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Thinking About Technology – Standard Bar Codes Beware- Smart Phone Users May Prefer QR Codes

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Darla W. Jackson**

Quick Response (QR) codes are free to produce, allow access to data, and can be read with most smartphones. QR codes are already popular in some other countries and are gaining popularity in the United States. This article discusses this growing popularity and the reasons for it, how QR codes are being used in law libraries and the legal profession, and how they may be used by librarians in the future to add value through the marketing of professional and library services and by providing easy access to information from library resources.

¶1 While at the 2010 Computer-Assisted Legal Instruction (CALI) Conference, I learned about a number of new technological tools that could assist librarians with information literacy instruction and other library functions. I came away ready to try several new tools, but I was the most enthusiastic about implementing the use of Quick Response (QR) codes. I was not the only one. Jon Lutz's presentation on the topic of Florida State University College of Law Research Center's use of QR codes[1] seemed to generate a shared enthusiasm for those attending the session.
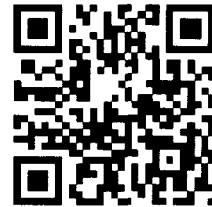
¶2 QR codes, including the one shown above, are square bar codes "with blocks of black and white pixels arranged in such a way that a mobile phone's camera can recognize them, align them, and pull data from what may seem like random checkers to human eyes."[2] Originally developed by Denso Wave in 1994, the "two-dimensional matrix symbology" and the three-cornered position detection patterns of the QR code were designed for "ultra-high-speed and omnidirectional reading."[3] Denso, a member of the Toyota group, designed the technology to track parts during vehicle manufacturing.[4] Since 1994, QR codes have been used in many other

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1. Jon Lutz, *The Implementation of QR Codes in an Academic Setting*, presentation at the Center for Computer-Assisted Legal Instruction (CALI) conference, Camden, N.J., June 24, 2010, abstract and video *available at* http://conference.cali.org/sessions/1090.

2. WOODY EVANS, BUILDING LIBRARY 3.0, at 79–80 (2009).

3. HIROKO KATO ET AL., BAR CODES FOR MOBILE DEVICES 51 (2010).

4. *QR Codes Explained*, QR CODE—TRACKING SERVICE, NEWS, VIDEOS, FORUM, FOCUS GROUPS AND MORE, http://www.qrme.co.uk/qr-codes-explained.html (last visited Nov. 10, 2010).

fields, including marketing and education. This widespread adoption has likely resulted from Denso's willingness to make QR codes available at no cost.[5]

¶3 The low cost of producing QR codes is one of the exciting aspects of the technology. QR generators can be downloaded at no cost.[6] Thus, the primary investment in producing QR codes is staff time. Despite the fact that staff cuts necessitated by difficult economic times have made staff time increasingly valuable, the value added by using this technological tool to improve access to information would likely offset the staff cost.

¶4 QR code readers can also be downloaded at no cost.[7] Yet there may still be some cost associated with the use of QR codes. Concerning Google Place Pages, which use QR codes, Allison Mooney wrote:

> [T]here is still the barrier of cost. QR decoding requires data, which requires money. Will people be willing to pay money (albeit tiny amounts) to read what is ostensibly an ad? Or will Place Pages provide enough value (through information, maps, reviews and now coupons) that people won't even think twice about it?[8]

¶5 If there is a cost for accessing the Internet via a cell phone, at least one survey of college students from four universities in the United Kingdom indicates some of the students might "think twice about" incurring that cost. According to the survey, while 93% of the college students had camera phones, 52% had Wi-Fi access on their phones, and 39% had data plans, only 18% percent of the responding students said they would be willing to use their own money to access educational materials on their phones.[9] However, not all QR Codes require an Internet connection to communicate information. Codes containing addresses, text, and telephone numbers can be directly resolved on the phone.[10] This use of these codes would not impose the cost barrier suggested by Mooney.

¶6 Despite some expressed hesitancy by college students to use technology to access educational materials, the use of QR Codes nonetheless appears to be catching on in the United States. At the March 2010 South by Southwest (SXSW) festival in Austin, Texas, Mark Sullivan, a blogger for PC World, wrote:

> Everywhere you go here you see little black and white QR Codes. On signs and posters, in magazines, on T-shirts, on badges. . . .
> When you aim your smartphone camera at that pattern on my badge, you will go to a location on the SXSW site where you can see various information about me, like who I am, who I work for, and what I look like.

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5. *Id.*

6. *QR Code Generators Online*, 2D CODE, http://2d-code.co.uk/qr-code-generators (last visited Nov. 10, 2010) provides links to a number of code generators.

