QR codes in use: the experience at the UPV Library

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QR codes are beginning to be introduced in our libraries and are an easy way to give additional information to mobile web users in a given time and place.

In this paper, we share the experience and give some examples of the introduction and use of QR codes at the Universitat Politècnica de València (UPV) Libraries in Spain. We describe how we use QR codes to give access to our mobile website, to download documents and to promote our literature blog. We also describe how we promote our QR codes to both users and librarians, including some best practices. Finally, we discuss our future projects, such as the use of QR codes for information literacy.

Introduction

We would like to start with a quote from the Taiga Forum[1], although we all know that their statements are intended to be provocative and exaggerated:

> *"E-books and e-book readers will be ubiquitous. Standards will have magically made this possible. Hand helds will be ubiquitous and library resources will need to be accessible to these devices to meet user needs."*

Technological advances bring new challenges for libraries. However, we should not consider this situation a threat nor see it as a new workload, but should view it as an opportunity to adapt the library to the new demands of our users. The 'quick response' (QR) codes are one of the tools that could help us to improve the relationship between the library and its users. It is important to understand what they can do and when they can help our users.

Advantages of QR codes

Normal barcodes hold information in only one dimension (horizontally) and are seriously limited in the amount of data they can contain. However, QR codes can hold much more information than a regular barcode. Denso Wave developed QR codes as a way of holding information in two dimensions (they go horizontally and vertically) and, strictly speaking, they should be described as matrix codes rather than barcodes. Walsh[2] defines a QR code as being like a type of two-dimensional barcode that is readable by QR barcode readers and mobile phone cameras.

The code consists of black modules arranged in a square pattern on a white background and it was designed to allow its contents to be decoded at high speed. It is really easy to generate and use them, and there are many free QR code generators and QR code readers available on the internet.

Spread of QR codes

QR codes are really common in Japan, but their popularity is rapidly increasing in other regions such as Europe. Although initially they were used for tracking parts in vehicle manufacturing, QR codes are now used in a much broader context. They can be used to link to a website, to download documents, to encode text or contact details, to show a location, to send SMS or to make a phone call. There are a lot of applications available which you can take advantage of in your library.

The use of smartphones and the mobile web is growing daily; therefore new ways to communicate with our users are appearing. The use of QR codes in libraries is still largely untried. However, last year a great number of international papers about their theoretical possibilities and uses, like studies by Hoy[3], Hampton[4] and Burns[5], have appeared. There are also already some studies giving examples of mobile web and QR code use in Spain, such as those by Arroyo[6, 7] and UPC[8].

In this paper we will describe our own practical experience, giving some examples of the use of QR codes in a university library and the results that we have had at UPV. We will also share some of our future projects involving the use of QR codes. Our ultimate goal with this paper is to encourage libraries to use QR codes by showing how they can be used in libraries as an easy way to give information to our smartphone users in a given time and place.

QR codes in the UPV Library

In February 2010, the Universitat Politècnica de València (UPV) Library drew up a performance plan for improving communication between the Library and its users. The aim of this was to address the fact that our current means of communication, via the website, e-mail, posters, RSSm etc., were no longer encouraging users to contact the Library. One of the workgroups created in the performance plan was the mobile technology group. This looked into various possibilities for the use of mobile technologies, including QR codes, in the UPV Library, to offer to smartphone users new mobile tools for a better library experience. We studied the literature, searching for new experiences of libraries in this area and we found that there were some case studies about mobile webs and QR codes. (Some examples of these have already been listed). We realized that this could be an easy way to dynamize our relationship with our users, and would enable us to reach several goals, such as:

- to give an extra access point to our websites
- to improve the image of the Library: the use of this 'new' technology could be highly valued by users
- to allow our users to learn what a QR code is in the Library.

