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QR Codes in the Classroom: Thinking Inside the Square

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According to some experts,¹ 2020 will be the year of the QR code. Remember QR codes? They were interesting for a while but also annoying because you needed an app to scan them. However, since Apple² and Android³ smartphone cameras now have native QR code scanning capability, QR codes are having a moment.⁴ Most view QR codes as marketing tools, but they also offer classroom utility. In this article, I demystify those mind-boggling little squares and offer examples and tips for mastering the use of QR codes in your classroom.

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- ¹ QR Code Statistics 2020: Up-to-Date Numbers on Global QR Code Users, SCANOVA, <https://scanova.io/blog/qr-code-statistics/> (includes comparison data to 2019) (last visited July 6, 2020).
 - ² Scan a QR Code With Your iPhone, iPad, or iPod Touch, APPLE (Oct. 3, 2019), <https://support.apple.com/en-us/HT208843> (how-to guide for scanning a QR code with an iOS device); Fitz Tepper, *The iPhone's Camera App Can Now Read QR Codes*, TECHCRUNCH (June 5, 2017, 7:11 PM), <https://techcrunch.com/2017/06/05/the-iphones-camera-app-can-now-read-qr-codes/>.
 - ³ Cameron Summerson, *How to Scan QR Codes on an Android Phone*, HOW-TO GEEK (Apr. 9, 2019, 9:00 AM), <https://www.howtogeek.com/410037/how-to-scan-qr-codes-on-android/>.
 - ⁴ David Pierce, *The Curious Comeback of the Dreaded QR Code*, WIRED (July 18, 2017, 11:00 AM), <https://www.wired.com/story/the-curious-comeback-of-the-dreaded-qr-code/>.

I. What is a QR code?

There are several types of bar codes.⁵ QR code is short for “Quick Response code.” Notice that “QR” is capitalized. QR code began as a patented⁶ and trademarked⁷ data barcode system, invented by the Japanese automotive industry. It is a type of two-dimensional (2D) data barcode. QR codes share many similarities with Data Matrix barcodes. As explained by Barcodefaq.com,

[Barcode] Data Matrix is a very efficient, two-dimensional (2D) barcode symbology [sic] that uses a small area of square modules with a unique perimeter pattern, which helps the barcode scanner determine cell locations and decode the symbol. Characters, numbers, text and actual bytes of data may be encoded, including Unicode characters and photos.⁸



Data Matrix



QR code

Data Matrix and QR codes are similar, but Data Matrix images can only store alphanumeric characters, while QR codes can store any type of data (binary, alphanumeric, and kanji⁹). The most significant difference is that a Data Matrix code can only store 2335 characters, while a QR code can hold 7089 characters.¹⁰ A smartphone camera can scan a QR code without an app; however, Data Matrix requires additional software. Data Matrix codes are typically used to track military, aerospace, and electronic parts, while QR codes have broader applications.

⁵ *Types of Barcodes: UPC, EAN, Code128 vs. QR & Datamatrix*, SCANDIT, <https://www.scandit.com/blog/types-barcode-upc-ean-code128-vs-qr-datamatrix/> (last visited July 6, 2020).

⁶ *About the Patent: Patents Pertaining to the QR Code*, QR CODE, <https://www.qrcode.com/en/patent.html> (last visited July 6, 2020).

⁷ *FAQ: QR Code's Intellectual Property Right*, QR CODE, <https://www.qrcode.com/en/faq.html> (last visited July 6, 2020).

⁸ *Data Matrix 2D Barcode ISO/IEC 16022 FAQ*, ID AUTOMATION, <https://www.barcodefaq.com/2d/data-matrix/> (includes tutorials) (last visited July 6, 2020).

⁹ *About Kanji*, JAPANESE LESSON, <http://japanese-lesson.com/characters/kanji/index.html> (last visited July 6, 2020).

¹⁰ *Data Matrix Codes vs. QR Codes*, CAMCODE (June 23, 2020), <https://www.camcode.com/asset-tags/barcodes-data-matrix-vs-qr-codes/>.

In other words, it's data—a lot of data—in a tiny image.