7. *QR-Code Readers*, MOBILE-BARCODES.COM, http://www.mobile-barcodes.com/qr-code -software/ (last updated Oct. 25, 2010) provides instructions and links for downloading readers.

8. Allison Mooney, *Google Bets (Again) on QR Codes*, ADVERTISING AGE (Dec. 7, 2009, 11:28 P.M.), http://adage.com/digitalnext/article?article_id=140932.

9. Andy Ramsden, *The Level of Student Engagement with QR Codes: Findings from a Cross Institutional Survey* 4 (University of Bath, Working Paper, 2010), *available at* http://opus.bath .ac.uk/19974/1/students_qr_codes_cross_ints_survey_2010.pdf. Forty percent of the students surveyed had heard about QR codes, and nearly ten percent had used one in 2009. This result was a nearly fivefold increase from the previous year. *Id.* at 2.

10. *See* Lutz, *supra* note 1 (video at approximately 3:30).

> If I choose, I can put a lot more information at that URL, like a link to my Twitter feed or my profile on Facebook. . . .
>
> . . . .
>
> QR Codes—or something like them—might start showing up everywhere. Especially as mobile networks get faster and mobile devices get easier to use (think iPad).[11]

¶7 Sullivan's comment that "QR Codes—or something like them—might start showing up everywhere" raises an interesting question. Why are QR codes or Microsoft tags,[12] both of which are a type of bar code, creating such a stir in comparison to the use of standard bar codes? One reason is that

> QR codes and their counterparts can contain far more data than the standard barcode. Each code is made up of a grid of tiny squares that can be read both horizontally and vertically. Some codes can even be stacked one on top of another. The increased data capacity means QR codes can trigger more complex actions such as opening a Web page or initiating the download of a video or an online coupon.[13]

¶8 Another commentator had this to say:

> The reason why [QR Codes] are more useful than a standard barcode is that they can store (and digitally present) much more data, including url links, geo coordinates, and text. The other key feature of QR Codes is that instead of requiring a chunky hand-held scanner to scan them, many modern cell phones can scan them.[14]

¶9 QR codes have a number of benefits related to their use on the web. Incorporating the codes on a web site allows search engines to "see that your pages have changed, and that you are updating pages. The search engine will see a new image and index it accordingly."[15] Thus, adding QR codes is a method of search engine optimization that will increase your site's discoverability. In fact, there is some speculation that "[a]t some point soon, the search engines will likely recognize QR codes and possibly index the content in them."[16] Further, web users are increasingly using their mobile devices to access the web, and "typing out URLs or other data on their tiny keyboards is still not very efficient."[17] The use of QR codes negates the need for those seeking information to type in the URL. Because of this,

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11. Mark Sullivan, *SXSW Notes: QR Codes Are Everywhere*, TODAY @ PCWORLD (Mar. 15, 2010, 12:52 P.M.), http://www.pcworld.com/article/191528/sxsw_notes_qr_codes_are_everywhere.html.

12. Microsoft tags have functions similar to QR codes. Microsoft uses a somewhat different process to produce its "High Capacity Color Barcodes, which are two-dimensional barcodes that can be quickly read on a mobile phone." Brennon Slattery, *Microsoft Tag: You're It*, TODAY @ PCWORLD (May 28, 2010, 12:24 P.M.), http://www.pcworld.com/article/197455/microsoft_tag_youre_it.html.

13. Leslie Meredith, *Beyond the Barcode: QR Codes for Shopping, Discounts and More*, TECHNEWSDAILY (July 7, 2010 3:13 P.M.), http://www.technewsdaily.com/beyond-the-barcode-qr -codes-for-shopping-discounts-and-more-0820. While over 4000 characters may be hidden in a QR code, most phones don't have the resolution to read that many. As a result, QR code scans are usually limited to 250 characters. Rarely will a URL exceed 250 characters. Lutz, *supra* note 1 (video at approximately 3:50).

14. Marc Lyne, *What Is a QR Code and Why Do You Need One?*, SEARCH ENGINE LAND (Oct. 15, 2009, 2:07 P.M.), http://searchengineland.com/what-is-a-qr-code-and-why-do-you-need-one-27588.