For these reasons, QR codes have now been integrated into the Library in the following contexts:

Mobile web

Recently, a mobile version of the Library[9] website has been developed. It is called 'Bibmobil'. After considering several options, we decided to create a tab on the website to access Bibmobil. It was also decided to accompany this button with a QR code (see Figure 1) which is the same as the Bibmobil URL. This way, users have the option to save to their mobile device and then access Bibmobil directly.

Signage

Many of our posters informing students about schedules and library news were overloaded with information. For this reason, we have included a QR code that replaces or provides extra information, achieving a double objective: to add more information and to visually reduce data overload. Figure 2 shows a QR code with information about Library schedules/timetables, and Figure 3 shows

Figure 1. Library website for the UPV showing 'Bibmobil' button and QR code

the Saturdays that the library is open during exam periods. This latest poster is part of the promotional campaign which will be discussed later.

Figure 2. Example of Library timetable using QR code

Guides

In printed guides about the use of services and/or products offered by the library, a QR code has been added that links to the digital version of the guide. This way, users who have saved the QR code could access the guide from their mobile device anywhere at any time. Figure 4 shows a catalogue guide that connects which QR code links with the same guide in digital format available on Issuu.

Electronic resources

Currently, many suppliers of electronic resources are offering their adapted products for display on

Figure 3. Poster showing Saturday opening times using QR code
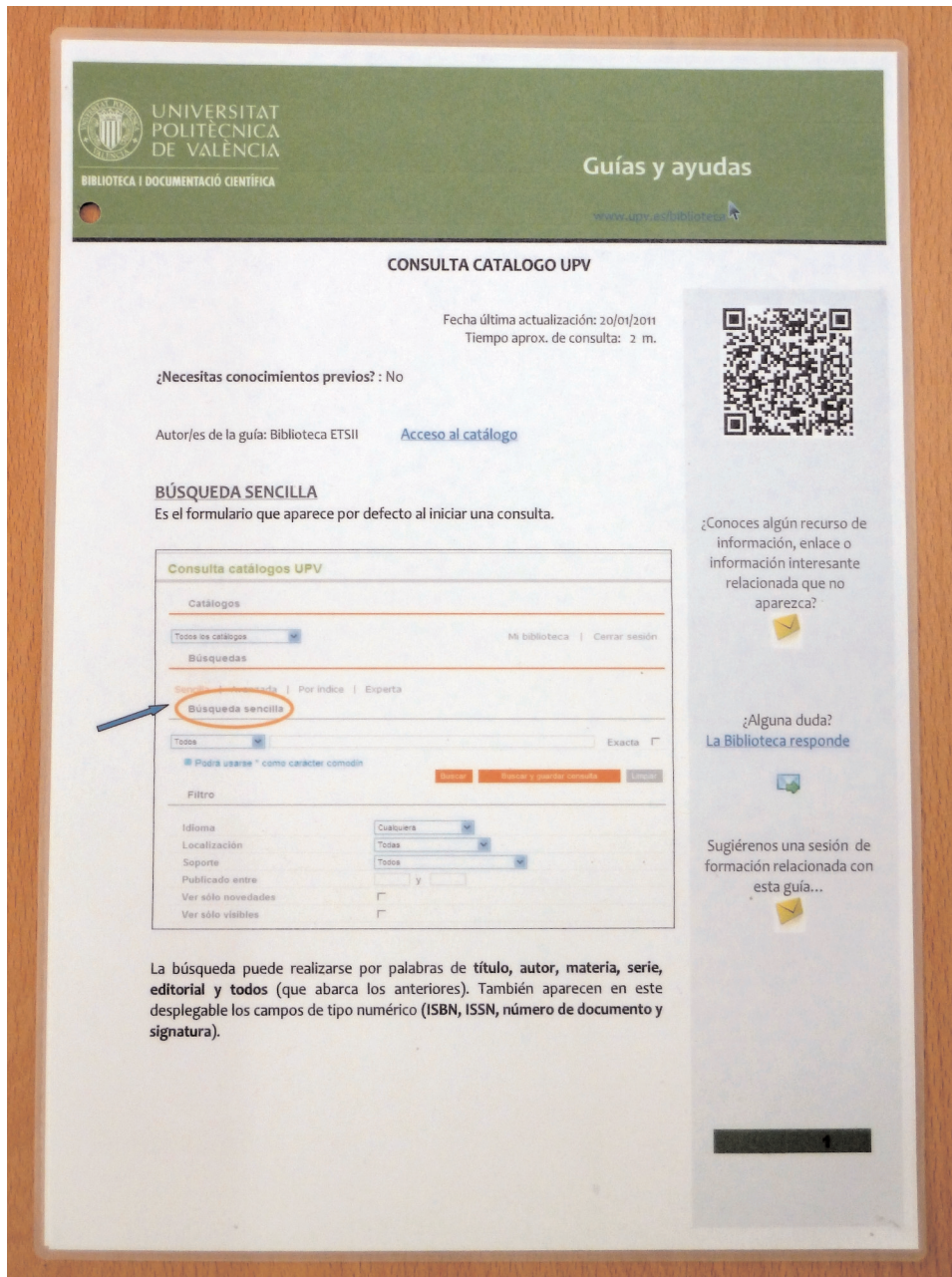
Figure 4. Catalogue guide using QR code

