Abstract

Technology continues to shift the definition of what it means to be literate. As literacy educators in teacher preparation programs, we must consider how emerging and mobile technology may be used within coursework to not only create multiple ways to conceptualize teaching 21st century literacy, but also as a professional imperative. This article presents practical insights from two literacy education courses at two universities that built mobile technologies into coursework in ways that expand and socially network student learning. This work offers educators who lead literacy education courses in teacher preparation programs a variety of ways to incorporate technology that benefit students and are value-added, rather than simply added on. (Keywords: educational technology, mobile technology, literacy, literacy education, multiliteracies)

Context

Our interest in literacy development and education undergirds our shared inquiry into the ways that we can effectively integrate technologies into our classes to promote student learning. I teach undergraduate courses in early childhood and elementary literacy education at a public, urban institution. My co-author, Elsener, teaches undergraduate and graduate courses at a private Catholic institution outside of Chicago. Although the contexts in which we teach have shifted since leaving our neighboring graduate school carrels, we remain grounded in our belief that literacy is embedded within both social practices and contexts (Gee, 1987; Street, 1984). To this end, we seek to use technology within our courses to prepare students for teaching in a multiliterate world. Multiliteracies, as defined by the New London Group (1996), frame the ways that language becomes networked within multiple and often parallel channels of communication. Although a multiliteracies perspective more accurately accounts for the “increased multiplicity and integration of significant modes of meaning making, where the textual is also related to the visual, the audio, the spatial, the behavioral, and so on” (Cope & Kalantzis, 2000, p. 5) inherent in contemporary literate lives, the ways in which this approach has been taken up in literacy courses within teacher education programs has been uneven (Rowsell, Kosnik, & Beck, 2008). This is not surprising given the state of technology integration in teacher education regardless of content area. Although student attitudes toward technology are positive, there is insufficient modeling of technology integration within university courses themselves (Brown & Warschauer, 2006) and little awareness of how to use these technologies in learning experiences that are collaborative, authentic, and student centered (Richardson, 2012).

We have devoted much time and energy to the process of reflecting lived experiences of both our students and the learners they will teach—lived experiences that are increasingly mediated by mobile devices—in the content of our courses. Both our courses utilize some or all elements of flipped courses (Lage, Platt, & Treglia, 2000), allowing for increased contact time with students. In my course, all lectures are podcasts working through course assignments to demonstrate mastery of course goals. Lectures in Elsener’s course are collaborative, using mobile devices to disperse how information for class lectures is gathered, organized, and shared. Prior to class, she designs slides on a specific content topic using Google Presentations with the introductory slides filled out, including the titles for key components of the content topic the students were learning in class. During class time, students are

Mobilotechnology has had a dramatic impact on literacy educators working within teacher preparation programs. It has not only affected the content of our classes but also the ways we teach within them. This is particularly true when considering how mobile technology allows educators to participate in global conversations about teaching and learning (Suarez-Orozco, 2007). The challenge we face within our literacy courses has become multifaceted. We must raise awareness of our students’ reading and writing processes; teach those skills and strategies that encourage, facilitate, and accelerate reading achievement in elementary and middle school contexts; and mediate the reading process as print travels from paper to digital and back again.

Just as the reading experience has evolved because of technology, the ways we teach should also change because technology has been shown to effect both learner engagement and motivation (Chiong, Ree, Takeuchi, & Erickson, 2012). The aim of this paper is to share the how we, as instructors of elementary and content-area literacy courses at both the undergraduate and graduate levels, integrate mobile technologies within our courses in ways that support, expand, and accelerate our students’ learning.

To Move Forward, We Must Be Mobile: Practical Uses of Mobile Technology in Literacy Education Courses

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The challenge for teacher educators, particularly those working within literacy and language education, is to provide students with opportunities to use technology in ways that are not added on but already valuable to their learning experiences. In other words, we want to make sure the technologies we bring into our classrooms are of pedagogical worth and enhance, refine, and expand learning possibilities (Harris & Hofer, 2009).

