QR Codes: pushing the library out or bringing the world in?

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The growing acceptance of mobile technologies within the library environment has raised the challenge of how libraries make available contextualized and personalized information. Mobile engagement with information and access to services is becoming increasingly routine. However, m-learning implementations are currently input dependent, regardless of the technology deployed. The protracted methods of accessing stored information and services through phone-pad input functionalities is time-consuming, frustrating and serves to limit the uptake of m-initiatives. Moreover, the type, scope or quality of the information being accessed is potentially a barrier to committed acceptance of mobile delivery as a useful, long-term component of an information environment. To increase the impact of m-deployments, to enhance flexibility of provision and also to advance the personalisation of learning, a number of institutions are investigating or using Quick Response (QR) codes, Mobile Tags (MT) or, just on the horizon for non-commercial use, technologies such as Nokia Point and Find, oMoby, Kooaba and Google goggles. Such software allow users with embedded camera phones ready access to information, products/resources and services. However, the increasing use of two-dimension barcodes, or point and click software creates challenges for the library. These may include evaluating the impact of mobile, personalised learning by library users, specifically in regard to the user being able to transfer information from one format to another, and assessing what impact the development of contextualised learning environments will have upon library service planning.

This paper describes a project being currently undertaken by the Waikato Institute of Technology Library to integrate QR codes within their policies, planning, and infrastructure.

Background

Embedded within the goals of the Waikato Institute of Technology (Wintec) Library is the drive to refine and enhance methods of delivery to ensure consistency of service, ease and equity of access, relevance of information, contextualisation and personalisation of learning and inclusion of emerging technologies. This meets several of Wintec's priorities of Modernisation and Sustainability, Flexible Delivery, Quality and Outcomes and supports both the ICT strategy of the institution and also various initiatives being developed, tested, implemented and supported within various curricula. The widespread availability and usage of mobile devices and their increasing relevance to the educational experience of students and staff has been a factor in planning future library services for the past couple of years.

Benefitting from inclusion in a wider project conducted in 2009, including staff from emerging technologies and teaching areas of the institution, library staff are aware the intention to allow a variety of non-stationary environments – incorporating ease of access to media-rich information and services without requiring bulky hardware, computer labs or specially-equipped spaces - will enhance the context or authenticity of learning taking into consideration how, where, or when it is likely to be best accessed by a learner. It is increasingly recognised mobile learning (m-learning), in its variety of forms, is shaping, and being shaped by, the way we live, work and learn. Recent research indicates a growing acceptance of the use of mobile technologies in tertiary teaching and learning (Wexler, Brown, Metcalf, Rogers, & Wagner, 2008). However, m-learning implementations are often heavily "keypad" dependent. The protracted and often clumsy method of accessing stored information and services through the limited input functionalities of mobile phones is time-consuming, frustrating and affects uptake of these technologies.

To increase the impact of m-deployments a number of institutions are using Quick Response (QR) codes to provide learners with speedy and ready access to information and services that are location sensitive (Ramsden, 2009). Examples from several universities in the UK, such as the Universities of Bath and Huddersfield http://blogs.bath.ac.uk/qrcode/2009/03/23/uni-of-bath-library-including-qr-codes-in-catalogue/ are noted with interest by the library and information communities. These higher education libraries have been trialling the augmenting of their catalogue information through inclusion of QR codes in bibliographic records summarising the key information, the resource title, the author, and the shelf location. Academic and public library sectors across the US are similarly embracing the concept of contextualised, personalised information – for example, Contra Costa County Library, which has recently partnered with their local transit authority to make the library's downloadable audio book collection available to patrons by posting onboard QR codes (MacKinnon, 2010).

Embedding QR codes into a variety of environments, both physical and electronic, has the considerable benefit of enabling learners to move from one place to the next, and to be able to use a range of readily-available, handheld computing devices and communication technology to access information and learning materials from anywhere and at anytime.