mobile devices. So, we have selected some highly used databases and have created a poster to put in a highly visible area of the Library giving a QR code that links to the database. For example, there is a poster in the Library of Industrial Engineers that links to *IEEExplore Mobile* (see Figure 5).

Promote reading

The UPV Library has a literature blog called *Connecta't a la lectura*[10], a site where reviews about fiction books are posted and where readers can add comments or recommend their favourite books. Most of the novels reviewed in the blog now have

Figure 5. Link to a database

a physical QR code (Figure 6). Such codes send readers to our blog, allowing them to read the whole post, read the comments or leave a comment saying whether they liked the book.

Figure 6. Link to a post in our literature blog

Link to a catalogue query

In our Library we have some paper listings of literature and grammar books. Users can consult them to find out which books we have on this specific topic, but the user cannot know the status of the book without doing a search in the catalogue. A QR code has been included in each listing with the search (Figure 7): it will take users to the catalogue and provide them with the information they need (book availability, loans, etc.).

Download documents

UPV Libraries offer maps with the location and placement of the bookshelves. These maps are printed and placed at the library entrance. The QR code is embedded in the map (Figure 8), so that users can download the information to their phone and take the map with them while they look for the books they are interested in. Another example of using QR codes to download documents is bibliographies prepared by the Library, which can be found on the UPV's website. Here, when a new bibliography is published, the QR code is included within the announcement itself, and by reading it, users may download a PDF document that can be comfortably viewed on their smartphone.
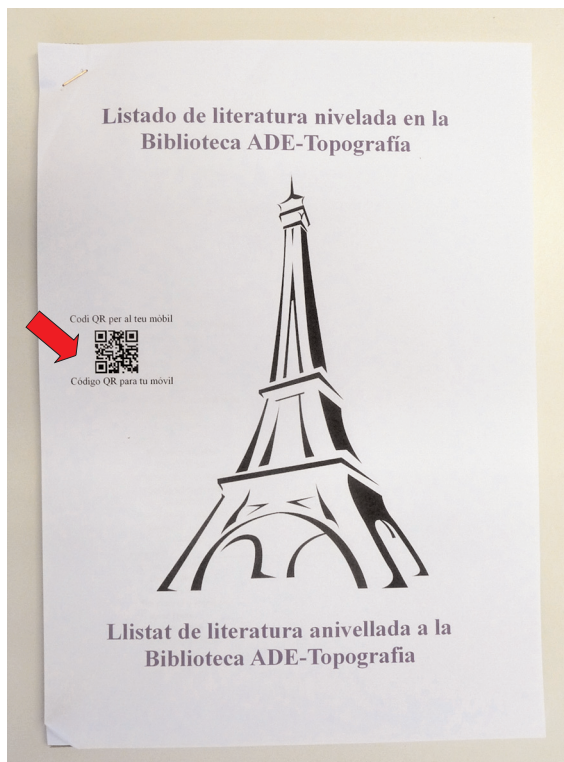

