Teachers' Engagement With New Literacies: Support for Implementing Technology in the English/Language Arts Classroom

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This qualitative study examined in-service teachers who were enrolled in a graduate level course that focused on new literacies and the integration of technology with literacy. They also taught children enrolled in a summer writing camp as part of the course. The authors followed the teachers into their classrooms once the graduate course ended to see if and how they were integrating technology. The primary focus of this article is on ways some of the teachers began to integrate technology into their instruction. An additional finding was that testing was perceived to be an especially challenging barrier to technology integration.

Technology has expanded notions of literacy that move beyond print-based texts to include digital texts and the practices associated with using them. These innovations made possible by technology hold important implications for the ways reading and writing are taught in schools.

Unfortunately, classroom instruction is not necessarily responsive to these new ways of reading and writing (Solomon, Allen, & Resta, 2003) due to many different reasons, such as not having access to technology or not understanding how to integrate technology (Hutchison & Reinking, 2011). Therefore, an understanding is required of ways teachers can be supported in integrating technology for literacy in the classroom; for example, by having hands-on experience with technology and then immediately applying their learning to their teaching (Jaipal-Jamani & Figg, 2015). Teachers may also adopt a broadened understanding of literacy that includes the new skills and forms of literacy made possible by technological innovations (Leu, Kinzer, Coiro, & Cammack, 2004).

This article reports on an examination of a group of teachers who were supported in a graduate course that focused on new literacies and the integration of technology with literacy. The teachers also taught children enrolled in a summer writing camp as part of the graduate course. We followed the teachers into their classrooms once the course ended to observe if and how they were integrating technology and found that, for most teachers, the course encouraged them in their use of technology.

The primary focus of this article is on the ways some of the teachers began to integrate technology into their instruction following completion of the course. The discussion includes how testing presented an especially challenging barrier to technology integration.

Challenges Teachers Face With Implementing Technology

The process of technology integration is complex. Teachers need access to proper resources as well as an understanding of the educational practices that support technology integration (Barron, Kemker, Harnes, & Kalaydjian, 2003; Hew & Brush, 2007; Kellner, 2000; Miranda & Russell, 2011). Teachers must also have technical support (Earle, 2002), as well as general support for their efforts from administrators, their peers, and school systems (Dawes, 2001).

Having access, support, and training are what Ertmer (1999) referred to as "first-order barriers" and are only part of what might explain why technology integration remains low in classrooms. She also identified "second-order barriers," what she considered to be the "true gatekeepers" to technology implementation. They include teacher attitudes, beliefs, knowledge, and skills.

Sixteen years after Ertmer first named these barriers, they are still identified as barriers in the recent literature on technology integration in teaching, although the first-order barriers do not seem to be as limiting as they were, because school districts and policy makers are increasingly investing more money in technology (Ertmer & Ottenbreit-Leftwich, 2013; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sundurur, 2012).

Many studies have documented teacher beliefs and attitudes as being factors that explain why they may or may not use technology in the classroom (Ertmer & Ottenbreit-Leftwich, 2010; Hutchison & Reinking, 2011; Miranda & Russell, 2012; Overbay, Patterson, Vasu, & Grable, 2010; Smerdon et al., 2000; Wohlwend, 2010), although teachers themselves do not necessarily report their own beliefs as being an obstacle for doing so. A teacher's stance on technology, however, especially if it aligns with his or her teaching goals, can be a strong predictor of technology integration (Inan & Lowther, 2010; Zhao & Cziko, 2001).

Teachers are more likely to integrate technology into instruction if they view the use of technology as part of the curriculum rather than as something separate (Hutchison & Reinking, 2011) and if they perceive that technology is important for teaching (Miranda & Russell, 2012). However, some teachers think technology is developmentally inappropriate for students, while others fear that using technology will result in the greater likelihood of plagiarism (Norris, Sullivan, Poirot, & Soloway, 2003).

The demands of teachers being technologically literate are constantly increasing as technology changes (Hagood, 2012; Kinzer, 2010). Additionally, teachers need to develop their technology, pedagogy, and content knowledge (TPACK). This framework recognizes that teachers should integrate technological knowledge with subject matter learning, rather than focusing only on technological knowledge at the expense of appropriate pedagogy or the content (Koehler & Mishra, 2009).

This framework also promotes the understanding that teaching with technology requires a whole other set of pedagogical skills and that each program, tool, and piece of software requires different genre knowledge. At the same time, while technological knowledge is important, it is not necessarily a prerequisite or even a predictor of who will integrate technology.

