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Volume 6, Number 1  
Spring 2010

<b>Introduction to the Special Issue</b> <i>Graham Brown-Martin</i>	1
------------------------------------------------------------------------	---

**Long Papers**

<b>Will Student Devices Deliver Innovation, Inclusion, and Transformation?</b> <i>John Traxler</i>	3
-------------------------------------------------------------------------------------------------------	---

<b>A Classification of M-Learning Applications from a Usability Perspective</b> <i>Robin Deegan and Paul Rothwell</i>	16
--------------------------------------------------------------------------------------------------------------------------	----

<b>Mobile Devices as 'Boundary Objects' on Field Trips</b> <i>Nicola Beddall-Hill and Jonathan Raper</i>	28
-------------------------------------------------------------------------------------------------------------	----

<b>Mobile Learning at Abilene Christian University: Successes, Challenges, and Results from Year One</b> <i>Scott Perkins and George Saltsman</i>	47
------------------------------------------------------------------------------------------------------------------------------------------------------	----

<b>Using Handheld Technologies for Student Support: A Model</b> <i>Jane Lunsford</i>	55
-----------------------------------------------------------------------------------------	----

**Short Papers**

<b>Further Development of the Context Categories of a Mobile Learning Framework</b> <i>Phil Marston and Sarah Cornelius</i>	70
--------------------------------------------------------------------------------------------------------------------------------	----

<b>Combining Analogue Realities and Digital Truths: Teaching Kids How to Hold Productive Learning Conversations Using Pictochat on the Nintendo DS</b> <i>Karl Royle, Clair Jenkins, and Julie Nickless</i>	76
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

<b>Mobile Learning for All</b> <i>Marco Arrigo and Giovanni Cipri</i>	94
--------------------------------------------------------------------------	----

<b>Mobilizing The Open University: Case Studies in Strategic Mobile Development</b> <i>Rhodri Thomas</i>	103
<b>Mobile Technology as a Mechanism for Delivering Improved Quality of Life</b> <i>Andy Pulman</i>	111
<b>A Novel, Image-Based, Voting Tool Based on Handheld Devices</b> <i>Peter van Ooijen and André Broekema</i>	122
<b>Implications of 4G connectivity related to m-learning contexts</b> <i>Arturo Serrano Santoyo and Javier Organista-Sandoval</i>	129
<b>Fun, Fizzy and Formative Approaches to Assessment: Using Rapid Digital Feedback to Aid Learners' Progression</b> <i>Rowena Blair and Susan McLaren</i>	136
<b>Collaborative Mobile Knowledge Sharing for Language Learners</b> <i>Lyn Pemberton, Marcus Winter, and Sanaz Fallahkhair</i>	144
<b>The Open University Library in Your Pocket</b> <i>Keren Mills and Hassan Sheikh</i>	149
<b>MoLeaP, The Mobile Learning Project Database: A Pool for Projects and Tool for Systematic Description and Analysis of Mobile Learning Practice</b> <i>Judith Seipold and Norbert Pachler</i>	157
<b>Can Nintendo DS Consoles Be Used for Collaboration and Enquiry-Based Learning in Schools?</b> <i>Steve Bunce</i>	172
<b>Towards An Intelligent Learning System for the Natural Born Cyborg</b> <i>Deb Polson and Colleen Morgan</i>	185

## **The Open University Library in Your Pocket**

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### **Abstract**

The Open University library is working to support mobile learners through provision of mobile access to information management skills tutorials, the library website, and the library helpdesk. In 2007, we joined hands with the Athabasca University library team to develop the first mobile-friendly version of our library website. Since then, we have been actively researching and developing around other mobile library services, and more recently have consulted users to identify their requirements and what services they'd prefer to access through mobile phones. Recommendations from this user consultation (and from other sources, including regular users' feedback and by tracking user behavior through Google Analytics) include revamping the mobile version of the Library website to offer only the most used services on the home page, implementing SMS (Short Messaging Service) such as loan reminders or library reference service, and developing a consolidated search to offer results from various sources including the library catalogue and e-journals collection.

