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The Application of QR Codes in UK Academic Libraries

LAUREN ELMORE
Hallward Library, University of Nottingham, Nottingham, UK
DEREK STEPHENS
Department of Information Science, Loughborough University, Loughborough, UK

Quick Response (QR) codes are relatively new in the UK, although they have been used very successfully in Japan. Two examples of the use of QR codes for commercial product promotion are outlined, one successful, the other a failure.

Against this background, this article considers the increasing need for academic libraries to promote their services and resources to a "mobile clientele." It reports on two case studies of UK academic libraries that use QR codes to promote library resources. It also gives an account of a pilot exercise at Loughborough University Library where QR codes were briefly tested.

The research found that, although awareness and use of QR codes in the UK was increasing and that certain types of QR codes, when used in academic libraries, were more successful than others, none of them were as successful as anticipated. Other new and more sophisticated technology was being developed which suggested that QR codes might simply be a bridging technology.

Keywords QR codes, new technology, mobile technology, promotion, advertising

INTRODUCTION

Quick Response (QR) codes are 2D barcodes that encode and decode data at a rapid rate and can be read with software input on to a mobile device with

Address correspondence to Derek Stephens, Department of Information Science, Loughborough University, Ashby Rd, Loughborough, Leics, LE11 4AN, UK. E-mail: D.P.Stephens@lboro.ac.uk

FIGURE 1 Example of a QR code.

a preinstalled camera (Rouillard 51). QR codes most commonly contain an URL but other information can be used within the codes such as telephone numbers or up to 700 words of text. These codes are gradually being adopted by many businesses as a cost effective method of advertising and promotion and seem to be being used because they are free to produce and simple to use. An example of a QR code is given in Figure 1.

This article considers how QR codes are currently being employed by academic libraries in the UK and which, if any, is the best way to utilize these codes to provide an additional marketing and promotional tool of significant worth within library services. The research included two case studies (the libraries of the universities of Bath and Huddersfield) and a short pilot exercise which introduced QR codes to the library at Loughborough University. A brief look at examples of the marketing/promotional aspects of QR codes in business provides a useful backdrop against which any potential use of the codes in academic libraries may be set.

QR CODES IN BUSINESS

QR codes were developed in Japan in 1994 by a subsidiary of Toyota to track their vehicle parts inventory (Rouillard 51), but they soon also became fashionable in advertising. The codes have been used in Japan for imaginative and interesting advertising campaigns, as well as providing a source of extra information. For example, in recent years QR codes have been attached to fruit and vegetables and when scanned they inform the user where the item was sourced from and how it is grown (Mendell 3). QR codes are now so ubiquitous in Japan that every mobile phone comes with a preinstalled reader (QR Codes – Historical and Technical Background).

Advantages of QR Codes

According to Pulliam and Landry (68) there are several factors which account for the popularity of QR codes in marketing:

- A QR code is dynamic. If a code links to an URL and the URL changes you can revise the underlying data without altering the image of the code.
- QR codes are freely available.
- QR is an ISO standard.
- QR is well designed, with a higher capacity than other matrix codes and with error correction capabilities.
- A QR code ties the physical to the digital.

QR Code Commercial Use Success

The biggest example of QR code success in Europe can be seen with a LEGO campaign by a German toy store MyToys.de. 3D codes were created out of LEGO. These codes were made to look like pictures, encouraging customers to take a photograph of them with their mobile phone, which would then provide a link to the online shop where they could purchase some LEGO bricks. During this 2009 campaign, 49% of visitors to the site came from the QR codes, with the sales of boxes of LEGO doubling (Barber 10).

Not only was this campaign financially successful but it also won an award at the 2009 Cannes Lion International Advertising Awards (*Lego QR Code Campaign*) for interactivity. This demonstrated that, when used well, QR codes could add a huge amount of value, and income, to an advertising campaign. The key to the success of this campaign was making the QR codes more visually appealing and eye-catching than normal. Rather than having them in the traditional black and white, the codes were in various colors with an attempt to include a picture in the middle which piqued the curiosity of many potential customers. An example of a LEGO QR code with a bird image within it can be seen in Figure 2.