Figure 7. Link to a query

Figure 8. Distribution of the bookshelves

Cultural activities

The Library recently held an exhibition of antique and rare books from the School of Design Engineering Library. This exhibition had a virtual counterpart in our Flickr account with pictures of every book. A QR code was placed at the entrance with a link to the virtual exhibition (Figure 9) so that users could take it with them. QR codes have also been used for specific cultural campaigns, aimed at promoting the reading of historical novels or travel guides, among other things. For such campaigns, the Library has provided lists of relevant books, with a QR code on each of them.

Promotion

If we compare the results of the surveys made by the University of Bath in 2009[11] and 2010[12], they demonstrate a large increase in the users who know what a QR code is during that time: from 13.8% in 2009 to 39.8% in 2010. However, this is still a relatively low percentage and it was thought necessary to initiate a campaign to promote these codes to library staff library and library users.

At the internal level at UPV, a course has been run aimed at staff to increase their awareness of the mobile web. This included a section on QR codes. Similarly, guidelines for librarians have been produced to raise awareness of the QR codes; how to create them and their potential uses for Libraries.

At the external level, the use of QR codes has been advertised in different ways: news on the University and Library website about the mobile web and QR codes, brochures for users to show what is a QR code, how to use it and the possibilities offered (Figure 10). In the Library itself, the use of QR codes has been advertised (on screens) and large posters have been put up in library areas with high numbers of users, giving just a QR code to catch the attention of users (as was shown in the example of Saturday opening times in Figure 3).

Best practices

When we started the internal information campaign, we produced some guidelines for the librarians – a few recommendations in order to improve their work, such as:

■   *URL is better than text*
When we have text, we can provide a QR code with the text, but if it has some unusual symbols,
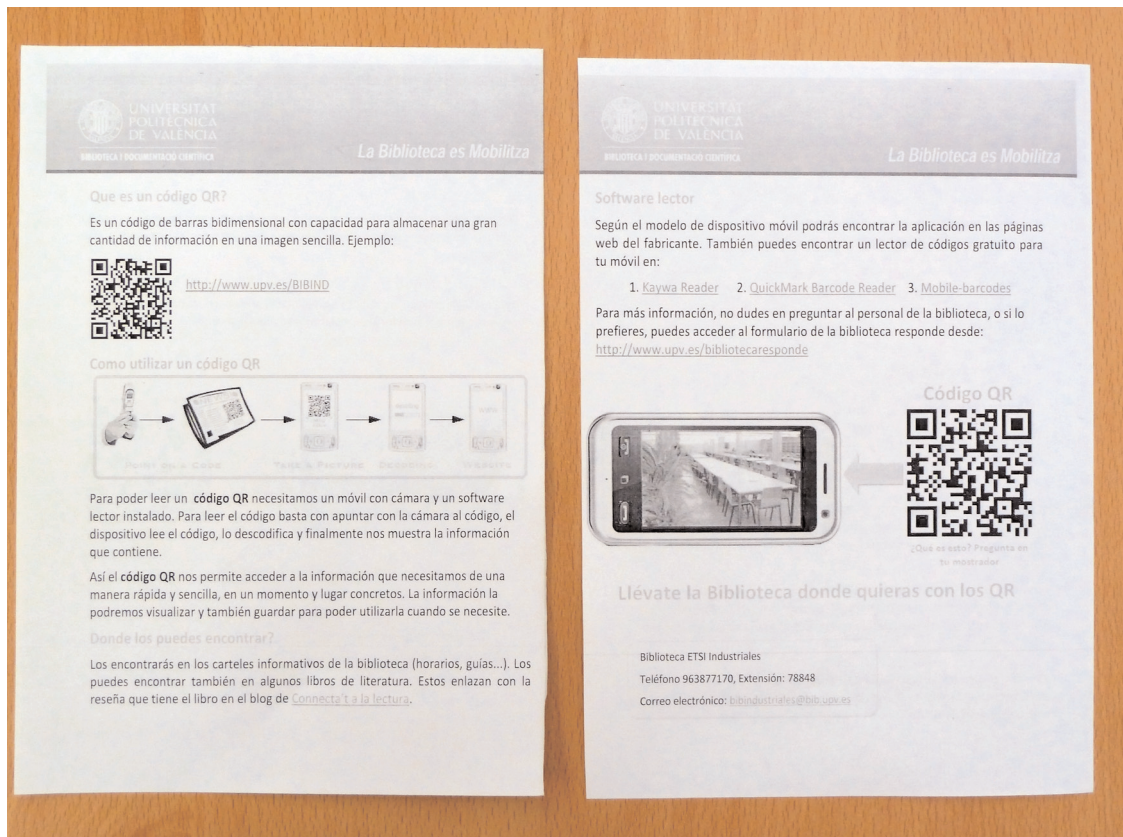