We are particularly interested in ways that mobile technologies give students mobility within the classroom. This allows students to use their devices as mediators between the learner objectives we set for the overarching class and the materials we use within engagements to meet those goals. We have found this fundamentally shifts the way we organize our classrooms. Rather than focusing on the teacher as the purveyor of content information, students are now able to attend to multiple foci throughout the classroom space to collaboratively construct understanding of content as mediated by the technology and to connect to a larger community of educators.

There have been instances when students were unable to bring a device, and this reminded us of the realities of the digital divide (Norris, 2001). In our experience, digital inequity is the exception rather than the norm, but it is something we must consider. When students do not have technology of their own, we rely on devices available to us through our university systems.

Thus far we have focused on the material realities of students bringing their own devices to our courses. Once technology is available, the question is what to do with it. Our attention will now turn to the ways we use mobile technologies to mediate the educational experiences of our literacy education students.

Making the Classroom Clickable: QR Codes in Practice

Facilitating practice. Running records (Clay, 2004) is a prominent assessment strategy I teach in my early childhood literacy course. Students spend time both in and outside of class recording visual representations of children’s reading. Such an assessment allows students opportunities to examine the psycholinguistic cueing systems that children use to make sense of text. Students design further instruction after analyzing those strategies.

In my classroom, training students in both the physical markings on paper as well as the assessment strategies took a particularly long time, as we used a single audio source for the whole class for running record practices. This way of teaching running records was frustrating for the students as well as the instructor. Students wanted the ability to manipulate the audio for the running record. Furthermore, individuals differed in which portions of the audio they wanted to revisit. This approach to teaching the methods of taking a running record occupied too much classroom time and limited the number of practice experiences students engaged in. Utilizing quick-response (QR) codes and mobile devices has allowed students to move through running record practices at a more individualized pace than previously allowed within the constraints of the course.

QR codes, which originated in the Japanese automobile industry (Kan, Teng, & Chen, 2011), encode information within a small square that, when read by a scanner, directs the device to Web pages, sound clips, images, and movies. Because they take up a physically larger space than a UPC code—whose most practical use seems to be in the grocery store—a QR code can encode a wider variety of complex information and are remarkably durable, as a QR code reading application can decipher them even when up to 30% of the code has been lost.

I used QR codes to index videos of children engaged in reading, tying them to running record forms the students use to create a visual representation of the children’s reading (see Figure 1, p. 48). By decentralizing the data source and allowing all students access to the video of...
a child reading, preservice teachers were able to move through the video at their own pace, revisit particularly problematic moments in the reading, and slow down the progression of the video. The ability to exert some self-control over the pace of the audio resulted in increased accuracy in how candidates used conventional running-record marks to represent student reading.

Center-based learning. QR codes also proved useful within my flipped classroom. Within this particular course, students accessed video podcasts containing lecture material prior to the class meeting. Students used class time to delve more deeply into the content of the podcast through hands-on activities. For instance, after watching a video podcast about assessment in the early childhood classroom, students engaged in multiple learning centers in which they partook in various assessments addressed in the podcast. Many of these engagements utilized mobile technology, as students examined video of children engaged in reading experiences to complete the assessments on their tablets and smartphones.

As practicing elementary literacy teachers know, student direction during literacy centers is often at odds with the small-group, guided reading lessons that occur concurrently. When working with groups of children to read a leveled text that promotes practice and mastery of a literacy skill needed by most or all of the children in the group, teachers often find their attention diverted as students ask for repetition of the directions for the literacy centers the rest of the class is involved in. This was no different in my college course. As students engaged in centers work, they often asked me to repeat the directions.

Using Audioboo, a Web-based app that allows registered users to record up to three minutes of audio and store it on the Web, I began to record directions for individual centers and then link them to a QR code that students could scan. Scanning the QR code to retrieve the audio file online seemed to be more effective than providing written directions, because the small groups I worked with at this time were interrupted less frequently for repetition of directions. When students did make inquiries, they were much more focused on the task at hand (see Figure 2.)