Other challenges noted in the literature relate to planning and establishing a classroom culture that supports creative designing as part of learning. Classrooms and schools are not typically organized in ways that allow for the easy use of technology for instruction (O'Brien & Scharber, 2008). Many teachers report that using technology is more elaborate and time-consuming than more traditional teaching practices (Dawes, 2001; Earle, 2002), and they do not feel they have an adequate amount of time to teach with technology or to plan for how to teach with it (Bauer & Kenton, 2005).

Supporting Teachers' Implementation of Technology

Understanding the challenges teachers face with technology integration is important, but so is considering how to support them. The following section reviews the literature on professional development for technology integration as well as the literature on how teacher beliefs and other forms of support interact with teachers' ability to integrate technology.

Professional Development

Professional development is an important part of helping teachers integrate technology. Teachers need models and research-based practices to understand and be able to implement technology into their instruction (Coiro, 2005; Hughes, 2005). They need to learn to cultivate an atmosphere that is conducive to creative designing with technology (Brennan, 2015). Teachers benefit from having hands-on experience with technology and being able to apply what they learn immediately in their teaching contexts (Jaipal-Jamani & Figg, 2015).

In studies that have shown these to be important factors, professional development models were used to support teacher learning. For example, in one study the researchers worked with 16 fourth- and fifth-grade teachers in a series of 56-hour professional development sessions on using interactive technology (O'Hara, Pritchard, Huang, & Pella, 2013). The professional development included explicit instruction on using technology as well as time for experimentation with technology individually and collaboratively. The researchers found that their professional development model helped teachers deepen their knowledge since it was responsive to their needs and interests.

In another study with middle school science teachers, Jaipal-Jamani and Figg (2015) explored the use of blogs to teach science content. Through professional development, they supported teachers by modeling specific digital activities to support student-learning goals. They found that teachers' development of TPACK was influenced by the professional development activities as well as the opportunity to immediately apply their learning in their teaching.

Another feature of professional development to be explored further and that shows promise for supporting teachers is the use of a new literacies framework. Collett (2013) argued that this framework can be a powerful way to help teachers understand technology integration in relation to literacy instruction. This framework can also help teachers

develop a conceptual understanding of literacy while simultaneously trying out new digital tools and practices.

Adopting a new literacies framework helps teachers recognize technology as more than just a way to get students' attention but as an actual part of the work that students do in the classroom (Bailey, 2009). This approach is similar to the one used in this study and aligns with other studies that have shown the importance of content-area learning along with technology integration, so that technology supports the curriculum and student learning, rather than being treated as an added on activity or object (Glazer, Hannafin, Polly, & Rich, 2009; Harris & Hofer, 2011). This approach may also help with addressing teacher attitudes and beliefs in ways that support theoretical understandings and broadened conceptions of literacy in addition to technical skills (Shoffner, Oliveira, & Angus, 2010).

Teachers' Beliefs

While professional development has been shown to help teachers integrate technology, a lack of professional development cannot fully account for why teachers do not integrate technology (Zhao & Cziko, 2001). Another reason can be attributed to teachers lacking desire to have training because they do not think technology will be useful; therefore, they may not take the time to develop their own technological skills and pedagogy.

Teacher beliefs and attitudes can also play an important role when it comes to integrating technology (Ertmer, 1999; Levin & Wadmany, 2006/2007; McGrail, 2005). When teachers strongly believe in the value of technology, they overcome barriers in order to do so (Ertmer & Ottenbriet-Leftwich, 2013). Also, teachers who have more constructivist teaching beliefs are more likely to use technology (Ertmer, Gopalakrishnan, & Ross, 2001; Miranda & Russell, 2011). When teachers are motivated and committed to their own personal development, they tend to have more positive experiences using technology and, in turn, their students tend to have more positive experiences as well (Sheingold & Hadley, 1990).

Flanagan and Shoffner (2013) examined how two English teachers used technology to support their English/language arts (ELA) instruction. One teacher was a veteran teacher with 14 years of experience; the other was a novice teacher in her second year of teaching. Both teachers reported that their biggest obstacle to technology implementation was a lack of training. However, despite not having training, they both valued technology integration and learned to do so through trial and error or from other colleagues. Their approaches to integrating technology differed in terms of their planning, actual use of technology, and their beliefs about technology and their role as a teacher in the classroom.

The novice teacher considered technology a primary focus of her instruction and made technology a priority, whereas the veteran teacher viewed technology as having a secondary role and, therefore, used it only to support her instructional objectives when she felt it added to her instruction. Despite having different approaches, these two teachers prioritized technology integration because they believed it was important and were able to do so even without professional development opportunities.