QR Commercial Use Failure

In contrast, throughout Europe and America there have been a number of failures in the use of QR codes for advertising. An American cereal producer, Post's Food, for example, created a web based sitcom for their product Honey Bunches of Oats where QR codes were the primary distribution vehicle. Research had indicated that a third of their target audience would be interested in accessing the QR codes and these codes were therefore printed on 12 million boxes (Zmuda 8). When the sitcom episodes of *Honey and Joy* were released at the end of April 2011, however, they only attracted at

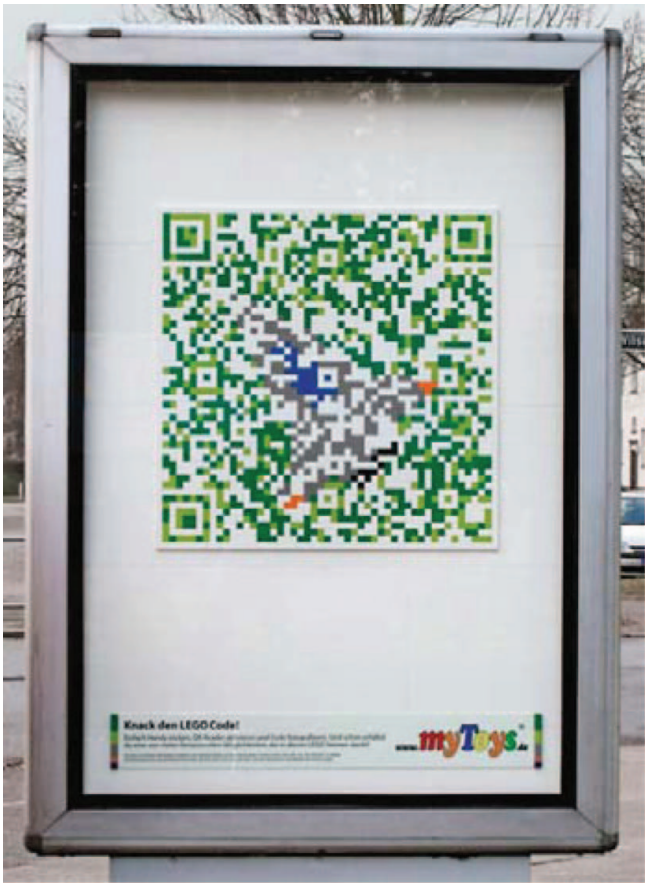

FIGURE 2 LEGO QR code used by MyToys.de. [Reproduced by kind permission of Arno Lindemann, LUKAS LINDEMANN ROSINSKI] (Color figure available online)

most 358 views, with the most recent episode only being viewed 35 times. It is arguable that this might have been attributable to the content, as a sitcom based in a cereal factory might not be appealing to the consumers of their product. It does clearly display, however, that using QR codes does not guarantee a successful campaign, and that the content included is still the motivation for access, not the technology used.

NEED FOR ADDITIONAL MARKETING OF ACADEMIC LIBRARIES

From the autumn of 2012 the cap on student fees will be raised for undergraduate UK/EU students and on average each student will be paying £8,666.87 per annum ("Undergraduate Fees"). Students are, therefore, likely to expect a more personalized and tailored university experience and value

for the money, including more resources being available to them from the library. As most UK academic libraries will probably not receive an increase in funding it is, therefore, crucial that libraries find new, cost effective, and relevant marketing strategies to promote the current resources that are available. The use of QR codes may be one way to achieve this.

EMERGENCE OF MOBILE TECHNOLOGY

In a fifteen-month study conducted in the UK, the percentage of internet use that originated from a mobile device rose from 0.02% to 8.09% which represented a 4000% increase ("Telemark UK Mobile Internet Usage"). Academic libraries cannot afford to ignore this growing trend. For many students a mobile phone is no longer just a telephonic device but a handheld information retrieval tool (Albrecht and Pirani). There is, consequently, a strong indication that libraries should harness web 2.0 technologies which are compatible with mobile devices supporting a web browser (e-readers, such as Amazon Kindle, PDAs, and particularly mobile phones such as smart phones). In this way the marketing of library services can be pushed into another dimension and the students' increasing expectations met.