### **Keywords**

M-Libraries; Library; Skills; Mobile Web

### **Background**

Following a visit to the Open University, UK (OU) from Mohammed Ally of Athabasca University, Canada (AU) in 2007, a partnership was formed between the two university libraries on developing library services and content delivery systems for mobile and handheld devices. During his visit to the Open University, Dr. Ally demonstrated the Auto-Detect and Reformat (ADR) system developed in-house by his team. The ADR software allows developers to make websites and other online content suitable for viewing on a small screen. The software automatically detects the type of mobile device used to connect to the website and both renders and optimizes the contents to fit appropriately on the mobile screen. The idea was of particular interest to the team developing the OU Library website and led to discussions about re-using the source code of ADR and building a partnership between AU and the OU to further enhance the functionality of ADR software. This partnership has brought a number of benefits to both parties. It has saved the OU development time and resources, and offered both partners the opportunity to work together to develop some innovative mobile library services.

Mobile learning has for some time now had a high profile within the OU, evidenced by the work of colleagues in our Institute of Educational Technology. Mobile access to our Virtual Learning Environment (VLE) was planned from the beginning of the project to implement Moodle (The open source VLE used by OU). As a Distance Learning institution, mobile access to course materials seems like a natural extension of our online course offerings. Seventy percent of OU students are in full-time employment (The Open

University, 2009a), and many of them have families and other responsibilities as well. Giving students the opportunity to access their course materials and library resources anytime and anywhere may assist them in fitting study time into their busy lives. We also offer a range of work-based learning opportunities, where students may benefit from being able to review learning materials or reflect on practice at work.

As the OU has over 180,000 students at any given time, students are only able to borrow books directly from the library if they live near enough to visit the campus in person. Although we participate in the SCONUL Access scheme (SCONUL, 2009), which allows our students to borrow books from other academic libraries; our own provision for them consists primarily of electronic resources such as e-journals and e-books.

## **Focus**

The focus of this paper is both on research into the requirements of our users, which was undertaken as part of the Arcadia Program (Cambridge University Library, 2009), and application in terms of our existing mobile service provision and our plans for further development.

## **Methods**

As well as being driven by the university and department strategies, we undertake continuous horizon scanning in order to decide which services to develop. We have also undertaken some research into user requirements, such as the M-Libraries: Information on the Move (Mills, 2009) research undertaken as part of the Arcadia Program, and performed observations of users engaging with mobile information management skills learning objects. The OU co-hosted both the first and second International M-Libraries conferences in order to encourage sharing of progress and practice in the field. In terms of service delivery, we use ADR software to render and display the contents of our website on mobile devices. One of the key benefits of this approach has been to use the same content to be rendered on two different display models (one is for normal screens and the other is for smaller size screens) and this has saved our content authors from writing two separate versions of the same content.

The user-requirements research mentioned above aimed to investigate how academic library users already go about accessing and interacting with information on mobile devices.

## **Findings**

Recommendations from the user requirements research were to:

- Ensure the Library website continues to be able to re-size to fit smaller screens, and that the opening hours and contact details are easy to find from the first screen.
- Pilot the prototype mobile Library Catalogue interface being developed by the Systems Development team, and share the development with other libraries using Voyager. Pilot text alerts for loaned items which are due for renewal or overdue and for requested items which are available for collection at the library.
- Review the volume of enquiries to Customer Services and the Library Helpdesk which could be asked and answered in 160 characters and consider piloting text reference services.
- Consider adapting Athabasca's Digital Reading room to allow mobile access to our electronic resources and ensure it works on multiple platforms including the iPhone and Google Android.
- Develop a project proposal to work with SCONUL and Oxford University Computing services on providing mobile access to the SCONUL database of libraries.
- Pilot library audio tours for new library users and visitors by making the audio tours available for download through the library website and preloaded on MP3 players for loan.

The OU Library website uses the ADR software to detect when it is being accessed from a mobile device and re-sizes itself to fit the mobile screen by changing the layout template and style-sheet. The mobile version of the Library website offers a customised homepage and simpler search interface for users. There have been more than 21,500 page visits through the mobile interface between its launch in October 2007 and July 2009. The mobile interface supports most standard mobile devices such as PDAs, Palmtops, Blackberries, HP iPAQs, and Nokia N95s.

OU student respondents to the M-Libraries: Information on the Move survey indicated that the main areas of the website they would be likely to want to access through their mobile phones would be the opening hours (75.9%) and the library's contact information (70.6%), so the mobile interface will provide links to those pages from the home page of the website. Students at Cambridge University indicated that in addition to these areas they would want quick access to the location details of the library.