Teacher Support

Professional development is one way that teachers can be supported with technology integration. Additionally, other factors that have been shown to be instrumental in leading to technology integration relate to school-wide change, with administrators playing an important role. As with all school environments, the administrator's actions and attitudes can shape the interactions and overall climate, including supporting teachers in using

technology. As the school's leader, an administrator can serve as a role model for teachers to learn about and use technology, set the tone for new learning, motivate and encourage teachers to try technology, provide resources, and facilitate learning opportunities (Payne, 2000).

Other related factors that can facilitate teachers' technology integration include the school structure, resources, and support available (Glazer, Hannafin, & Song, 2005; Grant et al., 2015; Staples, Pugach, & Himes, 2005). Administrators can provide support with all three of these factors by giving their permission to use technology, allowing classrooms that use technology to have priority access to computer resources, and ensuring that the structure of the school is set up for collaboration and working toward the goal of implementing technology. Administrators can also provide funding for opportunities that allow teachers to gain proficiency and provide time for teachers to plan their use of technology, such as joint planning periods (Means, 2010).

More research is needed to better understand how to help teachers with technology integration. This study addresses this need by offering examples and suggestions for how to do so, including examples of what teachers did when they returned to their classrooms. We pulled together our understanding of the challenges teachers face when implementing technology with what we knew about supporting teachers.

We specifically focused on ELA teaching in the context of combining a new literacies graduate level course for in-service teachers with teaching in a writing camp in order to understand how the two may have contributed to teachers' understanding and willingness to adopt new practices with technology.

Context

The New Literacies Course

Melody (first author) developed the new literacies course to accomplish three main objectives: (a) to provide teachers with a scholarly foundation in literacy studies that recognizes how advances in technology influence literacy practices; (b) to support teachers in building their pedagogical knowledge of digital texts and tools as well as social practices influencing composing practices; and (c) to provide teachers with a setting for direct application of the theories and practices discussed in class as they worked with children in a writing camp. Joy (second author) served as a teaching assistant for the course.

For a 5-week summer session, the class met for 2 hours each day, Monday-Thursday. Melody and Joy facilitated synchronous and asynchronous online and face-to-face whole group and small group discussions related to new literacies practices in the classroom. Most meetings occurred face to face. The assigned course readings included *New Literacies: Everyday Practices and Social Learning* (Lankshear & Knobel, 2011) as well as various articles (e.g., Lapp, Moss, & Rowsell, 2012; New London Group, 1996; Street, 1995).

Although other topics were addressed in the class (e.g., multiliteracies, critical literacy, culturally relevant teaching, and teaching English language learners), the main focus was on new literacies and technology integration. In addition to reading about and discussing new literacies, teachers composed reading responses using different tools, such as pen and paper, blogs, the online journal *Penzu,* and wikis – and reflected on the affordances of each. They also participated in one of four book clubs (e.g., Hicks, 2013) and developed an online resource to inform others about the book they read.

Other assignments included writing a grant to address technology needs for their classroom, lesson plans for integrating technology with writing instruction in the camp, reflections related to those lessons, and a final paper reflecting on understandings of literacy and ways digital tools could be integrated into ELA instruction. Table 1 includes a complete list of the digital tools the teachers used in class and the camp, along with a description of the tools and how teachers used them.

Table 1
Digital Tools Teachers Used During the Graduate Course

Digital Tool	Description	How Teachers Used It
Blogs (weebly, Google sites and tumblr)	A website that contains entries recorded in reverse chronological order and typically updated often.	• To respond to course readings • To create resource for book club book • Wrote lesson plans to help students create with it
Google Hangouts	A communication platform for video conferencing.	• To participate in book club discussions
Livebinders	A digital binder that allows the user to organize content by tabs.	• To create resource for book club book
MoPad	A collaborative Internet tool that is synchronized as users add text.	• To respond to course readings
Penzu	An online journal that allows the user to compose privately.	• To respond to course readings
Popplet	An online tool that allows the user to create concept maps.	• To respond to course readings • Wrote lesson plans to help students create with it
Prezi	An online presentation tool that utilizes one large canvas.	• To create resource for book club book • Wrote lesson plans to help students create with it
VoiceThread	An online tool that allows users to record video along with images or video.	• Wrote lesson plans to help students create with it
Wikis (wikispaces and wikidot)	A website in which users can collaboratively edit the content and pages can link to each other.	• To respond to course readings

In the graduate course we advocated for an expanded view of literacy that acknowledges advances in technology so that teaching practices in the ELA classroom reflect broader definitions of literacy. In addressing teachers' broadened understanding of literacy, we used "new literacies" as a framework for discussing literacy.