15. *Id.*

16. *Id.*

17. Terrence O'Brien, *In a Nutshell: What Are QR Codes?*, SWITCHED (June 21, 2010, 2:30 P.M.), http://www.switched.com/2010/06/21/in-a-nutshell-what-are-qr-codes.

and because QR codes can be read from any angle without the need for alignment,[18] the use of QR codes could help libraries serve visually impaired individuals.[19] Finally, because users are just beginning to see an expanded use of QR codes, they may identify organizations that use QR codes as "tech savvy" and be more receptive to information provided by those organizations.[20]

¶10 While there are many positive aspects of QR code use, there are also negative aspects. For example, one study of human and computer interaction reported that when comparing one-dimensional bar codes with QR codes "[s]ome participants felt that the designed QR code burdened their eyes with its fine pattern, and they felt giddy when viewing its labyrinth-like patterns."[21] Second, while QR code technology is rather easy to use, there may be interface issues that librarians will need to address in order to offer effective services using QR code technology. For instance, will camera quality or the operating system of the user's mobile phone result in lack of access to some resources through the utilization of QR codes?[22] Some have suggested that if a QR code directs the user to a site without knowing which web browser the user has, the whole experience seems "low tech."[23] But, in contrast, others have argued that browser detection is not the solution because it hinders some devices from accessing content, even if the device has the capability to access the content.[24] It can also be problematic if the QR code directs the user to a site that is not optimized for mobile devices.[25]

¶11 Abuse of the QR code technology to gather information on users is another potential negative. While QR code generators may be downloaded for free, it has been reported that some generators collect data about users before redirecting the user to the desired web site.[26] However, possible abuse of the open nature of QR code technology should not be a reason to foreclose use of QR codes altogether.[27]

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18. *Id.*

19. *See* Hend S. Al-Khalifa, *Utilizing QR Code and Mobile Phones for Blinds [sic] and Visually Impaired People, in* COMPUTERS HELPING PEOPLE WITH SPECIAL NEEDS 1065 (Klaus Miesenberger et al. eds., 2008).

20. Such a suggestion has been made to businesses seeking product sales. Lyne, *supra* note 14.

21. Cheolho Cheong et al., *Usability Evaluation of Designed Image Code Interface for Mobile Computing Environment, in* HUMAN-COMPUTER INTERACTION: INTERACTION PLATFORMS AND TECHNIQUES 248 (Julie A. Jacko ed., 2007).

22. *See* EVANS, *supra* note 2, at 81.

23. David Boike, *QR Codes: The Lamest Thing to Never Reach Critical Mass,* DAVID BOIKE'S BLOG (May 26, 2010), http://www.make-awesome.com/tags/qr-code.

24. Chris Coyier, *Browser Detection Is Bad,* CSS-TRICKS (Jan. 28, 2009), http://css-tricks.com/browser-detection-is-bad.

25. *The First Rule of QR Codes,* 2D CODE (Feb. 21, 2009), http://2d-code.co.uk/first-rule-of-qr-codes. The QR code appearing at the beginning of this column was optimized for mobile users using Google's mobilizer function, which is described in *id.*

26. For those that generate QR codes using tools on the web please keep in mind that many of the QR generators out there propagate spam and then redirect your users to your site. (collecting information about them first).

If you use a QR generator, just be sure to use one that is known not to retain information or redirect users.

John Gibson, Comment to *QR Codes in Libraries,* SPECTRUM > MOBILE LEARNING, LIBRARIES, AND TECHNOLOGIES (June 14, 2010, 9:55 A.M.), http://mobile-libraries.blogspot.com/2010/06/qr-codes-and-libraries.html. QRstuff.com is reportedly such a site. Gina Trapani, *How to Make Your Personal QR Code,* SMARTERWARE (Mar. 8, 2010, 9:11 A.M.), http://smarterware.org/5399/how-to-make-your-personal-qr-code.

27. There will be abuse . . . of QR Code communication just as there has been in listservs and BBS

¶12 Finally, the need to operate call phones in the library at all may be viewed by some as a negative outcome of QR code use. In academic environments particularly, libraries have traditionally been seen as areas of "quiet study" that should not be disturbed by the noise associated with the use of cell phones. As a result, some libraries have policies banning cell phone use in some or all areas of the library.[28] However, policies that restrict only the use of phones for incoming or outgoing calls would allow for maintenance of a quiet environment, while also indicating that libraries are willing to adapt to change.