The same ADR software has been integrated with our in-house developed Learning Object Generator (LOG) system to customize and deliver mobile friendly learning objects. The LOG system enables instructional designers to author learning objects which can easily be converted into mobile-friendly versions. The LOG system has been used to create short revision modules for the OU Library's online information literacy tutorial, Safari (The Open University Library Services, 2009), and to develop the Information and Knowledge at Work resources (iKnow), which are aimed at helping users to find and manage information effectively at work. The iKnow activities have been created in bite-sized chunks so that users can fit them in whenever they have a few free minutes, and can be done at their desks or on the move (The Open University, 2009b).

Since the launch of the OU Library website in October 2007, and the launch of the mobile site a few weeks later, we've been using Google Analytics to track website traffic and analyze what users have been doing online. Google Analytics is a free tool (free for websites with up to 5 millions page hits per month) and provides a lower barrier to entry in terms of allowing inexperienced users to easily create eye catching graphical reports that provide information on the source of traffic (where visitors came from), what pages and areas they visited, how long they stayed on each page, how deep into the site they navigated, where their visits ended, where they went from each page, and so on. One of the strands of our analysis is to look at traffic to the mobile version of the Library website. Google Analytics statistics have revealed that the most popular areas for the Library website's mobile users are the Homepage, Contact Us, Opening Hours, News, Jobs and Events at OU Library, and Search the Library Collections. These findings were also confirmed during the Arcadia research project when users were asked about the top Library services they would like to access from their mobile phones.

Based on these findings, we are currently working on revamping the mobile OU Library website and will focus on improving these key areas. Figure 1 shows how the mobile version of the OU Library website homepage has evolved as a result of those findings discussed above.

As part of our mobile Library website project, we've been capturing information about the brand and models of mobile phones used by our students to access the Library website. Those mobile phones range from simple mobile phones such as the Nokia 1112 or Samsung E250 to more advanced phones like Apple's iPhone or Google's Android. It is therefore important for us to develop the key functions of the website to work effectively and accurately on phones with limited capabilities as well as on the latest high end phones. However, the original mobile interface did not render well on the iPhone and iPod Touch. Planned improvements to the website include providing a link enabling visitors to switch between the mobile version and the full version of the site.



Figure 1: The Library Website - Original and Revised Versions

The touch screen phone market (e.g. iPhone and Android) is expanding quite rapidly, causing a reduction in the cost of handsets, mainly due to the competitive market and frequent releases of new phone models. According to the latest forecast by BMO Capital's Keith Bachmen (Hadar, 2008), Apple will sell 26 million iPhones (4.3 million more handsets than the forecast for 2009) by the end of 2010. As iPhone and Android handsets are becoming relatively affordable, we have been observing (through our Google Analytics website stats) a steady growth in the number of our students using them and accessing Library resources through these phones. Based on those stats and user feedback, we're now working to develop a dedicated version of our Library website and some other Library services for iPhone and Android platforms. The new system would deliver a better quality user interface to our e-resources and improve the user experience by making use of the larger screen and the intuitive user interface of those touch-screen phones.

The OU Library plans to undertake usability testing of the website, including the mobile version, in the last quarter of 2009. The results of this usability testing will help us to further evaluate and refine the mobile-

friendly version of the site. The mobile Learning Objects are being evaluated through observation of users and a program of work-based testing in the case of iKnow. They will also be added to our Google Analytics tracking in the future.

The OU Library's strategy includes developing user-centered resources and services, and supporting the delivery of e-learning. Our improved mobile services and skills offerings will provide OU students with a greater degree of flexibility in their studies and enable them to access our content whenever and wherever they choose.

In sum, the OU Library's mobile services development project represents work in progress building on several strands including research into the requirements of our users, which was undertaken as part of the Arcadia Program (Cambridge University Library, 2009), consulting the Library stakeholders to accommodate their ideas into the development and tracking user's behavior on the Library website through Google Analytics to improve the mobile services. We have been constantly working to enhance the mobile library service, and further developments include the support of third generation touch screen phones such as the iPhone and Android, optimizing the search for mobiles, further development of the bite-size chunks of digital literacy content, development of SMS services, and conversion of mobile content on-the-fly.