LIBRARIES AND THE MOBILE CLIENT

It was predicted in 2009 by the Association of Research Libraries that these new technologies would spur libraries into re-evaluating and repackaging their online content for a mobile audience. While this technology is being embraced by the business world, however, its potential still remains largely untouched by academic libraries (Canuel and Crichton 108). A survey conducted among the 95 academic university libraries in Canada in October 2010 found, for example, that only 14% had any content that was specifically tailored to the use of mobile devices (Canuel and Crichton 112). As Pulliam and Landry (68) noted "According to many recent surveys on current technology trends, libraries and library services remain out of sync with user expectations."

Canuel and Crichton suggested that libraries needed to create a special webpage for mobile devices. This, however, is not now actually necessary since many of the current smart phones which have an Android or iOS operating system have the capability to access and use ordinary websites.

Does this mean that libraries do not need to use any new technologies to attract students? A mobile site may seem desirable but it is time consuming to create and maintain. Librarians should perhaps look instead to much more simple new technology, such as mobile applications and QR codes, while remembering that current web 2.0 technology already in use, such as Facebook and Twitter, has already been tailored for mobile use.

Current Use of QR Codes in Academic Libraries

Early pilot schemes of QR codes in academic libraries encountered little success. During a trial period at Providence College, Rhode Island, USA, the most QR popular code, which linked to LibGuide, only attracted 87 "clicks" (Pulliam and Landry 74). A Wiki on QR codes (Library Success) currently lists eleven university libraries in the USA and a few isolated examples of academic libraries in other countries which use these codes. The Wiki notes how the QR codes are used in the various libraries and the list includes: directing to libraries' mobile websites, blogs, and main Twitter pages; group study room reservations; realtime searches of the library catalogues; links to video trailers and electronic music resources; and for audio and virtual tours.

Slightly fewer academic libraries in the UK than in the US seem to have experimented with QR codes. QR projects at the universities of Bath and Huddersfield have been well documented and are analyzed below. Other UK academic libraries that appear, from information on their websites, to be using or introducing QR codes include Swansea University, the University of Bedfordshire, and the Radcliffe Science Library, Oxford University. In addition, according to Little, who quoted a webpage from Educause as his source, the University of Gloucestershire Library have "added QR codes configured with the automated circulation telephone number in all of their books, making the renewal process infinitely easier" (Little 268).

Cost of QR Codes

QR codes are easy to produce by using an online program such as BeeTagg where a code can be made in a few seconds, free of charge, and without the need for specialist technical skills. As such, they are a financially viable product for libraries to try using even if they prove unsuccessful in the long term.

Information on the Move

QR codes will allow library resources to be accessed and read "on the go." Use of these codes differs, however, from the current web 2.0 technology used by academic libraries as the student is not required to have an account with any one website or network, but only a compatible mobile device.

CASE STUDIES: BATH AND HUDDERSFIELD

Case studies on two academic institutions which had used QR codes to promote their services to the students, the University of Bath and the University of Huddersfield, were completed. These case studies consisted of a

comparative analysis of the documentation relating to the use of QR codes in these institutions, supplemented by an interview with a staff member at the University of Bath Library in order to provide further insight into how the QR codes were implemented and used. Unfortunately an interview with a staff member from Huddersfield was not possible in the very limited timeframe of this research.

Integration into the Library

The University of Bath Library used QR codes in a number of different ways. The most significant usage was in the library catalogue, with the expectation that students would scan the code and be able to save the bibliographic details of the book, as well as the shelf location on their phone rather than write it down. Cleverly, these codes only appeared when the book is available, providing a clear link with the physical and the virtual (Robinson 82) that was both useful and engaging to the user. The codes were also used on the doors of the subject librarians' offices and to promote the MP3 tours of the library.

The University of Huddersfield Library produced five different QR codes: two URL based, one linking to instructional videos, one linking to their text service "ask a librarian," and, lastly, similar to the University of Bath, one that stored the shelf marks of items. The link to "Ask a librarian" contained the number of the text service and opened a message box for the student to make contact (Walsh "Quick Response Codes" 8), thus using this new technology to advertise other services for which the library has already provided funding. This usage could be expanded further to provide email or telephone contact to the IT service or Subject Librarians (Walsh "Quick Response Codes" 8), further emphasizing and increasing awareness of the personalized service that academic libraries already offer.

Incentives to QR Code Use

By advertising the QR codes through traditional methods such as posters or rolling advertisements, both universities offered incentives.