Digital read-aloud think-alouds. Elsener used a program called Croak.it in her content-area literacy courses. This free and easy-to-use program allowed her to record oral directions that students could access via a QR code. A major goal of the course is for teachers to learn how to conduct read-aloud think-alouds for their current and future K–12 students by modeling how they think and interact with texts as strategic readers. Elsener created interactive digital read-alouds by embedding the QR codes throughout informational texts, such as news articles, that connect students to her voice-thinking reading strategies and inviting them to use similar strategies and share their thinking about the text with a partner. The use of QR codes connected to audio-recorded think-alouds has dynamically changed the read-alouds from teacher centered (i.e., the teacher doing all of the reading and thinking while the students hopefully attend) to student centered. With the digital read-aloud think-aloud, the students do the reading of the text and try strategies themselves after they stop periodically at QR codes to hear Elsener model the strategies.

<table>
<thead>
<tr>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

1. Carefully listen to the running record. Accurately capture the reading in the document below, providing analysis of the miscues and self-corrections. (5 pts.)

<table>
<thead>
<tr>
<th>Page</th>
<th>Text</th>
<th>Miscues</th>
<th>Sc’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>What am I?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I am in a tree.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>I swing from tree to tree.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>What am I?</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td>3</td>
<td>I am in the grass.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>I can hide in the grass.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>What am I?</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td>5</td>
<td>I am in the dirt.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>My home is under the ground.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>What am I?</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td>7</td>
<td>I am in the sea.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>I can swim fast.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>What am I?</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td>9</td>
<td>I am in a cave.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>I sleep here all day.</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>What am I?</td>
<td>M</td>
<td>S</td>
</tr>
</tbody>
</table>

Figure 1. Running record assignment sheet linked to QR code.
Digital gallery walks. Gallery walks are a common teaching practice in which thought-provoking quotations or questions about content are posted on large pieces of paper around the classroom. Students then walk around and respond to the quotation or question by writing their thinking on the poster in a graffiti-like style, with multiple people writing on the posters. Students then break into small groups around each poster, and each group summarizes the thinking written on their poster.

Elsener transformed gallery walks in her classroom into digital gallery walks. By posting a question and then creating QR codes to link to Web sources, she aims to help students think about the question and construct an answer. For example, in a recent class session for graduate students about 21st century literacies, Elsener created five posters with questions about what it means to be literate in the 21st century and how teaching and learning experiences can support K–12 students’ development as digitally literate citizens. Poster 1 invited the graduate students who are all current educators to answer the question “Are you a 21st century teacher?” A QR code on the poster linked the students to an infographic (see Figure 2) to inform their answer.

Having students use devices to access information during gallery walks has provided an engaging learning opportunity for students to explore and discuss a range of available sources about the course content. As a result, course content is no longer centered on the instructor’s lecture or the course’s required readings.

From “Talk to Your Neighbor” to “Type to Everyone”: Mobile Technology Fostering Connected Teaching

Mobile technologies can be used in class sessions as tools to promote active engagement in learning. When the only technology in the room is a computer, the teacher stands by to share information (generally in the form of a PowerPoint). Students are positioned as receivers of the information the teacher gives. This dynamic changes when everyone in the room is holding technological tools they can use to create and share information as part of the learning process. A BYOD class session can promote conversations about content in which everyone can participate at once, and it can be archived for reference later in the course as learning evolves. For many years now, teachers have been telling their students to “turn and talk to your neighbor” about the topic of learning. When students have mobile digital devices in their hands, they can type and talk to everyone—not just their classmates—about their thinking.

In her reading methods course, Elsener used the app Explain Everything, which allowed students to produce their own professional videos about methods for teaching reading and share them with a real audience of educators via the Internet. When the future teachers were studying how to teach comprehension strategies to readers, they broke into small groups to explore different comprehension strategies (e.g., visualizing, making connections, etc.). The students also created a video they posted to YouTube using Explain Everything. In the videos, they taught other educators how to explain and teach the different literacy strategies. You can access an example via the QR code in Figure 3 (p. 50). Explain Everything allowed the students to record voiceovers for PowerPoint slides and record annotations and animations. Elsener’s utilization of mobile devices changed the traditional model of information sharing (delivering information from one spot to just the other students in the classroom). The students did not sit and take notes about a lecture Elsener delivered about the comprehension strategies, nor did
they make a presentation to share with just their peers in class. The students used mobile devices to create and share information about teaching with other educators on the Web.

