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The use of QR codes in Education: A getting started guide for academics

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Information Sheet

This working paper was written by members of the e-learning community at the University of Bath. If you'd like to access other working papers, presentations or posters given by the e-learning team at the University of Bath then see our Online Publications Store, <http://opus.bath.ac.uk/view/divisions/elearning.html>.

If you have any questions about this paper then please contact the authors directly.

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Introduction

This document is part of a series of reports which make up a scoping study on the potential of using QR codes in learning and teaching which was commissioned by the JISC.

The document is intended as an introduction to the role of QR codes in education. In particular, it starts to find answers to the following key questions:

- what are QR codes?
- how might they be used in education?
- how do I create my own QR codes?
- can students engage with this technology?
- where on the web might I find up to date information about QR codes being used in education?

The other two reports focus on the technical aspects of implementing a QR code generation service in a UK HEI (a case study from the University of Bath) and how

QR codes are being used in other sectors including media and marketing (a literature review).

What are QR Codes and what can they do?

What is a QR Code?



A quick response (QR) code is a two dimension bar code (see opposite) that can be read on devices such as a mobile device (camera phone) or a laptop computer which, once accessed, will allow you to complete an action. For instance, reading some text, accessing a web site or texting a number. As an illustration the QR code opposite will open a web page (<http://blogs.bath.ac.uk/qrcode>).




A useful way of thinking of QR codes is that they link the physical world (the poster, print out, room, or physical object) to the electronic (web resource, text information) or facilitating communication (SMS message, phone call). This adds value through improving the potential of making access to information more efficient and effective.

What tasks can be completed through a QR code?

Technology QR codes are evolving rapidly. This is evident from the increasing number of activities that can be achieved using a QR code. However, in the context of this introduction there are four core content types or actions associated with QR codes. These are illustrated in Table 1.

Table 1: Content types of QR Codes

1. Linking to a web resource (url)	This QR code provides a link to the QR codes blog at the University of Bath (http://blogs.bath.ac.uk/qrcode).	
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2. Providing additional text information		This QR code will provide additional contact information about Andy Ramsden in a text format on your mobile device.
3. Providing a telephone number	This QR code will provide a telephone number which triggers your mobile phone and allows you to quick call the number.	
4. Sending a SMS text message		This QR code will send a pre-written text message to our SMS service. In this case it subscribes to a SMS e-learning news update.

So, how might I start using QR codes in my teaching?

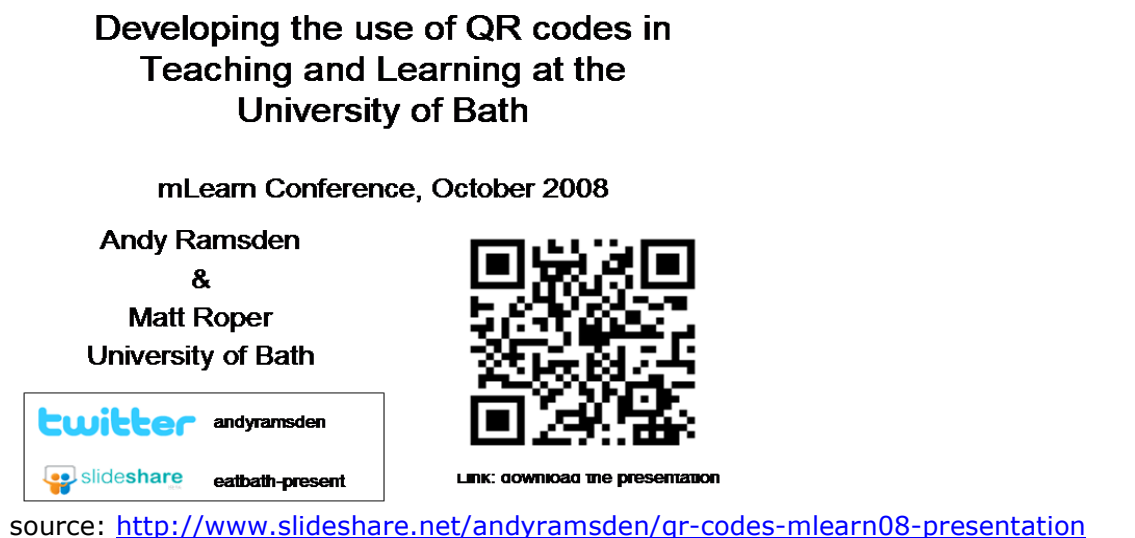
Later in this report a number of learning and teaching scenarios are provided, however, the aim of the following example is to give some context for the *how do I use it* section.

One approach is to use QR codes in presentation material to provide people with *just in time* information available from the projected presentation. For instance, the presenter might be discussing a concept and making reference to various online resources. These links can be made available as a QR code. The student could scan the QR code and either access the supporting online resource directly or save it in

their web bookmarks. This offers a significant efficiency gain over having to enter a long url manually, whilst the slide is disappearing.