In recent years, research has indicated that learners are increasingly emphasising the importance of communication and collaboration in teaching and learning along with convenience and flexibility, to accommodate the needs of their active lifestyles. In other words, learners are looking to educational providers to deliver in a relevant manner that is technology-enhanced rather than technology-driven (Traxler, 2007). Across the education environment a shift of focus is occurring which places the learner within context, whose needs define technical specifications, content management, a rich set of capabilities and services, accessibility and authorisation protocols. The new model offered is – 'learner demands, the technology supplies seamlessly' – differing from the traditional 'technology

defines and pushes, learner accepts as mobile device permits'. The increasing diversity of mobile education and the increasing power, sophistication, and complexity of mobile technologies call into question the adequacy of the conventional approaches around formal, sedentary, and traditional learning (Alexander, 2004).

Wintec Library – a case study

To address the issues created by this changing landscape, in mid-2009 Wintec created a project team to review the use, effectiveness and impact of QR codes across a range of tertiary teaching scenarios and learning support services. The project was structured around three key themes:

- *Creation*: To examine what software applications are currently available to create, store and manage QR Codes, their level of reliability and their "intuitiveness" in use by tutors and students.
- *Deployment*: To determine in what ways QR codes could be used to generate location-based content and provide services, what institutional policies, learner support and tutor professional development would be required to encourage and support stakeholders in the use of these technologies, how these technologies would be distributed, and how tutors and learners could be informed of their impact on teaching and learning.
- *Impact*: To assess how QR codes usage could be monitored, what modifications to existing ICT infrastructure would be required to integrate these technologies into existing learning environments, how usable the content and design of the information is, and how the impact on student learning and tutor teaching could be evaluated and reported on.

A small trial project was conducted to introduce the concept of the QR code to students. A class of international students was invited to participate in a treasure hunt around campus which began and ended in the Library. Students were shown how to download a QR code reader onto their mobile phones and how to snap the code. Each code carried written clues on how to identify the next location on campus. A number of students completed the treasure hunt without problem and follow up with them indicated they thought the codes were a useful way of accessing information quickly and easily.

Emboldened by our modest success with the first trial, the Library took the opportunity provided by the Indian celebration Diwali to promote QR codes, this time with embedded videos as content. The codes were displayed prominently throughout the Hub areas and within the Library. Beside the posters were instructions on how to download the reader and what the purpose of the codes was. No direct promotion was undertaken and students were left to their own curiosity to engage with the codes. There was no follow up with this promotion; it was part of an overall strategy to increase the visibility of QR codes within a heavily-used area of the institution.

The beginning of Semester 1, 2010, saw the Library's next attempt at deploying QR codes. By now, library staff were fully competent in creating QR codes and investigating potential use that would allow benefit to both the library as a support area and the students as learners and seekers of information held within that area. Orientation tours around the Library had always been held face-to-face, with library staff moving around the facilities and explaining these, and the services offered, to groups of newly-enrolled students. This method has proved time-consuming and requires a strong set of lungs plus carrying voice to reach the outer limits of the group, which sometimes numbers around thirty students. It also requires all students to be physically present – a situation that excludes any students studying by distance or who are unable to attend the session for whatever reason. A series

of video tours were therefore created and placed on our Learning Management System for student access and from these, a series of QR code posters were created and placed around the library to allow students a third option – the self-paced tour using their cell phones with embedded cameras to capture information. They were then able to demonstrate through the History functionality of the reader software that they had undertaken the tour. A number of students took up this option. The posters are permanently displayed within the library area and students can refresh their understanding of the library at any time.

With this development came the realisation that the potential for using QR codes to convey information needed to be carefully thought through. Study of what other libraries were doing in this area alerted the QR code project team to the potential of embedding bibliographic information or location-specific information within the codes. The critical question remained – what information is most useful to students as library users? Given the ease with which information can be embedded within codes, staff pondered a series of brainstorming questions - should we look at linking bibliographic information with predefined searches in areas similar to the catalogue item but linked to subscription e-resources, should we be thinking of linking through to an online store where the user could purchase a copy of the item, what about linking straight to a predefined Google search or mega-repository search? Will such contextual information be useful to those using the library catalogue? Or are we doing the “Library Thing” yet again and assuming we know best what our catalogue users want and can pre-empt them in ways that will demonstrate our close alignment with their learning needs? And then be disappointed when our good intentions and hard work meet with disinterest and lack of uptake.

