

# 7 things you should know about...

## QR Codes

### Scenario

Sid, Boris, and Kristi are working on their joint senior project in Urban Planning. The topic must address this year's theme, "Connecting with the Community," and requires a proof of concept with a public presentation. Sid wonders if they could use QR codes to provide information at city gardens. "We can post QR codes next to the plants or garden spaces," he suggests. "Then anyone with a QR code reader on their phone can scan the code to access a website with additional information." At the team's second meeting, Boris reports that three public gardens offer free Wi-Fi access—the roof garden at city hall, the botanical garden, and the heirloom herb garden outside the university library—and they choose the garden at city hall.

They work with the City Hall Garden Docents, volunteers who act as visitor guides on Saturdays, and obtain permission to post signs with codes in the garden. They also invite garden workers and volunteers from throughout the city to their public demonstration. Kristi interviews the docents about the questions that visitors most commonly ask. The students begin compiling information on plant names, uses, culture, and the specific requirements and benefits of rooftop gardens. Boris writes up the content and posts it to the web. Sid generates a QR code for each URL or information module and posts them around the garden.

On the day of demonstration, Boris and Kristi set up a booth near the entrance where guests can download QR reader software if their phones don't have it. Guests who don't have web-enabled cell phones are paired with other guests who have them to move through the exhibit. In one group, no one has a web-enabled cell phone, so Sid accompanies them. The guests find the immediate access to information about the plants valuable, and all are excited by the potential of QR codes. They quickly begin making suggestions for ways QR codes could be used in garden settings. The docents even say they would like to use the codes to check details when visitors ask the best time to set out certain plants, how to combat specific pests, or how much of an energy saving could come from a rooftop garden.

### What is it?

QR codes are two-dimensional bar codes that can contain any alphanumeric text and often feature URLs that direct users to sites where they can learn about an object or place (a practice known as "mobile tagging"). Decoding software on tools such as camera phones interprets the codes, which represent considerably more information than a one-dimensional code of similar size. The codes are increasingly found in places such as product labels, billboards, and buildings, inviting passers-by to pull out their mobile phones and uncover the encoded information. Codes can provide tracking information for products in industry, routing data on a mailing label, or contact information on a business card. Small in size, the code pattern can be hidden or integrated into an esthetically attractive image in newspapers, magazines, or clothing.

### Who's doing it?

QR codes are popular in Japan, where they are used for commercial tracking, logistics, inventory control, and advertising. Their popularity is climbing in Europe, the United States, and Canada as people increasingly use mobile phones to access 3G networks. So far, their application in learning has been limited, used by some instructors in



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slide presentations to direct students to websites where the slide deck is hosted or where supplementary information can be found. In England, a grant-funded venture led by Andy Ramsden at Bath University investigates ways to use QR codes in academic settings. As other institutions have signed on to the effort, Ramsden has conducted "idea factories" (brainstorming sessions) at those campuses, resulting in a number of proposed uses for QR codes, including putting them into library books with the renewal phone number encoded (University of Gloucester) or putting them in equipment rooms where they might be scanned to access a how-to manual (University of Leicester). Some see potential in using QR codes to direct students to RSS feeds or lecture podcasts.

In physical learning spaces, QR codes might indicate what types of learning take place in each area or provide a link to scheduling software that offers the opportunity to reserve a room. QR codes might also be effective repositories of data in problem-solving

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activities involving role play or alternate reality games (ARGs). In Australia, for instance, a promotional ARG for the movie *Quantum of Solace* used QR codes to hide clues in the unfolding game.

## How does it work?

Data can be translated into a QR code by any QR generator, many of which are available free online. Users simply enter the data to be translated, and the generator produces the code, which can then be displayed electronically or in printed format. Decoding the information can be done with any mobile camera phone that has a QR reader, which is freely available online for most devices. Once the software is loaded, a user points the cell phone camera toward the code and scans it. The software interprets the code, and the cell phone will either display the text or ask for permission to launch a browser to display the specified web page.

## Why is it significant?

The idea of linking spaces to information is not new, but QR codes combine simple creation with easy access to QR code readers. As a result, QR codes might kick-start widespread thinking and innovation around information connected to locations and objects. In museums, for example, QR codes might appear on plaques beside art displays, directing patrons to information about the artwork and the artist. QR codes posted on a building might offer visitors the history of the building itself or the corner on which it stands, and they might give the architect's name or discuss the events happening in the city when the building was built. At botanical gardens, codes could direct users to information about the medicinal uses or food value of botanical specimens on display or offer data about the climate or soil requirements necessary for certain plants to thrive. Because QR codes are so inexpensive, they might even be printed as stickers and temporarily added to campus signs for a class activity.

## What are the downsides?

Not everyone is aware of QR codes. As a result, not everyone who sees one will know to pull out a cell phone and take a picture of the matrix. Not everyone owns a camera phone, and because many cell phones do not include a QR reader, the software must be downloaded and tested. Moreover, a QR code might direct users to a website that does not display properly on a cell phone. Taken as a whole, it is impractical to expect students to be able to capture coursework information from QR codes without some support. Beyond that, while projects like the one at Bath University are investigating potential uses, the challenge remains to find appropriate and effective pedagogical uses of QR codes.

## Where is it going?

QR codes can store quite complex information in a small matrix. As awareness grows about how useful they are, we can expect to see them in more public venues. Commercial packaging will display codes with detailed nutritional information or links to websites where users can play the latest product-associated game

or register for updates or coupons. In academic uses, QR codes on student tests could help ensure anonymity in grading. Posted next to artwork or in musical or theatrical programs, QR codes might lead students to open forums where they could join in community discussions about what they've heard or seen. In scientific endeavors, QR codes could take the place of printed labels; attached to lab work, samples, or medication options, they could preserve confidentiality of participant names.

QR codes may presage other applications that use mobile devices to decode information. Already one popular mobile application interprets the music signature of a song it "hears" and provides the name of the work and artist. New applications might read photographs and employ face-recognition technology to provide a name and related data or identify a pictured object and direct users to online resources about it. The technology may evolve so that data embedded in a QR code can be interpreted differently by different viewers; that is, passwords or biometric data might open more data to some authorized users, or viewer signatures may unlock different information sets.

## What are the implications for teaching and learning?

QR codes link the physical world with the virtual by providing on-the-spot access to descriptive language and online resources for objects and locations. In this way, the codes support experiential learning, bringing scholarship out of the classroom and into physical experience. They offer expanded pedagogical value in exercises that draw students into creating and contributing content. In history projects, students might research information about local sites, write up what they have learned, generate QR code for their content, post the codes at key destinations, and tour the sites where a network of information from other students has been posted. Such exercises move students outside the bounds of the campus and into city centers, historic neighborhoods, and manufacturing districts, where learning becomes a matter of exploration. Because much of the information in QR codes is browser-based, students engaged in study abroad can use the codes to read websites in their native languages or turn a local destination into a foreign-language lesson. Finally, the greatest importance of QR codes could lie not in their specific use, which may be superseded by newer codes and interpreters, but in the opportunities they offer for moving away from keyboards as input devices in learning environments.