Figure 1 is a copy of a powerpoint slide which illustrates this concept. The QR code on the title page links to where a person can download the presentation. The full presentation is available from (<http://www.slideshare.net/andyramsdem/qr-codes-mlearn08-presentation>)

Figure 1: Using QR codes to link to an online resource.



source: <http://www.slideshare.net/andyramsdem/qr-codes-mlearn08-presentation>

This presentation used other QR codes to gather formative feedback during a presentation. For instance, two QR codes were used so the audience could answer a closed (yes/no) question. To do this they simply scan the appropriate QR code and this would send a pre-written SMS message to our SMS service. The presenter could then access these results via a web page. The audience could then follow up using an SMS text message to answer the open ended question (this approach is illustrated in Figure 2). This offers advantages over asking people to raise their hands as it quantifies the feedback and the replies are anonymous.

Figure 2: Using QR Codes for classroom feedback

Lets try – session feedback

Would you recommend this session to a colleague?



yes



no

Could you explain your answer?



source: <http://www.slideshare.net/andyransden/qr-codes-mlearn08-presentation>

How would I include a QR code in my presentation?

This is relatively straightforward for both the lecturer (person generating the QR Code) and the student (person accessing the QR Code). The following workflow is based on the previous example. The aim is to include a QR code in a slide which links to where people can download the presentation.

Step 1: Find the url of the presentation online.

Once the presentation has been written then it needs to be published on the web. This might be through the course area on your Virtual Learning Environment or through another location. Once it is available then you need to copy the web address (URL). In the scenario discussed the presentation was uploaded and this produced a unique URL.

Step 2: Creating and saving the QR Code as an image (jpeg)

To create the QR Code you need to access a QR code generator. There are many available online. A very popular QR code generator is Kaywa QR Code Generator (<http://qrcode.kaywa.com/>). Once accessed, cut and paste the url for your presentation into the appropriate part of the web form and click on generate. The url will then be presented as a QR code. Finally, save the image to your computer.

Step 3: Adding to the presentation and testing

Once the image has been saved then insert it into your presentation at the appropriate place. A recommendation would be to use at least a quarter of the space on one slide. After it has been added then test it works.

Step 4: Re-upload the modified presentation

Once you have created all your QR codes and uploaded them to your presentation, do not forget to re-upload the latest version to the web.

OK, but can my students engage with QR codes?

These commonly asked questions have been adapted from the QR Code Service Blog at the University of Bath (<http://blogs.bath.ac.uk/qrcode>). You are recommended to visit this resource to access further questions and answers.

You've mentioned Kaywa, but are there other QR Code generators?

Yes, there are an increasing number of QR Code generation services available on the web. If you search for "qr code generators" in Google you will find an ever increasing number.

How do I support students in obtaining QR Code readers?

It can be strongly argued that the responsibility lies with the student to find and install the appropriate QR Code reader software for their device. This is for a number of reasons, firstly, you cannot be expected to keep up with all the different readers being made available for mobile phones and, secondly, you do not own the device. To help the student you might want to suggest that they search Google for "QR Code Reader Software" and add the make and model of their mobile device. Alternatively, you might suggest the following as a starting point.

- Quickmark QR Code Reader (<http://www.quickmark.com.tw/En/basic/download.asp>)
- i-nigma QR Code Reader (<http://www.i-nigma.com/personal/GetReader.asp>)

Question: Does it matter which QR code generator I use?

The answer is no. QR codes comply to an international standard (ISO/IEC 18004:2006). We recently tested this using a number of different generators and readers on a wide range of devices. It was evident that the generators followed the standard and could read (decode) the QR Code.

Interestingly, in some cases it did not complete the whole action, ie open up to SMS manager and text the question, however, all did decode the QR Code. To find out more see <http://go.bath.ac.uk/be3f>

Question: Do students know what a QR code is and have they any experience of accessing QR codes?

No. Currently the majority of students are unaware of what a QR code is and they are unaware if they have the reader software pre-installed on their phone. A recent survey at the University of Bath of students identified that 12.6% of respondents knew what a QR code was while 87.4% did not (sample size 759 students). When asked if their device had a QR code reader installed, 79% replied that they had no idea while only 2% answered that they had scanned a QR code on their device. Please note, this data is collected before we started to promote QR Codes at the

University. That said, once the student body picks up the use of QR codes then awareness spreads very fast.

Question: Do students have the technology in their pocket to access QR codes?

Yes. In terms of device ownership, 93% of respondents had a camera on their phone which is a requirement if their mobile device is to scan the QR code. Therefore, the majority are currently carrying technology that could access QR codes. The next part of the question is - do these devices have QR code readers? There was a significant range of different devices being used by students. However, a review of the 10 most popular identified that for the majority there was a free QR Code reader available. Interestingly, 7% of the respondents do not currently own mobile devices with cameras, therefore for equity of access, alternatives will need to be provided.