Returning to our original critical question, our observations of students using cell phones to aid their use of library facilities and services revealed students capturing location information from the OPAC and then using this to try and find the item on the shelves. However, despite being armed with the call number and availability, many students were unaware of the exact physical location of the item and spent fruitless time wandering about until either spotted by a library staff member and assisted, or giving up and assuming the item was not available. The combination of student plus technology should be successful if the processes around how the technology can provide access to relevant and timely information are designed to contribute to this success.

The idea of providing location information for every item on the catalogue emerged as a consequence of studying those library sites employing QR codes to provide location information and those that have proceeded down the track of incorporating library maps into their catalogues. A number of interactive maps were inspected and tested for usability on a basic cell phone, Nokia, and an iPhone. Difficulties emerged when the map could not be downloaded onto a handheld device; this was seen as limiting the usefulness of the information. Other maps were relatively general in their structure or assumed an understanding of the library layout and resident classification system which might not be present in the viewer. The team discussed the possibility of creating a dynamic map using Adobe Photoshop, and Adobe Image Ready. We looked at using dynamic maps generated on the fly by Web GIS technology; the dynamic relationship being the links, but also including direct manipulation of the map itself using limited GIS functionality (zooming, panning, legend expansion, and control over what content is displayed). The Google Maps API for Flash offered a way to add interactive Google Maps to the website, using Adobe's Flash® plugin to display dynamic map content.

Of concern, however, was the time required to create a series of maps and the cost involved through the necessary employment of specialised programming or graphic design skills. Working on the theory that the simplest way of gaining useful results is to compare apples with apples, staff felt that visual identification of item location that replicated the student’s actual experience would be more useful that the need mentally to translate from

2D to 3D. We therefore, undertook a series of video clips that took the viewer from the entrance to the library and walked them to the physical shelf location of the item. This was achieved using Apple's iMovie, Google API, and revising some XSL scripts on WebVoyage. The video clips were then embedded within QR codes assigned to each bibliographic record on the catalogue and available for download onto a mobile device equipped with an embedded camera and downloaded QR code reader. This allows the library user to access the item details from any location, to capture the location-specific details via the QR code and then to visit the physical library and follow the video to the desired resource.

The success of this particular QR project will be evaluated in 2011. Two factors have led to this delay in assessment – firstly, the time of year for employing this use of QR codes – end of the academic year when students are on the point of departure and, secondly, a full upgrade of the library management system almost immediately after deployment of the codes. However, the bulk of the work has been completed and tested as an initial phase in the multi-phase project. It is also critical that library staff who have undertaken this specific project refer back to other, similar projects that are taking place across Wintec to ensure that all activities serve to inform each other and contribute to institutional planning.

Conclusion

Inherent within this project was the anticipation that planning and processes would occur to determine efficient and effective ways of creating, storing and managing QR codes. This activity would serve to inform library planning around service delivery and integration of technologies within the current ICT infrastructure and will contribute to assessment of the impact their use will have on students' learning. The project outcomes will enable the library to:

- Develop the competence, confidence and capability of library staff and learners in using QR codes to a level sufficient for them to be able to continue using these technologies to enhance or influence their learning environments
- Allow a body of experience on the impact on learning of QR codes to be built as processes are developed and QR codes designed, deployed and evaluated.

While there yet remains a sizeable uptake of the use of QR codes within Wintec, the feeling amongst library staff is that the groundwork is being laid and will continue to be developed. Creating opportunities for the transformation of the learner's educational experience, increasing flexibility of provision and access, and advancing the personalisation of learning are factors underlying the case study described above. Ease of access to information remains a relevant issue for students both on- and off-campus. Familiarity with a technology that will assist this situation is a goal the library continues to work towards.

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