The University of Bath encouraged the students to use the QR codes in exchange for a QR chocolate. Students were simply required to show a member of staff that they had scanned a QR code on the library catalogue, along with their library card, to claim a QR code chocolate. As no metrics were available it could not be determined whether there had been a surge of use during the "chocolate offer" period, or whether any increase in usage continued afterwards thus signifying that the users had felt the codes were an effective tool. The library had provided 360 chocolates to hand out to students and most of these were gone by the end of the pilot period (Bath

University Staff Member 2011), possibly suggesting that the scheme provided a useful stepping stone to further use of QR codes.

In order to promote the use of QR codes in the library the University of Huddersfield ran a competition where the students could win £100 toward a new mobile phone if they found seven of the ten secret words in the library (Walsh "QR Codes" 59). This marketing scheme yielded very few entrants, suggesting that, in order to encourage students to overcome the barriers of understanding and use QR codes, such codes actually needed to contain relevant information, rather than just appear to be part of a marketing scheme or competition.

Barriers and Problems

A recent study at the University of Bath suggested that 92% of students owned the relevant technology (Ramsden and Jordan 3) so it is clear that there were few barriers within actual technology to stop QR codes from being a success. On the other hand, the use of QR codes is currently in its infancy in the UK. A study performed by the University of Bath in 2009 before implementation of the QR scheme found that only 13.8% of the students knew what QR codes were, and only 2.2% had ever scanned them (Ramsden and Jordan 2). This lack of knowledge of what a QR code was and how it worked provided a negative impact on the Bath University scheme. Many students were unaware of how to access the QR codes on their device, meaning that the uptake was far less than anticipated (Robinson 82).

It was clear, however, that such schemes increased awareness of the codes. A second study conducted at Bath in 2010 found a 26% increase in awareness of QR codes compared to the previous year's findings; along with 7% more of those surveyed having used a code (Ramsden 2). The use of the codes was only at 9.6% but this still represented more than a fourfold increase.

The University of Huddersfield experienced a similar increase in awareness from 8% to 22%, with a further 11% saying that QR code technology was gradually becoming better known. This suggested that the universities were right to begin integrating the codes early on.

It was also suggested in both institutions that the initial trials suffered because they took place only in the library. At Bath University it was hoped that in the near future the QR codes would be rolled out across the university campus, providing continuity and increasing awareness (Bath University Staff Member 2011). This posed an interesting question as to whether QR codes would become more successful if they were a ubiquitous presence across an academic setting or whether their prevalence would create a feeling of over amplification of a device that was sometimes seen as little more than a novelty.

Many users in both libraries were put off using the QR codes because of the charges incurred by using a 3G connection to access the information. When students at the University of Bath were asked if they would be willing to pay to use these codes to access materials only 18% felt that they would be willing to do so (Ramsden 64). Instead of accessing library resources using mobile technology the majority of users were far more likely to access the materials they required for free on a library-provided computer. The issue of cost was further reinforced by evidence from the University of Huddersfield where the least popular QR code was one linking to a vodcast, which only received 50 "clicks" during the trial period, compared to the information storing device code which was most successful with 242 "clicks" (Walsh "Mobile Technologies" 4). It appeared that many students felt that the cost of streaming a vodcast might outweigh the educational benefits it was providing.

This question of cost to the client highlighted how valuable research among the student community was. It was found at Huddersfield, for example, that there had been a great deal of perceived value to the QR codes without prior consideration of how students might wish to use them. It could therefore be said that, here, at least, successful use of QR codes was likely to be limited before it had even begun.

Client Feedback

Feedback from the scheme at the University of Bath reinforced the fact that QR codes should only be used when they could enhance a user's learning experience. If this were not the case, the functionality of the codes would be undermined by a reticence or simply a lack of enthusiasm (Ramsden 5). One user who took part in the survey, for example, described QR codes a "ridiculous techno-fetish (that is an) overcomplicated gimmick . . . with some arcane symbol" (Ramsden 11). It was this kind of attitude that the University of Bath library wanted to avoid by ensuring that the information included in their QR codes made it worthwhile for the user to take time loading and using them.