¶13 Based on the widespread use of QR codes in other parts of the world, it seems likely that the positive aspects of QR code use will be judged to outweigh the negative, and use in the United States is likely to increase. If this is the case, how can QR codes be used in law libraries and in the legal community? Sarah Glassmeyer has suggested that

> you could place one at the front door that will tell patrons hours/contact info/etc., especially if they arrive after business hours. You could have one at the Reference Desk that will connect to a SMS reference service. Or how about putting them on the end caps of shelves? So, for this example, put a link to your Tax Research Guide on the shelves that contain your tax books. Or another link to the reference desk info for research help.[29]

¶14 The Florida State University law library is already utilizing QR codes in some of the ways mentioned by Glassmeyer. For example, contact information for the reference librarians in the library is available via QR code.[30] QR codes are also being located in the stacks to assist library users attempting to locate the electronic format of a print resource. Further, the library is using bookmarks with QR codes to market library services and lead students to the mobile library catalog, law-related databases, legal research guides, and the library's blog.[31]

¶15 One of the often suggested uses of QR codes in libraries has been to supplement print resources.[32] For example, a library could use QR codes to assist patrons in accessing reviews of print resources.[33] Or QR codes might be used to connect library users not only with resources but also with people. As suggested above, contact information for reference librarians might be provided via QR codes, or QR codes could be used to connect patrons having computer problems to a help desk.

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systems and . . . even good old fashioned pen-and-paper suggestion box forms. But abuse of a medium
is no reason, nor has it ever been a good reason, to throw out or block access to that medium full stop.
EVANS, *supra* note 2, at 83.

28. *Id.* at 75–77.

29. Sarah Glassmeyer, *QR Codes*, SARAH GLASSMEYER (DOT)COM (Oct. 10, 2009), http://sarahglass meyer.com/?p=220.

30. Lutz, *supra* note 1 (video at approximately 21:45).

31. *Id.* (video at approximately 18:30).

32. *See, e.g.,* Marshall Kirkpatrick, *Books Come Alive with QR Codes and Data in the Cloud*, READWRITEWEB (May 27, 2010 10:33 A.M.), http://www.readwriteweb.com/archives/books_come _alive_with_qr_codes_data_in_the_cloud.php; *One More QR Code Story: A Jules Verne Classic with QR Codes to Enhance and Add to the Material*, RESOURCESHELF, http://www.resourceshelf .com/2010/06/02/one-more-qr-code-story-a-jules-verne-classic-with-qr-codes-to-enhance-and-add -to-the-the-material (last visited Nov. 10, 2010).

33. Teresa Ashley, *QR Codes and Libraries*, NOTIONSARK, http://notionsark.pbworks.com/ QR-Codes-and-Libraries (last visited Nov. 10, 2010).

¶16 And there are additional uses that might be possible as the technology becomes more fully developed. For instance, "[t]he 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."[34] Can you imagine the delight of librarians, attorneys, and students everywhere if passwords to subscription databases could be accessed any time through the simple scanning of a QR code? In fact, Denso, the original developer of QR code technology, has released Security QR Code (SQRC), which could potentially be used for such purposes. Using SQRC, "[c]onfidential information is code key encrypted and combined in the QR Code. This means that the QR code can still be read by general readers, but the encrypted data is protected and only accessible using a special reading device with the same SQRC code key."[35]

¶17 QR codes are starting to appear within the legal community outside of law libraries. For example, the Legal Services Staff Section of the National Conference of State Legislatures (NCSL) reported that "[b]ill watchers in a dozen or so states are used to seeing bar codes on bills" but in January 2011 the Wisconsin State Legislature will include "matrix codes" on legislative proposals.[36] The purpose of the inclusion of the codes is "to speed access to bill information for anyone who has a smartphone equipped with a camera and a 2D matrix code reader."[37] Steve Miller, Chief of the Wisconsin Legislative Reference Bureau, had looked into how standard barcodes were used by other state legislatures, but wanted to put technology to work in a way that would assist public access to legislative information.[38]

¶18 As law librarians, we want to use the available technology to support the information needs of our patrons. And it is best if we can introduce newer technology to our patrons rather than waiting for the demand to arise. The use of QR codes and Microsoft tags provides us with the opportunity to assist our patrons in a proactive way through the use of an emerging technology. We can help formulate the answers about the value of libraries in the electronic age if we seize the day and the opportunity to link our patrons with information in new ways.

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34. EDUCAUSE, *7 Things You Should Know About . . . QR Codes*, available at http://net.educause.edu/ir/library/pdf/ELI7046.pdf (last visited Nov. 10, 2010).

35. *What Are QR Codes?*, DENSO, http://www.denso-adc.com/what-are-qr-codes (last visited Nov. 10, 2010).

36. Pam Greenberg, *Matrix Codes Improve Mobile Access to Bill Information in Wisconsin*, THE THICKET AT STATE LEGISLATURES (Sept. 22, 2010), http://ncsl.typepad.com/the_thicket/2010/09/legislative-junkies-in-at-least-13-states-are-used-to-seeing-bar-codes-on-bills-but-a-new-kind-of-bar-codea-matrix-code.html.

37. *Id.*

38. *Id.*