Figure 9. Virtual exhibition

Figure 10. Brochure about QR

like "ñ", "ç" or accent marks, is better if the QR code links to a website with the related information. Some software does not recognize accent marks or symbols in other languages, and we do not know what software the user's phone has.

■ *be brief*

First, QR codes are read with a phone camera and, after that, decoded with software. If the camera or the software is of poor quality, the user can have a problem with the QR code reading. If we want to minimize this problem we must create light QR codes using short texts or create a shorter link version of our URL.

For example, Figure 11 and Figure 12 go to the same web page (library schedule) but the first is more complicated to read because it is dense. The second QR code was generated with a URL shortener and it is really much easier to read.

Results

The use of QR codes at UPV is relatively recent and therefore we have insufficient data at present to evaluate the real impact on Library users. However,

we can analyze and explain some previous data, as follows.

Nowadays, mobile website visitors represent less than 2% of all Library website visitors, so the use of QR codes that link to the mobile website[13] is still very low.

In order to find out how many accesses to our websites come from QRs, we are now analyzing the pros and cons of two ways to do this.

The first one is the creation of intermediate web pages. With the same content management system (CMS) that we use for our mobile website (Joomla), we will produce as many pages as the physical QR
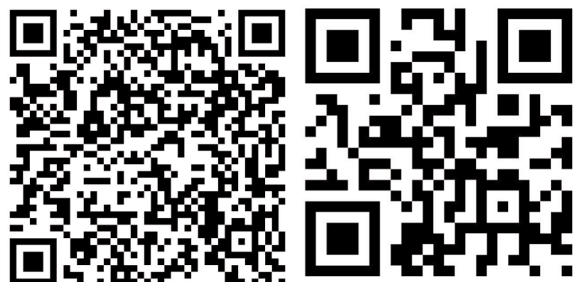

Figure 11 (on left). QR code with a long URL
Figure 12 (on right). QR code with a short URL

codes we have. Then the physical QR will lead us to this intermediate page which will take us seamlessly to the correspondent website. In this way, if we change a URL, then we will only need to modify the redirection in this page and leave the physical QR as it is. On the other hand, as we already have a Google Analytics account to our Joomla site, we could monitor the success of the codes. We could organize them by types (guides, maps, timetables, etc.) to get interesting data.

The second one is a web service called bitly URL shortener[14] that provides a tiny URL. If you sign up to a free account, it will generate a QR code from a URL and it will also provide you with usage statistics.

As mentioned before, we produced brochures about the use and possibilities of QR codes, and estimate that approximately 10% of users who borrow a book also take a QR brochure, and some of them even ask the librarian about QR codes.

Finally, to evaluate the improvement in the Library's image, we would need to wait for the users' survey that the University produces every year. For the time being, we can only say that some users have congratulated us on introducing QR codes into the Library.