PILOT QR SCHEME AT LOUGHBOROUGH

Strategy

The purpose of launching a pilot scheme at the Loughborough University Library was to investigate on a first hand basis the worth of QR codes in an academic library. The codes were created by using a QR code generator, BeeTagg. This particular generator was selected as it offered an inbuilt statistics monitor, the provision of metrics being important to gain a clear view of how functional the codes were.

The pilot study was based on the use of the "Know How" handouts the library provides, QR codes being created for the five most popular handouts. These were:

- How to cite
- How to write a literature review
- Report writing
- Revision and exam skills
- Word 2007

The codes provided a downloadable PDF which could be saved onto mobile devices. It was hoped these codes would prove worthwhile during the busy period of 24 hour opening in the library, when the library staff were unavailable to replenish the handouts. This scheme thus had the inbuilt potential to have further benefits for the university library apart from marketing and repackaging library content.

The codes were displayed both on a poster displayed at eye line, for ease of scanning, and on a single A4 sheet so that all five could be taken away. The take away option was introduced after research indicated that some users were put off from using the codes because they did not want to incur charges when accessing the internet on their smart mobile phone using a 3G connection.

The poster and sheets on which the codes were displayed provided a short explanation for what each code was but did not offer an indication of where to download a QR code reader. The library did not offer any additional support to students wanting to use the codes as it was felt that the pilot scheme was too small to warrant this level of interaction from the staff.

Due to time constraints the pilot scheme only ran for a month, but it ran at a period of high footfall in the library at the end of summer term, when examinations were taking place and final reports were due (20 May until 24 June 2011). This meant the time constraints were not as limiting as they appeared to be.

Results

Over the four-week pilot scheme the QR codes were accessed 33 times in total. This was less than expected but does show that on average at least one code was scanned every day of the pilot scheme, suggesting that the codes appeared to be providing some function within the library. Contrary to expectations, codes were quite often scanned singularly, rather than all five at once. Students appeared to be only using the codes which contained relevant information and were not just scanning them all for the novelty value. Since the students who used the codes cannot now be questioned

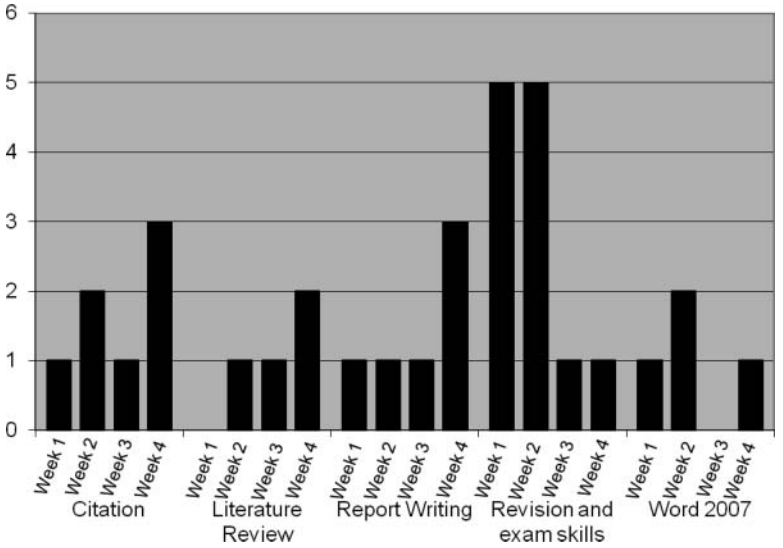

FIGURE 3 QR code usage over a four-week period. Pilot scheme at Loughborough University Library.

about their reasoning, it can only be inferred that the QR codes did provide some value as repackaging of the educational resource that they provided.

Unsurprisingly, the most popular code was the revision and exam skills handout. It is clear, by looking at Figure 3, that the exam skills handout became less popular after the first two weeks, when most of the examinations had been completed. This suggests the information included in the codes was actually providing the students with some useful knowledge. Similarly, in the last week of the trial period when only undergraduates and postgraduates were completing their reports, the use of the citation and report writing QR codes peaked. It would appear, therefore, that QR codes might have value across the university student spectrum.