In a social studies methods course, Elsener sent all of her students a survey using Google Forms to teach controversial issues in classrooms. Students were asked to answer three questions:

1. Should controversial issues be taught in the elementary classroom?
2. What are some reasons controversial issues should be taught?
3. What are some reasons controversial topics should not be taught?

Students typed their answers, submitted the survey, and were then able to view the results. The results for question 1 were presented as a circle graph clearly showing the percentage of class members who felt controversial issues should or should not be taught. With questions 2 and 3, the students were able to look at all the reasons their classmates felt controversial issues should and should not be taught in elementary classrooms.

Elsener first gave the students an opportunity to look over the survey responses by themselves and then discuss them with a small group and as a whole class. Because of mobile technology, each member of the class was quickly able to hear everyone’s thinking. This differs from classroom conversations, where just a few voices and ideas are heard because of time limitations and the unequal flow of conversations.

Creating a Backchannel Conversation
Elsener begins her digital literacy class by asking the following question: What is literacy in the 21st century? Using their own devices, in addition to several Elsener brought with her to the course, the teachers developed their own definitions of 21st century literacies using the free backchanneling site Today’s Meet to post new thinking about the topic throughout the evening as they encountered new ideas and information. Not only did Today’s Meet provide an audit trail of their developing understanding of digital literacy, but it also provided a course document that they could refer back to and changed throughout the course. Most important, all students were able to have their voices be part of the conversation about the course content.

Students in my class engage in similar practices through the social media site Twitter. Students used a class-specific hashtag to share resources, provide guidance to one another, and connect with educators worldwide. I included this hashtag on my syllabus to provide an additional way to communicate assignments and deadlines for the course rather than simply using it as a backchannel. Students, however, began to use it to communicate with others, both within and outside of the class time. The Twitter backchannel experienced something of a snowball effect. As more students used it, even more students joined. Beyond providing an audit trail for the course, this backchannel also allowed external voices to partake in the larger conversations the class was having. Practicing teachers on Twitter vetted classroom activities designed to help the students teach in their own classrooms. These same teachers served as resources as students began to write lesson plans. Conversations bounced between best practices and classroom experience.

Implications: Connecting Teacher Preparation to Professional Realities
If mobile integration in teacher preparation courses is to be successful, teacher educators must integrate productive uses of mobile technology into their own courses and build connections with classroom practice. Students in my early childhood literacy course began to utilize QR codes in their own work in a variety of ways. Codes for instructions read in Spanish began to appear on assignments. Others began to integrate mobile technology into their classroom practice. One candidate redesigned a reading activity using QR codes after noticing students in a word work center were unable to complete a rainbow words activity. The young students were rewriting sight words in a variety of colors because of their inability to read them. In the redesigned activity, each of the words the students worked on were both read and spelled by the teacher using QR codes linked to Audioboo. If a student was unable to read the word, they could scan the code using the candidate’s smartphone to reorient themselves to the word.

Students in Elsener’s course have begun creating collaborative lectures using Google Presentations in their secondary-level classrooms to get their own students to construct rather than receive information about the content. Elsener’s undergraduate students created a digital gallery walk using iPads for a lesson about poverty to create an opportunity for elementary students to explore photographs of children in poverty from around the world.

Conclusion
Technology is rapidly changing the ways that education is done. Just as our candidates are working to prepare K–12 students for jobs that don’t even exist yet, as teacher educators, we must prepare our candidates to teach even the youngest learners with technologies that have not yet been developed. In this paper, I have discussed ways we have utilized technology, particularly mobile technology, within our literacy education courses in hopes of developing “a mutual sense of interest and inquiry that is apparent to any community of practice” (Rowsell, Saudelli, Scott, & Bishop, 2013) as we strive to “go beyond one-shot assignments and weave new literacies into the
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