New literacies are commonly referred to as "21st-century literacies," which include proficiency with digital tools as well as the ability to collaborate, create, design, navigate, and evaluate multimedia texts (National Council of Teachers of English, 2013). New literacies are concerned with how literacy has changed because of technology such as the Internet and computers. One way literacy has changed is that people are now able to create texts that include sound, images, and movement (Kress, 2003).

People are also able to control design elements easier than ever by attending to size, appearance and functions and are able to do so quickly, making their writing publicly available at the click of a button. As a result, part of being literate means knowing how to use digital tools for a variety of purposes (Alvey et al., 2011). For example, new literacies are involved when participating in online forums like Facebook, designing webpages, and navigating online spaces like blogs.

New literacies are about more than technology, however, and also emphasize the ability to collaborate, problem solve, and think critically (Swenson, Young, McGrail, Rozema, & Whitin, 2006). Therefore, teachers need to think beyond using technology, focusing on how their literacy instruction can be enhanced (Pope & Golub, 2000; Young & Bush, 2004) and considering how to integrate technology into instruction so students can learn to access, evaluate, synthesize, and contribute to information (National Council of Teachers of English, 2007).

In addition to defining new literacies, we discussed the importance of new literacies in relation to the Common Core State Standards (http://www.corestandards.org/), which emphasize using technology for creating, collaborating, problem solving, and critical thinking. Furthermore, at least 29 states have either adopted or adapted the International Society for Technology in Education (ISTE) Standards (http://www.iste.org/standards/standards/iste-standards), which emphasize the importance of students using technology to create, communicate, collaborate, research, make decisions and problem-solve. These standards complement and support a new literacies framework.

The Writing Camp

In addition to theoretical and practical readings related to these topics, we knew that teachers would need support as they began thinking about literacy differently. Thus, we planned for teachers to work with children during a writing camp at the university in order for them to try out what they had been reading and learning in the graduate course.

University faculty and doctoral students, including the three authors of this article, collaborated to plan and run a 2-week writing camp. The camp was independent of the new literacies course, but ran concurrently for 2 weeks, which were the last 2 weeks of the graduate course. This approach allowed the graduate students to work with the children during the writing camp after spending the first 3 weeks developing an understanding of new literacies and digital tools.

Sixty-four students attended the camp; we offered 12 full scholarships to students with financial need. Students were provided with either a laptop or desktop computer, and they were divided into three groups: elementary (3rd-5th grades), middle (6th-8th grades), and

high school (9th-12th grades). Camp lasted 3 hours each day and began with local authors visiting to talk about their work for about 45 minutes with all campers. Afterwards, campers moved into age-level groups and engaged in extended writing time, where they chose their own topics.

For the last hour of camp, which was also the last hour of the graduate course, the graduate students enrolled in the course worked with campers in small groups. During this time, they taught minilessons related to composing with digital tools and worked individually with campers to confer about their compositions and offer assistance. The campers used the following digital tools during the camp: VoiceThread, Weebly, Google Sites, Popplets, and Prezis.

The purpose of the camp was threefold. First, the camp served the local community as a unique summer camp experience where students can focus on writing and using digital tools. This camp is the only one of its kind in the area and we advertised to local school districts by sending out flyers. Second, because we hired local teachers as camp instructors, the camp served as summer income for these teachers and provided them with experience helping students compose with digital tools. Last, the camp served as a field experience for the graduate course so that teachers in the course could gain experience with implementing technology and immediately apply their learning and work with students.

Methods

This is a qualitative study that used a collective case study design (Stake, 1995) to examine the question, How does engaging in a new literacies course support teachers' efforts to implement technology with students? Case study research is an important tool for exploring and describing a phenomenon in context while refining theory and identifying areas for more exploration. Data were collected from 19 K-12 teachers enrolled in a new literacies teacher education course as part of a requirement for a reading education master's degree at a university in the southeast United States. The teachers were a diverse group in terms of their ethnicities, years of teaching experience and grade level experiences. Table 2 provides this information about the teachers.

Data Collection

All three authors collected data, which included observational field notes of discussions during face-to-face and online classes (19 total); written reflections for each teacher related to assigned articles and book chapters (approximately 19 per teacher); email correspondence with teachers; course assignments; end-of-the-semester feedback; and transcriptions of semiformal small group interviews (teachers were divided into five groups for these interviews). We conducted one round of interviews at the end of the course with teachers divided into four groups. These interviews lasted approximately 1 hour. Appendix A details the questions we asked.