## Reflection

It has been over two years since we first started developing mobile services at the OU UK Library. We have accomplished significant advancement on the library website by ensuring that the format is optimized for small screens, that is, format changes in response to the device that accesses the web site. There have been a number of milestones we have achieved so far, including:

- Adapted Auto Detect and Reformat – The ADR renders and optimizes website content to fit nicely on a smaller screen and includes most make and models of the phone in its detection engine. Since the AU/OU collaboration was initiated in 2007, we have been actively working on enhancing and adding the new functionality to the ADR software such as screen size detection, stripping out the images from the contents, validating html tags, and the ability to render new stylesheets. This is a cost-effective approach in comparison to hand-crafting a separate mobile website.
- Optimizing the search function for mobiles-- We've developed a version of the search facility with reduced functionality to display results with simpler metadata fields such as the result title (and a link to the title) and result score. The first phase (developed in October 2007) only includes the Library website search. However, we're now working on a consolidated search solution to include nearly all our e-collections (Our catalogue, e-Journals, Open Research Online (The Open University, 2009c), and 3rd party licensed databases) to be searchable through one single search box. Figure 2 illustrates the technical architecture of the consolidated search solution we're currently working on.

The search engine is able to show the search results in a mobile-friendly manner. However, one of the challenges is that the majority of 3<sup>rd</sup> party contents is not optimized for mobiles, so if users click on some of the search result links, they may not be able to read the contents of the target pages. We have been talking to database vendors about the possibility of optimizing their contents for mobile, but the majority of them apparently either do not have capacity to do so or it is not their top priority. Another option is to re-direct users to view those target pages through [Skweezer](#), which is a mobile-friendly search engine and converts the content of normal websites into a mobile-friendly format on the fly, though it does not guarantee that the website will render correctly on a mobile phone.

It is quite challenging to render lengthy content on smaller screens. It has been observed at our usability evaluations that users do not like to read large chunks of text on smaller screens. We have been working with our content authors to help them with writing concisely and to the point.