2. Why QR codes in the classroom?

QR codes have many classroom uses. Their value lies in both the amount of data that can be stored in one image and the kinesthetic engagement they provide to students. One QR code can replace a cluttered mass of information on a PowerPoint slide, and requiring students to use a device (that they're probably already using for something other than class) for an academic purpose brings back their focus while reinforcing their visual and aural cognitive pathways.¹¹

As all professors know, students are distracted by phones and laptops, even during the most dynamic PowerPoint slide show, lecture, or workshop, and an interactive slideshow is worthless unless all students open it and participate. When you ask students to scan a QR code, for example to visit an in-class quiz or survey, they engage kinesthetically, a learning domain that is not reached frequently in higher education classrooms.¹² By using QR codes strategically at certain intervals of the class period, the professor can revive focus in students who are inattentive, while reaching different learning styles.¹³

QR codes declutter information-packed slides and web pages. The general rule of thumb is to limit the verbiage in a slide show.¹⁴ Yet, when professors know that students revisit slides to study, professors are tempted to overload slides with as much information as possible, including URLs directing students to even more information. QR codes allow greater information density without visually burdening the reader or presenter. For example, a professor can create a page in Canvas, Blackboard, TWEN, Lexis Classroom, or CALL, that holds all the information ze would like to include on the slide, and one simple QR code can link to the

¹¹ *The Physical (Bodily-Kinesthetic) Learning Style*, LEARNING STYLES ONLINE, <https://www.learning-styles-online.com/style/physical-bodily-kinesthetic/> (last visited July 6, 2020). I do not ascribe to the myth that individuals have only one learning style. Rather, we are influenced by a variety of learning styles, and educators should reach all types of learning pathways.

¹² See Kayce Mobley & Sarah Fisher, *Ditching the Desks: Kinesthetic Learning in College Classrooms*, 105:6 SOC. STUD. 301 (July 2014), available at <https://www.tandfonline.com/doi/abs/10.1080/00377996.2014.951471>; Rowan Cheney, *Kinesthetic Teaching Strategies for Adults in a Lecture Setting*, Western Oregon University Digital Commons @WOU: Honors Senior Theses (June 1, 2017), available at https://digitalcommons.wou.edu/honors_theses/121/.

¹³ See Ian Weinstein, *Learning and Lawyering Across Personality Types*, 21 CLINICAL L. REV. 427, 441 (2015) (“Many law teachers may never have considered the role of bodily movement, or kinesthetics, in law teaching. A little bit of kinesthetic teaching, in which one repeats combinations of phrases and gestures during the class, can go a very long way in sparking a moment of interest and energy.”); see also M.H. Sam Jacobson, *Learning Styles and Lawyering: Using Learning Theory to Organize Thinking and Writing*, 2 LEGAL COMM. & RHETORIC 27, 37 (2004) (noting that “everyone learns better if information is absorbed multiple times and in more than one modality”).

¹⁴ John Zimmer, *PowerPoint Math: The 1-6-6 Rule*, MANNER OF SPEAKING (Mar. 4, 2010), <https://mannersofspeaking.org/2010/03/04/powerpoint-math-the-1-6-6-rule/>.

webpage. A student can scan the barcode faster than ze can type in the URL or parse a verbose slide. A professor can also use a QR Code to take attendance, at the beginning of class and at various intervals during the class.

Visual clutter is not the only drawback of data-dense presentations; they may also create slower application or computer hardware responses. For example, rather than embed a long pdf as a large object or embed video files, why not simply create a QR code to point to the media that is stored externally? That solution also allows students to download the media, while a secure PowerPoint presentation (you secure your documents, right?) does not allow them to download the objects contained in it.

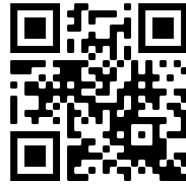
3. How to use a QR code in the Classroom

QR codes eliminate the need to type in a lot of data. For example, instead of typing a lengthy URL, students can simply scan the QR code. Taking it a step further, a QR code can automatically create a v-card, follow someone on social media, open applications, connect to Wi-Fi, send text messages, and open an email addressed to the QR code's creator. The code may be static (the user cannot change it) or dynamic (the creator or user can edit the information later). The developer's creativity is the only limit to the QR code's utility. With iOS (iPhone and iPad) or Android devices, a student need not be close to the QR code image. The image's unique design helps the QR reader find the four corners, no matter the size. Thus, from their seats, students can scan QR codes displayed on a projection screen.