Providing take away sheets with the QR codes included proved effective. Analysis of the pilot scheme results showed that the codes were not only accessed in Loughborough but also in Manchester, Widnes, and Shipley, 28% being accessed away from the university campus. This suggested that students liked having the option of taking the codes away with them to access either when the codes became useful or when the students were able to download them for free. Providing take away sheets differs from the approach taken by other academic libraries and is possibly a means of breaking down one of the barriers that QR codes are facing.

Research has shown that although codes can contain links to information such as vodcasts and podcasts, these tend to be the least popular items. Instead, QR codes experience the highest volume of use when they contain basic information which does not require a large amount of downloading.

In this respect the PDF files for the University Library's handouts were the perfect item. The QR codes for the PDF files used in this pilot scheme were on average around 54KB in size, and thus quickly and cheaply downloadable as well as not taking up a great deal of space on the limited memory of a mobile device. The "Know How" handouts are a popular item in the library and by providing extra access to these the library indicated its interest in the students' needs.

DISCUSSION

Barriers to Use of QR Codes

Two main barriers can be seen from the pilot scheme and case study research. First, the success of QR codes was limited by a lack of knowledge of how the codes functioned and what could be integrated into them and secondly there was the problem of client disinterest.

With regard to the first barrier, although the codes are becoming more commonplace many people are still entirely oblivious to what they can offer. When introducing QR codes the academic library therefore needs to offer some support. This would include signage around the codes themselves with some explanation of how to find a QR code reader and what is included in the code. Front line staff also need to understand how the codes work and how to advise students to use them. Although the creation of the actual QR codes is relatively cheap there are some additional cost implications related to the introduction of the codes if an academic library wants to integrate them as a long term feature. In general, however, the extra costs, such as the initial staff training, would be a one off expenditure and the potential future worth of the codes could outweigh the expense. It is also important to remember that ensuring the QR codes are providing enrichment to the student experience involves more than having useful information embedded.

The second barrier facing use of QR codes in academic libraries, that of client disinterest, seems to be considerable. Although extra web 2.0 applications such as Twitter and Facebook are highly popular with students outside the library setting many students appear to lose interest in these media when they relate to library matters. Walsh certainly reported a perception among students that "You only interact with the library, in the library" ("Mobile Phone Services" 27).

Although both the University of Bath and the University of Huddersfield created incentives to encourage the use of the codes in neither case was there the client interest that had been expected. Students cannot be forced to engage with applications offered to them; academic libraries will need to be patient with the use of new technologies and not expect them to revolutionize the way students use the library overnight. This is not to suggest, however, that using new technology of this kind in an academic library does not hold potential value. By using technologies such as QR codes, the

academic library is able to display to students, potential students, and other institutions that they are forward-thinking and trying to find innovative ways to communicate information about the wealth of resources held to a wider range of users.

Development and Content

Monitoring

Although QR codes are used in many different ways in the business world, not all of these complement a library environment, nor are they suitably tailored to the library client. All new technology introduced into the academic library should be monitored and developed over time with regard to which aspects are proving to be successful and which are hampering progress.

If the purpose of using QR codes is to make a significant impact on increasing clients' accession of library resources, there is a clear need for research into the kind of information the clients actually want to access while on the move. There is also a need to ensure that the information contained in the QR codes is not too complex for smart phones to process and that costs incurred by the client are taken into consideration.

It has previously been noted that using QR codes to link to vodcasts is generally unpopular due to the expense of streaming or downloading the vodcasts using a 3G connection. This was clearly reflected in the University of Huddersfield campaign with that particular code having the lowest uptake of 50 clicks over the pilot period, around four times less than the most popular code.

Success is more likely to be achieved when using the QR codes to link to websites or photographs, as shown by the MyToys' lucrative advertising campaign. This success can again be linked to the expense of viewing because the cost of accessing a webpage is relatively low.

Furthermore, a QR code with a simple resource encoded within it, such as a website link, is accessible to a wider range of smart phones, whereas many older models struggle to process audio and visual materials at a fast enough rate. The success enjoyed when using a simpler approach has been reflected in some of the QR codes produced for the libraries at the University of Bath and the University of Huddersfield.