Appendix B contains the interview questions used at this time. Because we were interested in what teachers were doing with their students, we decided to follow up only with practicing K-12 classroom teachers; teachers were not asked for a follow-up interview if they moved to a different city, took on new positions as curriculum facilitators or school administrators, or returned to graduate school full-time. These interviews lasted approximately 45-60 minutes. During these interviews we engaged the teachers in conversation about their access to technology, how they were continuing to make sense of and reflect on their experiences from the graduate course, and if and how they were implementing content covered in the course and writing camp.

Table 2
List of Teachers Who Participated

Teachers	Ethnicity	Years of Experience	Teaching Assignment
Ann*	Caucasian	6	third
Beth	Caucasian	5	seventh
Brittany*	African-American	4	fifth
Carly*	Latina	6	Pre-K/Kindergarten
Connor	Caucasian	8	sixth-eighth Latin
Dena	Caucasian	6	third
Emily*	Caucasian	6	first
Felicia	Caucasian	3	first
Hannah*	Caucasian	3	K-5 ESL
Henry	African-American	6	Elementary curriculum facilitator
Kate*	Caucasian	11	Kindergarten
Linda*	Caucasian	3	K-5 special education
Mara	African-American	7	second
Meredith*	Caucasian	9	sixth-eighth reading specialist
Robyn	Caucasian	11	Eighth
Samira*	Persian-American	6	first
Sammy	Caucasian	4	eighth
Skylar*	Caucasian	5	fourth
Tara*	Caucasian	5	fourth

We also collected data during the writing camp, such as observational field notes and video recordings of the teachers working with campers (approximately seven per teacher). Other data sources from the 2 weeks of camp included transcripts of video recordings, photographs of teaching materials, and the campers' writing.

At the end of the semester we created individual cases by compiling all of the data for each individual (e.g., field notes, interview transcripts, and course assignments). In order to follow up with some of the teachers once the school year started, we conducted individual interviews with 11 of them the following fall semester (Note: These teachers are identified with an * in Table 2).

Data Analysis

Data analysis occurred in two phases. First, we divided the data sets amongst ourselves for coding purposes. In this initial phase, we examined individual cases and were interested in how teachers developed their theoretical and pedagogical knowledge about digital tools and texts and the kinds of practices they used with the children in the writing camp. We then compared our individual codes across all data sets in order to identify similar codes, agree upon codes, and verify each other's codes. This preliminary analysis generated a total of 59 codes after some codes were combined; for example, "expanded view of literacy" and "broader view of literacy" were combined into one code: "broadened view of literacy."

Next, we collectively compared all 19 cases to combine and collapse codes into a total of six more meaningful categories. Appendix C contains a list of the six categories with an example from the data. In this article, we focus on categories 4 ("Planning for technology implementation") and 5 ("Feedback from teachers about the experience") in order to show the challenges teachers faced as well as how they overcame those challenges.

We then moved into Phase 2 of data analysis, in which the individual cases were combined and compared to create a collective case study. This analysis involved triangulation of the data and a synthesis of cross-case themes (as described by Lincoln & Guba, 1985). We continued to meet regularly, engaged in conversations about the data, and wrote analytic memos (defined by Miles & Huberman, 1994). We also sought out an experienced qualitative researcher not associated with the study for peer debriefing to ensure credibility and to broaden our interpretations (as recommended by Mertens, 2005).

Integrating Technology After the New Literacies Course

Overall, the teachers deepened their understanding of literacy and expressed excitement for shifting their teaching to include more technology. They made statements such as the following:

> The concept of new literacies was unknown to me before this course. Through our readings, discussions, and lectures, I now understand that new literacies is not simply about incorporating new digital technology into our teaching practices; it's about a new way of thinking about literacy.

> I plan to incorporate the technology tools we learned about into my instruction to enhance student learning.

Because teachers were taking graduate level course for credit toward completing their master's degrees, they teachers may have said things they thought we wanted to hear, which is why we followed up with teachers to see what carried over into their teaching.

After visiting with the 11 teachers in their classrooms and conducting follow-up interviews, we learned that most teachers used technology during their literacy instruction and thought differently about their use of technology. The new literacies course and writing camp seemed to positively influence and encourage them to incorporate technology into their instruction. Specifically, we noted they (a) used the same digital tools we used in the graduate class and camp in their classrooms, (b) were proactive about procuring technology for their classrooms, and (c) took risks and were creative about making time to integrate technology.