Future projects

In this case study we have shown several uses of QR codes at the UPV Libraries in Spain. There are, of course, libraries that have developed other services based on QR codes, for instance the UTS library[15] in Australia, the University of Bath[16] or the University of Huddersfield[17] in the UK. We describe below the steps that need to be taken at UPV from now on, which are:

- to create intermediate pages for QRs
- to add QRs in the catalogue
- to promote our physical and virtual collections
- to use QR codes for information literacy activities
- to lead QRs to augmented reality layers or audio tours.

We consider that the use of QR codes must be in keeping with a mobile website policy. And the mobile website of a library is not complete as long as its catalogue is not adapted. At the time of writing this paper, our institution has a mobile website but we are in the process of implementing

a new ILS. For this reason, we are still working on the development of a *mOPAC* (mobile OPAC) that will be available once we start to use this new ILS. Parallel with developing a mOPAC, we would like to embed QR codes in each record of the desktop-mode catalogue. There is an example of this function at the University of Bath.

Another project consists of expanding the use of QR codes around our physical collection in order to widen the user's vision of our libraries. For example, as we have a film library, maybe we should place a QR code next to it that informs users about other film collections in other libraries or campuses, or about our books on cinema.

And not only should we use QR codes to promote our physical collection but also to increase the accesses to our expensive e-books collection, for example, placing QR codes where frequently unavailable paper books are. This QR code would lead the user to the electronic version of this book, like the University of Bedfordshire is doing.

Walsh[18] and other authors consider that information literacy is going to be affected by mobile environments, probably in a positive manner. But first we must think deeply about how we can evolve from a paper-based concept of information literacy to mobile learning for digital natives. We should not just reproduce our paper guides in the mobile website, but adapt the message to the new delivery mediums.

Location-aware phones provide us with a very powerful tool which, together with QR codes, could be really useful for our users. So another interesting step would be to develop some augmented reality layer and QR codes that connect with a Layar layer.

There is another area of research in our University which is using QR codes for geolocation in a map of the University campus without needing GPS, by means of downloading an application and scanning QRs. We think this technology could be useful for an indoor environment such as a library, where GPS does not normally work very well.

Conclusions

Nowadays, the expansion of mobile technology is clear (smartphones, tablets, e-readers, etc.) as well as the spread of Wi-Fi nets and 3G networks. According to the report of Morgan Stanley[19], in 2014 there will be more mobile internet users than

desktop internet users. Several studies made by technological companies like Mobio[20] or Scanbuy[21] show two important aspects. Firstly, QR code users are between 25 and 54 years old, similar to our users' average age. Secondly, in 2011 there has been a high increase in the use of QR codes (1200% more QR scans according to Mobio and 300% more QR generations according to Scanbuy), Spain is the third country in the word in the use of QRs and there are two Spanish cities in the top three. One of the latest data that evidence the increase of the use of QR codes is that 14 million Americans scanned QR or barcodes on their mobile phones in June 2011[22]. It opens a field of experimentation and improvement that we can develop within our financial capablities. As we have seen, many of these technologies are free and, in many cases, their implementation just takes time.

On the other hand, we cannot ignore the way users communicate. Some of our users are already in a mobile communication environment and sooner or later the rest will be joining them. This does not mean that we should be always where they are and use all these tools, or other future tools, but we must at least be aware of the existence of them, and their usefulness.

Although a QR code can be a quick extra access point to our digital or physical facilities, we could miss an opportunity if we do not make an effort to design user-oriented landing pages that really meet the patrons' needs. We have to avoid, as long as we can, QR codes referring to non-adapted sites.

Finally, we also need to take into account that by using QR codes and new technologies in the library, we are helping to reinforce our image of modernity, and are thus beginning to be seen as a source of dynamic information that is evolving without losing sight of technological advances. But this new image and role will only happen if we are ready in time to meet our users' changing needs.

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