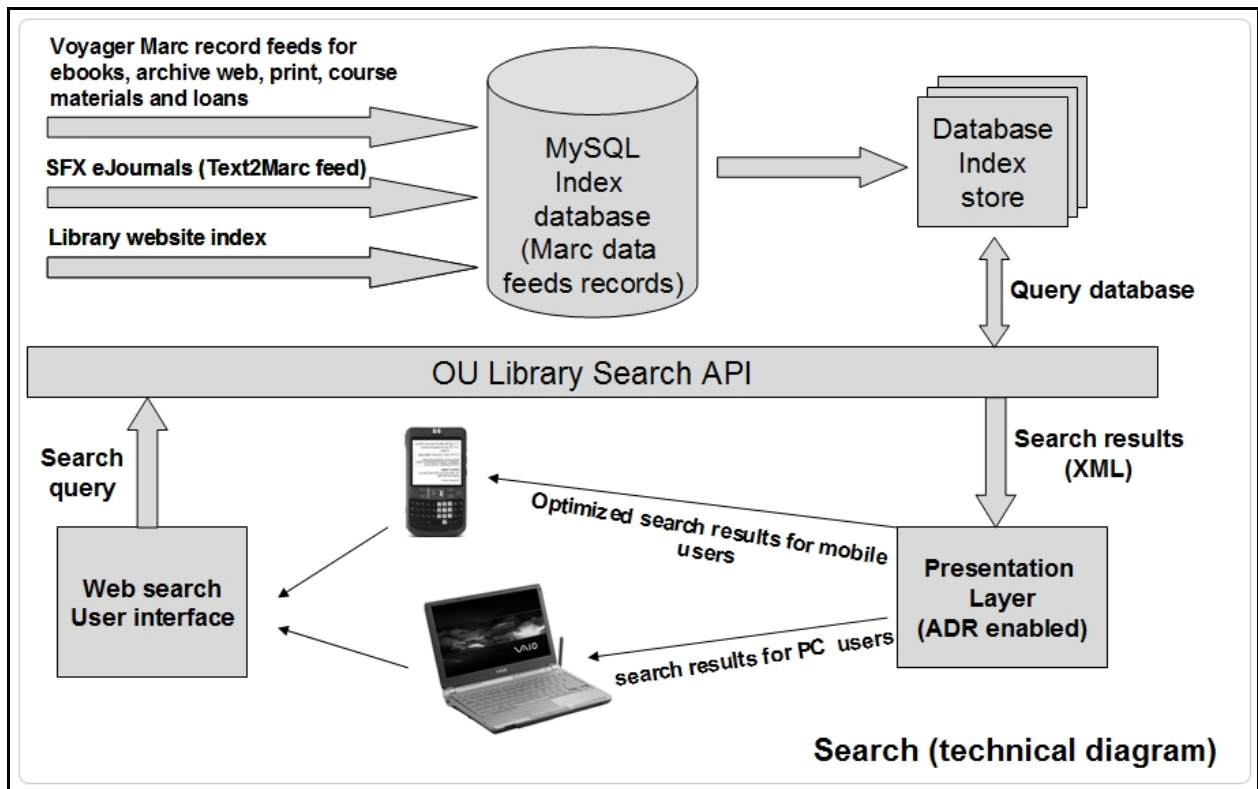


Figure 2: Technical Architecture of OU Library Search API

As part of our mobile services development project, we have also been actively working in the area of information literacy to deliver learning activities to smaller screens. Our e-Learning specialist, Anne Hewling, has designed a content model for instructional designers to author mini learning objects which can have a maximum of 5 pages with no more than 90 words per page. These mini learning objects render really well on smaller screens, especially on lower end mobile phones. This content model has been delivered through our in-house developed Learning Object Generator (LOG) system. With the LOG system, you can either preview the authored learning objects as a web page or it packages the contents of those learning objects according to the IMS content package specification (IMS Global Learning Consortium, 2009) which makes them suitable to be deployed directly into Moodle. We have used this tool during the 2nd International M-Libraries conference workshop and participants successfully produced several mobile-friendly learning objects around their chosen information literacy topics. Examples of this work are available at <http://library.open.ac.uk/digilab/testarea/mLib2009Outputs/>

Deciding whether to continue to provide the full content of our website or a cut-down version for mobiles is difficult and will be influenced by feedback from our users and our website tracking data. It is clear, however, that some mobile services are expected of us and that we will need to continue to adapt as the available technology changes.

### Future Developments

Further developments to our mobile services will be influenced by both the university's teaching and learning strategies and the user-requirements research mentioned previously. The OU Library's aim is to improve user experience for our students. We will do so by:

- developing a dedicated version of the OU Library website for iPhones and Android to take advantage of the advanced features of these phones, such as bigger screen sizes, intuitive UI, and the good a/v quality. The work would also include redeveloping the page templates and enhancing the existing stylesheets to work on iPhones.
- implementation of a public web service (in collaboration with the AU Library) which would return the profiles (containing details about screen size, make and model, platform, and the features supported) of mobile phones that users are connecting from.
- developing SMS alerts to notify Library users about their overdue loans and offer renewals through their mobile phones.
- investigating implementation of the SMS reference services as an additional communication channel for library users needing help. A number of academic libraries in the USA are already offering SMS reference services and are finding that it has good take-up amongst their users.
- continuing to work on refining the Library search and improving our consolidated search prototype.
- exploring the possibility of developing a mobile self-assessment tool for the iKnow materials.
- developing a rich media zone with digital literacy video clips to render nicely on smart phones, in particular iPhones and Androids.
- continuing to work with the OU's Learning and Innovation Office to develop the mobile Virtual Learning Environment (VLE) system. The primary aim of the mobile VLE project is to increase access to the OUVLE to better support students who are already trying to access OU content and services via mobile devices. A longer-term aim of the project is to work with the course teams to investigate and identify parts of their activities and resources that are most appropriate for mobile learning.
- continuing to collaborate on mobile Library services development with AU and build new collaborations with other interested Universities such as Cambridge, UK, Ryerson University, Canada, and the University of Catalonia, Spain.

### **Limitations of Mobile Technology**

Many mobile devices are limited to slower wireless connections. Multimedia requires faster connections and delivering multimedia content to mobile devices is not always possible.

- It is difficult to include each and every model in the ADR software to account for small screen size. Therefore we are working with the AU Library to develop a web service to detect screen size. This service would look for the profile in the database and return the key characteristics of the mobile phone including screen size and operating system.
- Mobile devices do not support mobile or wireless printing. If users want to print, they have to use a third party program, but not all devices are supported.
- Mobile devices have limited and unstable memory. The amount of content and the length of time it can be stored both create problems for web browsing. The memory of mobile devices is also unstable; if a device is left uncharged it could lose anything stored in its memory.
- Not all mobile platforms support advanced html features, so it is best not to use them, especially when the contents are targeted for lower-end phones.
- Flash (Wikipedia, 2010) is not supported by all mobile phones.

The landscape in the use of mobile phones is changing rapidly, and with the sharp increase in the use of 3G and WiFi-enabled phones and PDAs it has become cheaper for users to stay online. Consequently, mobile web browsing is becoming increasingly popular. With this increasing number of mobile users going online, the demand for m-library services has increased as well, which puts pressure on universities and libraries to improve their Internet-based systems and develop the services which are fit-to-purpose for the smaller screens.

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