Using Digital Tools from Class and Camp

The teachers we followed up with explained that they used the digital tools we used during class and writing camp, which speaks to the importance of providing teachers with hands-on experiences in using digital tools (i.e., Collet, 2013; Jaipal-Jamani & Figg, 2015). Emily, a first grade teacher, said,

> For me with the camp, you know, I was able to view and use technology tools that I really didn't know were out there, like Popplet and the bubble maps and things. We've done that in my class this year, and really, truly having the opportunity to get in and use their VoiceThreads with them.

Emily made reference to two tools we used in the camp: Popplet, an online tool for making mind maps, and VoiceThread, an online tool that allows the creator to pair voice recordings with images.

Linda, an elementary special education teacher, told us how she used VoiceThread to work with students who she thought lacked motivation:

> I've never used VoiceThread before, and I was really hesitant. Since my students are struggling and are a lot lower in grade level than others, I was worried that they wouldn't be able to do it, but they surprised me.

Having previously used VoiceThread helped Linda incorporate it into her instruction, even though she was not initially sure about doing so. Emily's and Linda's experiences demonstrate the importance of providing opportunities for students to use technology, since doubts can be cast aside once teachers see the positive impact of technology use with students.

Brittany, a fifth-grade teacher, said that she used different methods for composing with her students because of what she learned in the graduate class. She gave her students the choice of using blogs, word processors, or pen and paper to create their reading responses. She had also begun incorporating Prezi online presentation software and had plans to introduce VoiceThread and wikis later in the year. In reflecting on how the graduate course and writing camp supported the implementation of technology into her teaching, she said,

> The camp experience influenced my understanding of the content in the course and helped me see the theories and research in action. It was a great way to put into practice all the ideas, course text, and articles. It helped me use the digital tools, and being a writing coach [in the writing camp] helped me focus on the writer, then the writing, then the writing tool. Camp also made me understand how real kids respond to the content in the course.

In the following fall semester, Brittany integrated technology into her instruction although she was one of the teachers who initially had worried about what her administrators would think about her use of technology in her teaching. She also worried about supervisors from the district who have a role in teacher planning and classroom observations:

> I think that getting your administration on board, getting your curriculum coordinator on board, and your assistant principal and your principal, and your coaches in your district [is important]. If it's not on the classroom observation checklist, you're going to be reluctant.

Although Brittany may have worried about being monitored by her administration and district, her worries were not enough to preclude her from trying the digital tools she used in the graduate course and camp.

When Brittany, Emily, and Linda had the opportunity to work with digital tools beforehand in the graduate class and the camp, they were able to gain experience and understanding of the tools as well as envision how they could be used in their own classrooms. The time to experiment and gain experience with the digital tools can be a critical way to support teachers' use of technology (as also asserted in Jaipal-Jamani & Figg, 2015).

Procuring Technology for the Classroom

In addition to using the digital tools from class and writing camp, we found that teachers were more proactive about securing more technology. One of the class assignments required students to write a grant in order to seek funding for technology for their classroom or school. Grant writing was new for most teachers; it had not occurred to them that this was an option for getting additional resources. Meredith, a middle school reading specialist, began to see grant writing as part of a teacher's role and believed that inaccessibility was not an excuse for not incorporating technology:

> Digital texts should play an important role in teaching because this is part of the future of reading and writing in our society. We have the responsibility to expose students to many different types of texts and educate them in effective ways to use these digital texts. If access is an issue, write a grant!

Meredith successfully received $1,000 for a grant proposal she wrote in class, which she used to purchase a Chromebook and books to aid with hosting family book clubs. In this way, she used digital technology to enhance paper-based texts and extend her instruction beyond the classroom.

In addition to grant writing, teachers gained access to more technology through rethinking the tools they already had available to them. This action reflects a component of the graduate class where teachers had to think about technology they had access to and reflect on how that technology could be used to enhance their instruction. For example, Emily, a first-grade teacher, made a computer station in her classroom with old laptops that she salvaged from being discarded at her school. In addition, she described how she was provided with an iPad in order to administer and record individual student assessment data. Rather than restrict the iPad's use to testing, Emily let her students use it and even offered her own iPhone for students' use.

Seeing how Emily was able to be creative about allowing her students to access technology was encouraging for us, because she did not let lack of access discourage her. Her behavior supports what the literature says about teachers' use of technology: that when teachers believe technology use is important, they find ways to use it that get beyond problems of access (Miranda & Russell, 2012).

Taking Risks

As the teachers became more comfortable with using digital tools and finding ways to obtain more technology, they also started taking risks to be able to integrate technology. In the graduate course we read articles about how teachers implemented technology (e.g., Hagood, 2012; Husbye, Buchholz, Skidmore Coggin, Wessel Powell, & Wohlwend, 2012).