Question: Are mature student less likely to be able to participate?

No. When the survey results are filtered by age, then the results for those over 26 years old, (63 students) mirrored very closely the responses of the whole sample.

Question: There are obviously some advantages of using QR Codes in terms of accessibility. However, what might be some of the barriers and how might these be addressed?

In terms of accessing the QR code, there will be some implications for visually impaired students and those with mobility issues that might impact on their ability to scan the QR code. Many of the issues will be related to the place of use and the proximity of the student to the QR code.

Another issue is for people on the autistic spectrum and those with severe dyslexia. This concern is raised because QR codes do not include any meaning or signpost the outcome of the activity when you look at them. These issues are surmountable by providing effective practice guidelines to how they are designed into physical printed material.

A slightly different aspect of accessibility to learning materials is how it might change lectures practice. An anxiety was raised that the introduction of this technology in lectures might result in a change in practice where staff focus on the "just in time delivery of information" at the expense of the current approach of providing material before the event. Again the solution involves dialogue with the parties as the learning activities are being worked through.

How might they be used in an educational context?

The following scenarios provide examples of how QR codes might be used in an educational context.

- a student subscribing to an RSS news feed
- inclusion within printed learning materials
- integration within an alternate reality game

- just in time information in a face to face lecture

Scenario 1: A student subscribing to an RSS news feed.

Many lecturers and departments provide regular news updates online. In many cases Blog software is used. This is for a number of reasons including ease of authoring and displaying information in chronological date order. An advantage of blogs is that many of them automatically include RSS functionality which allows people to subscribe to an RSS feed update.

This type of content is perfect for the mobile learner as many mobile devices include RSS aggregation software. Therefore, the mobile learner can simply subscribe to the Blog's RSS feed and check for new updates via their mobile device. So how would providing the RSS feed address as a QR code help? The key advantages are efficiency and accuracy. RSS subscriptions tend to be very long so entering them on a mobile device is prone to human error, while the very long url can also act as a potential deterrent to subscribing. So in terms of the user experience, many would favour scanning the QR code and cutting and pasting the url into their RSS aggregator. For instance, the RSS subscription url for the Mobile Learning Blog could be provided as either

as text	as an image
http://mobile-learning.blog-city.com/index.rss?format=atom	

Scenario 2: Integration of QR Codes within printed learning materials

Another use of QR codes is their inclusion in printed learning materials, ie, workbooks. This is to improve the connection between the activity being undertaken in the book and an additional online activity. This approach is being rolled out across a number of distance learning modules at the University of Bath. The learning activity requires the user to complete a set of exercises and then access an online discussion forum to further apply these concepts and expose their ideas to the wider community. A QR code is included with each activity in the workbook to provide a deep link to the specific forum on the appropriate Moodle course.

Scenario 3: Integration within an alternate reality game

The previous scenarios have focused more on enhancing efficiency than offering any new learning opportunities. This scenario focuses more on enhancing learning opportunities and is inspired by the Alternate Reality Game run by the Podcasting for Pedagogical Purposes SIG at Alt C 2008. An Alternate Reality Game consists of many elements including a series of challenges, an underlying narrative and a collaborative community. The game encourages collaborative problem solving around a number of physical locations. Therefore, the use of QR codes through printed signs or stickers, will help provide clues, problems, additional text information and online connections for the game

Scenario 4: Accessing just in time information in the lecture

This scenario focuses on the use of a QR code to connect a physical presentation with just in time support materials. For instance, when the lecturer is discussing a topic they could include a QR code which allows the user to link to the resource being discussed, or using a QR code which includes a SMS action to allow participants to feed back on questions, or providing a text based QR code which contains all the references from the presentation. The outcome is that the student can simply scan the material as opposed to trying to follow complex urls or spend valuable time composing SMS text messages. The integration of these approaches is evident from a recent presentation by Andy Ramsden at MLearn 2008 (see <http://go.bath.ac.uk/lp5h>)

Further Reading

Information from the University of Bath

These two blogs that focus on recording and reflecting on the role out of QR codes in learning and teaching at the University of Bath.

- QR Codes Blog (<http://blogs.bath.ac.uk/qrcode>)
- Section in Andy Ramsden's Mobile Learning Blog (<http://www.mobile-learning.blog-city.com/read/qrcode.htm>)

Online guides

The following online guide (movie) is available:

- creating and inserting a QR code into a powerpoint (<http://www.bath.ac.uk/lmf/download/25102>)

Article

The following article has been selected as excellent starting points for the use of QR codes in Education:

- Using mobile Phones and QR Codes for Formative Class Assessment - <http://www.formatex.org/micte2006/pdf/1006-1010.pdf>

Delicious

The e-learning Team at the University of Bath tag material concerning QR codes using the tags; eatbath & qrcode