The QR codes offered by Loughborough University were based on a popular resource the library offered, the "Know How" handouts. Although the pilot scheme was not as successful as hoped, all of the QR codes did experience some usage. The "Know How" sheets did need to be downloaded and opened using a PDF viewer, meaning that they would only function on more recent smart phones. The actual download size was quite low but would have still cost more than accessing a single webpage. It could therefore be argued that the uptake was more than likely due to the constructive

nature of the information embedded in the codes. It would appear that if the information is valuable to the student, and they are already aware of its value, then they are willing to accept the download costs. An effective initial use of QR codes can therefore sometimes be with a resource that has already been successful within the library environment prior to the introduction of the codes.

Some institutions have used QR codes to repackage their less popular items, such as vodcasts of how to use the library. It has also been hoped that employing QR codes might encourage students to make use of a wider range of resources. Use of these codes does allow for lesser used information to be opened up to a wider audience by making it more accessible. It should, nevertheless, be remembered that if students are not interested in a certain resource then they are unlikely to access it no matter how it is packaged. Furthermore, the use of QR codes with less used or "unpopular" resources might have a negative effect on the use of the codes as a whole.

Engagement of Clients

It is not yet clear how much value the QR codes provide as a pedagogical learning tool, not only because of lack of statistical evidence but also because the options of use have not yet been fully explored. It can been seen, however, that the libraries of the University of Bath and the University of Huddersfield have attempted to engage students by using the QR codes in interesting and diverse ways. Such initiatives certainly promote the library as an interactive experience, reinforcing its dedication to developing new tools to improve the student experience.

FUTURE APPLICATIONS

Future applications of QR codes are already being discussed in some American libraries. It is hoped that a process can be developed whereby a user can scan a QR code on a book in order to check it out (MacKinnon and Sanford 5). There are security issues currently surrounding this process, however, that will need to be addressed before such a scheme can even be piloted. Libraries also face a security problem if they want to adopt QR codes that take payments. For example, it may be seen as convenient for printers and photocopiers to have QR codes on them that link to an online payment system for printer credits, a system already widely deployed around Asia (Buczynski 264). Unfortunately the lack of secure connections when accessing the internet via a mobile device has so far prevented UK academic libraries from adopting such a method for processing payments.

BEYOND QR CODES

Two technologies with similar functions to QR codes are currently being developed for smart phone use. These are Radio Frequency Identification (RFID) tags and Near Field Communications (NFD). Both Bath and Huddersfield university libraries have begun to investigate the potential of these technologies.

RFID technology is currently common in the library service for holding the bibliographic details of items held in the library. This technology could be used in the future to provide access to a wider range of more complex information than QR codes are able to do but at the moment RFID readers are not commonplace on mobile phones.

Near Field Communication (NFC) is a "short range, wireless interactive tool that allows interaction with PCs, mobile devices and consumer electrical devices" (*NFC Forum*) and it is currently being implemented into many smart phones as a method of secure payment. This not only allows for information exchange through the scanning of a code, with a similar functionality to QR codes but it also has inbuilt security to allow for credit and debit card payments to be made. For an academic library this would allow for payment of print credits and fines, meaning less staff time would be taken up on frontline services.

The University of Huddersfield has suggested RFID could be used for book recommendations, personalized help and social networking (Walsh "Mobile Technologies" 4; Walsh "Blurring the Boundaries" 434). Although knowledge of RFID outside the library environment is probably less than that of QR codes, it is possible that this technology will become more prominent. Interestingly, Apple has taken out a patent on a touch screen RFID reader (US Patent and Trademark Office) suggesting the possibility of the integration of RFID readers into the next generation of iPhones.

CONCLUSION

Evidence in the literature relating to the use of QR codes in Japan clearly shows that the codes are successful there because their use is widespread. It is, therefore, arguable that the same could be true of a university campus wide campaign in the UK, making QR codes become a useful part of the students' and academics everyday lives. On the other hand, QR code readers are inbuilt into every smart phone in Japan whereas they do not yet come as standard in the United Kingdom, suggesting that a campus wide campaign in the UK might still fail to succeed.

As QR codes become more common throughout the UK, and as a greater number of people begin to own smart phones with increased capability, it is possible that academic libraries will, before too long, be seeing a larger

use of their QR codes. They may not be a long term fixture of the academic library but while they are cheaply available, they can provide a source of information, not just for the students but also for staff looking for new ways to provide information that could expand into the use of RFID or NFC in the future. QR codes could, therefore, be seen as a very useful bridging technology.

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