In our discussions about these articles, we emphasized the importance of being adventurous and trying technology with students.

In camp, the teachers could immediately see how students reacted to using digital tools and support them. In turn, teachers became more persistent about incorporating digital tools into their teaching. For example, Emily, the first-grade teacher who took steps toward obtaining more technology, communicated her understanding that administrative support was important for technology implementation. She explained,

> If we're trying to fight someone [an administrator] who wants nothing to do with it; we're going to lose every time. You've got to have support, you know, on the higher end, so that you can give it a try.

Her comment reflects an understanding of the importance of having administrative support, but also echoes a sort of fear that teachers may have of not following the norm. When Emily took a risk to obtain more technology and use it in her instruction, she was pleasantly surprised to learn that her administration was not as opposed to technology use as she had previously imagined.

Similarly, Skylar, a fourth-grade teacher, became proactive about convincing her administrators of the importance of technology after taking the graduate class. Originally, Skylar had reported feeling constrained by her administration in using technology and was, therefore, discouraged from using it. She taught in a school that was part of a technology initiative, however, where each classroom was well equipped with technology such as individual iPads, smart boards, a document camera, Nooks (e-readers), and digital cameras.

Despite having everything she desired in terms of technology, Skylar did not initially feel she could readily use it. She described this feeling, saying, "Access is not the issue, but administration's monitoring of [it] is. [I'm] afraid of getting into trouble for using technology." Skylar believed the administration in her school was not supportive of her teaching with technology and she worried that an administrator would walk in and "catch her" doing something that was not explicitly stated in her lesson plans or the Common Core State Standards. Her school and administration were so intensely focused on standards and developing lessons that prepared students for end-of-year testing that there was little room for the use of technology.

This concern echoes other studies that have shown the importance of administrators in influencing teachers' practices (Dawes, 2001). When we followed up with Skylar, we saw a noticeable shift in her approach to using technology, which included showing her administrators how technology could be used in the classroom and advocating for its integration by taking on a leadership role as a staff trainer for other teachers in her school.

Samira, a first-grade teacher, also reflected on taking a risk by giving kids more control of the process. She found that "letting go a little" was a way to navigate time and management issues. Where she previously thought students would not be able figure out the technology without strict guidance, she found that they were much more capable that she previously thought. She said that it actually took less time when she let them try the technology instead of restricting them to use only when she was sitting right next to them. In turn, it was easier for her to manage the technology because she did not feel the need to work with each student individually all the time. This set-up is similar to the camp setting, where students were encouraged to experiment with technology and Samira could see firsthand how students were able to work independently. When teachers were able to see what students

could do with technology, they were surprised that they did not need as much assistance as the teachers had previously thought.

Carly, a kindergarten teacher, saw her lack of comfort with technology as an opportunity to take risks in her classroom. Carly believed that teachers should "figure it out with our students or else we will never try." In addition, Carly said that the way teachers approach teaching impacts how comfortable they feel with technology and suggested, "It takes an inquiry framework."

She believed that teachers who control how students learn rather than having them construct their own understanding will have a harder time feeling confident in their use of technology. Carly's approach to integrating technology into her teaching serves as an example of how we emphasized that teachers did not need to be technology experts in order to use technology in their teaching.

As with any new materials or methods, technology integration meant these teachers had to be persistent about using technology, which involved learning to take a risk. For Skylar this meant taking on a leadership role, for Samira this meant allowing students to have more control, and for Carly this meant learning as she went.

Being Creative About Time

In addition to taking risks so teachers could integrate technology, we also found that they discovered ways to be creative with their time so they could implement technology. In camp integrating technology was easy because that was the focus of the camp and it was set up for technology integration from the beginning. In their classrooms, however, teachers had to think beyond what they perceived their schedules might allow in order to make time for technology.

Skylar found ways to incorporate more technology during the school day that included using her morning work time to teach and have students practice with new technology:

> Just squeezing it in and letting them use the iPads whenever they want. I think that's been my biggest surprise. I thought I was going to have to model, guide, share every program and really, the more you let them use their iPads, like if you let them take them to recess, the more they play around with them, and they'll tell me things.

For Skylar, part of increasing student access also meant recognizing that students can figure out the technology without as much teacher assistance as she previously thought. Her experience in the camp also showed her how students were able to quickly learn the technology, even without formal and explicit instruction.