As a simple illustration of how to develop and use a QR code, assume I want to generate a QR code to place on my CV that directs readers to my website, www.jajonesjurist.com. First, I copy the URL from my website. Then I go to a QR code generator. (I use the free Tec-It Online Barcode Generator website¹⁵; there are many free websites and apps available.) I paste the URL in the text area (I could also upload a file), and the generator does the work. I download the jpeg of the QR code, and then I insert it in documents and presentations. Voila! Go ahead, scan it.¹⁶

¹⁵ *Online Barcode Generator*, TEC-IT, <https://barcode.tec-it.com/en/> (allowing users to create dozens of barcode types) (last visited July 6, 2020).

¹⁶ Whether on an Android or Apple device, select the camera app and bring the QR code image into the frame. Almost instantly, an alert will appear, indicating that the device's default web browser has loaded the site. Click the alert, and the web browser should come up with the site loaded. Note that if the quality of the QR code image has been damaged, for example a worn-out sticker at a restaurant table, it will not work. This should not be an issue in classrooms.



Recently, I used QR codes in my legal writing class. I placed three QR codes in the PowerPoint presentation, and I spaced them to appear at points during the class session when I knew students would likely be tuning out a bit.¹⁷ Students who typically did not participate very often were suddenly engaged by the novel idea of scanning something during class. Even those who did not have the slide show open on their laptops were able to scan the QR code from the projection screen. I placed the first code about twenty minutes into class, and it linked students to a recent Indiana Supreme Court opinion that is a large PDF file not yet published in legal research databases. After students had read the opinion, a second code took them to a quiz on our class Canvas site. At the end of class, I reminded students to register for an upcoming workshop, and I included a QR code that linked to the RSVP form on Google Forms.

4. Best Practices for Using QR Codes: PASTE

Purpose. Too much of anything can be bad. Use QR codes and other matrix bar codes sparingly and with purpose. Strategic placement during the class/lecture can help engage students who lose focus. The action and content of a QR code is up to its creator. Think about how you can use the code to cross-reference materials stored in your learning management system, social media, YouTube, and other services.

Accessibility. Documents and presentations must always be accessible. When inserting a QR code into a document, remember that it is an image. You must provide alt text,¹⁸ and for example, if the QR code redirects students to a website, include that hyperlink information so that a screen reader can open the website. For printed materials, you should use the “Berman Corner,”¹⁹ a 45-degree cut on

¹⁷ See Simon Maybin, *Busting the Attention Span Myth*, BBC NEWS (Mar. 10, 2017), <https://www.bbc.com/news/health-38896790> (noting that the notorious comparison between the attention span of a goldfish and the attention span of a human appeared in an ill-sourced footnote in a 2015 Microsoft study). In humans, attention spans vary by task; in my class, I have learned that at about twenty minutes and forty minutes, my students need interaction.

¹⁸ For a tutorial about adding alt text to images in Microsoft Word, see *Add Alternative Text to a Shape, Picture, Chart, SmartArt Graphic, or Other Object*, MICROSOFT, <https://support.microsoft.com/en-us/office/add-alternative-text-to-a-shape-picture-chart-smartart-graphic-or-other-object-44989b2a-903c-4d9a-b742-6a75b451c669> (last visited July 6, 2020).

¹⁹ *Berman Corner for People Who Can't See*, DAVID BERMAN COMMUNICATIONS, <https://davidberman.com/portfolio/berman-corner/> (last visited July 6, 2020).

the top left corner of the page that indicates there is a QR code within 3.5 inches of the cut.

Static v. Dynamic. If you have reason to think you will need to edit content later—for example, if you might move information to a different webpage—consider using a dynamic code rather than a static one. Static QR codes, like URLs, can also rot or become orphaned.

Test. Always test the QR code before offering it to students.

Experiment. Don't be afraid to try! As with all technology, your first time using a QR code in the classroom may be a flop. Keep at it, and you'll discover new and useful ways to pack lots of data into the short span of your class time.

Given our new reality of online learning and “flipped” classrooms, QR codes will be with us for the foreseeable future, and law professors will benefit from learning about them and using them. With a little thinking inside the tiny data box, nay *square*, you can find many new uses for these little gems.