to technology savvy younger generation becomes a key differentiating factor.

The app needs to be easy to access, fast and should be accessible on a range of mobiles (interoperable) to ensure that all students with a smart phone are able to use the system and interact. If support is needed the app will probably not be used although online help help is likely to be viewed positively. The technological aspects will be taken for granted (unless they go wrong) and so the focus should be on a visually appealing, easy to use app that will allow students to share and enable informal and formal learning at the time and place that best suits their needs. A mobile experience is profoundly different to even a laptop, as it is available at all times and enables them to learn whilst relating to (in the world of) the concepts about which they are learning.

2.2 Examples of the Pitfalls to Avoid

What students can see on the mobile learning app depends on at least two factors:

The ability of a specific wireless device to display the variety of learning materials that may be included in the course content. For instance, iPhone, iPad and iPods running mobile operating system do not provide support for Flash. Therefore earlier e-learning materials developed using Flash will be inaccessible to Apple users.

Instructors have control over which course content is available through the mobile app. Therefore options set so that only limited content is

available to students should be carefully thought through by academic staff. Pedagogical reasons should drive the mobile learning platform development, rather than pure enthusiasm of a new gadget from technology-centric instructors (Benson and Anderson, 2010). Students should have a clear understanding as to what materials are available through the mobile medium and why others are accessible only online, and how the mobile app can help improve their learning and their student experience on and off campus. As with all learning, particularly when technology is involved, explaining how and why different elements are designed in a particular way will facilitate learning (Ausburn, 2004).

3 CASE: SUCCESSFUL MIGRATION TO MOBILE PLATFORM AT KINGSTON UNIVERSITY

As part of the student information system and learning management system (called StudySpace) upgrade Blackboard Mobile Learn application, available for iPhone, Blackberry and Android phone, has been launched by Kingston University, UK. The app allows students flexible mobile access to StudySpace course content and communication tools. The mobile platform solution was introduced in January 2012. By the start of the spring semester, the mobile learning app already had thousands of downloads. The rate of rapid adoption illustrates that the impact of the mobile platform on student population, demand on computing services provided by Kingston University and external stakeholders. In the experience of other HE institutions (e.g. Stanford University (see (BlackBoard.com, 2012)) that the number of mobile learning app downloads tends to exceed the number of enrolled students. The impact of the mobile platform deployment has a wider impact on not only on current students, but involves alumni, parents, and the greater community.

Capabilities of the StudySpace app at Kingston include access to course content and communication tools. Course materials most suitable for accessing on the go are enabled by instructors for mobile learning. One of the most well received features of the mobile app is instant communication capability. Integration of mobile text messaging service with online announcements as well as Facebook site for the university are tied in with individual courses and organisation. This allows for seamless and unified

communication means for students, staff, alumni and wider community. One of the key objectives of introducing StudySpace mobile app is to improve student experience by increasing 24-7 access to learning technology that is not dependent upon location. This reflects the social, and increasingly work, environment to which students are accustomed.

Furthermore, it enables learning to move in and out of the classroom in a much easier manner than laptops as students invariable have their mobile with them, not always the case for other devices. Class activities including assessments could use and link to the mobile app (this also enables movement between classroom and workplace, for example, placements or work-based learning – see Couldby, Hennessey et al., 2011).

4 CHALLENGES TO EXPLORE

Whilst the mobile platform appears a lucrative solution for engaging learners on and off campus, the BlackBoard app still suffers drawbacks. User ranking of the Blackboard Mobile Learn for Android (GooglePlay, 2012) phones averages at only 2.6 out of 5 (based on 6,196 reviews) according to Google Play data in 2012. The app version for iPhone and iPad (iTunes, 2012) also lags behind in user reviewers (2.5 stars from 2420 users) based on iTunes user feedback. So what challenges are ahead of developers and academic staff alike to help make a mobile learning platform fulfil its objective to increase the quality of student experience and improve learning and teaching?

There are several levels of challenges to address, including application dependent, service depended, compliance related and pedagogical underpinning of the mobile technology.

Application dependent issues reported on the BlackBoard Mobile user reviews revolve around the following:

Compatibility Problems – having downloaded the app students were unable to find their institution or reported messages of 'your institution does not support' the app.

Application Failure – when accessing PowerPoint slides app 'crashes'. Conversion of files to PDF formats causes application failure.

Device Support Issues – individual wireless devices will have an impact on what resources are available and how they will be presented to the user. One of the most notorious support issues affecting a wide range of existing learning materials is the Flash

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vs Apple support. BlackBoard Mobile Learn and other apps base their popularity on their support for a variety of wireless devices but pockets of unsupported functionality and varied presentation between devices remains.

Service provision problems reported relate to speed of the app loading resources. Slow download rate of the communication tools and learning resources are the main causes of concern for mobile app users. On the other hand, service availability of the learning management systems maintained by universities in-house is quite an important factor in student satisfaction. By moving LMS service provision to the cloud, service quality and reliability improves. However, issues of privacy and security of data transported between cloud service provider and users on or off campus creates a number of concerns. These include regulatory issues around personal data storage and management, communication of data across borders and other compliance issues. On the other hand outsourcing of LMS hosting to a cloud provider enhances security and reliability of services as professional approach of cloud vendors may mean better security as well as business continuity.

Finally, **pedagogical underpinning** of the mobile learning apps is far from maturity. How to ensure that students are not lost in 'virtual learning space'? How to deliver meaningful learning experience through a powerful mobile platform but yet limited in its capabilities at present?

The pedagogic implications of developing systems that are sufficiently simple to work well on an app but challenging and interesting to students, and the extent to which students can and will learn using these technologies, has yet to be explored. There may be exciting new pedagogical approaches that can be taken to make full use of the potential of mobile. All aspects of the technology potential should be assessed to consider what new learning experiences we can offer students. What we can be certain of is that students will increasingly expect these services, and they will expect them to work well. Indeed HE institutions that are able to truly innovate and enhance learning with mobile apps, working around the challenges above, could gain ground quickly.

5 CONCLUSIONS

Whilst mobile platforms for e-learning are still in early development stages, it is imperative to consider issues needing research attention and

improvement of software and wireless device capabilities, as well as pedagogical approaches to learning in mobile circumstances, in order to assess objectively technology's current and future impact on education.

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