When we followed up with Carly, she was finding ways to support her instruction with technology. For example, she described a student in her class who used the computer to reinforce his understanding of phonemic awareness:

> Just seeing how much he could do. Seeing he could search the Internet, he could find images. He loved finding images. And that takes literacy. Finding images is literacy. Thinking about the beginning sounds, and it was for a purpose. We weren't doing beginning sounds drills but he was working on initial and medial and final sounds.

Rather than have her students use worksheets or drill them on identifying sounds, she was able to let them use technology to practice and demonstrate their understanding. Students used technology in a purposeful way to enhance learning and instruction rather than rote learning (as also in Brennan, 2015). Additionally, Carly said that "finding images is literacy," a view supported by new literacies that recognizes literacy is about making meaning in multimodal ways.

In the fourth-grade class, Tara was required to use a reading textbook during her language arts instruction. She described how she used this curricular requirement as an opportunity to incorporate technology: "I used the stories we read together to do the blogging and the technology. So it's okay to be able to pull that technology, and there's some stuff in there like researching and how to use the Internet properly." Rather than restrict her teaching because she was required to use the textbook, Tara found that blogging was a way to incorporate technology while still following her school's protocol. Blogging was one of the composition practices teachers were asked to try during the graduate course to respond to assigned readings, much like Tara had her students do with their assigned reading.

Impact of Testing on Technology Integration

The ways that teachers implemented technology into their teaching after taking the new literacies course was encouraging for us, and we learned from them about how to support them. One challenge, however, teachers found especially difficult to overcome was testing and how they felt restricted by testing.

Because testing has been reported as strongly affecting the curriculum and organization of pedagogical practices in negative ways (e.g., Au, 2007; Valli et. al, 2008), addressing how it also intersects with technology implementation is important. Several teachers said that the amount of time spent on testing and test preparation was a major barrier to incorporating technology into instruction. Some teachers did not increase their use of technology for this reason.

Teachers expressed frustration with testing. For example, Kate, a kindergarten teacher, expressed her annoyance with having to administer what she thought was an excessive number of one-on-one tests with students, leaving her little instructional time:

> I'd like to be able to implement a lot more of the technology and the different things that I have learned in my [graduate] classes, but I really haven't had any time to work with any of it. I feel like all I do is test, and I don't have time to teach them.

She referred mainly to the progress monitoring mandated by her district that she was required to administer every 10 days. In Kate's case, technology integration into her instruction was not the only aspect of her teaching that was affected by testing; she did not feel she was able to teach in other ways she desired either (e.g., reading and writing workshop). Interestingly, Kate was provided with an iPad specifically for recording students' assessment data. In this case, the new technology was only intended for the teachers' use and explicitly for testing purposes.

Robyn, an eighth-grade teacher said,

> There is so much pressure on language arts teachers to have high value-added data and help schools achieve growth that anything not explicitly tested is pushed to the side. Even with a supportive principal, it is still difficult to spend class time on anything that cannot be directly linked to the test.

Robyn's statement reflects Boardman and Woodruff's (2004) findings that statewide assessments have a significant impact on teaching, and teachers often use the tests as a reference point to decide whether or not to adopt a new instructional practice. If teachers perceive a new practice as supporting test-preparation goals, such as teaching to the test, they are more likely to adopt the new practice. If the practice does not seem to support testing, teachers may not implement the new practice or will adapt it to be more aligned with test preparation goals.

In addition to questioning the ability to teach anything that was not directly tested, some teachers questioned their ability to use technology for purposes other than testing. For example, Brittany, a fifth-grade teacher, explained that laptops were provided at her grade level for each student because the required end-of-grade tests were only available online: "We got them [carts with classroom sets of laptops] because of the science tests moving online. So pretty much they wanted us to use them for test prep and not digital teaching."

The result was that technology instruction was geared toward testing, with students learning "how to click in a bubble instead of how to pencil in a bubble." This example is a sober reminder of the prominent role testing plays in schools and how what might seem innovative—a one-to-one laptop ratio for students—can actually be another form of supporting testing.

Brittany highlighted another tension many teachers expressed regarding high-stakes testing not matching expanded notions of literacy:

> I have not seen or heard of a high-stakes test that measures the proficiency of friending, sharing photos, tagging, liking a comment, sending messages/gifts, or any other social aspect of network awareness.

Her statement also indicates the prominent role that high-stakes testing plays in the current educational context and the shaping of teaching practices, including technology integration.

Problematic Access to Technology

Testing was not the only barrier to technology integration, however: Two teachers – Ann, a third-grade teacher, and Hannah, a K-5 English as a second language (ESL) teacher – did not increase their use of technology because access remained an issue. Despite more funding for technology found in many schools (Ermer & Ottenbreit-Leftwich, 2013), access can still serve as a gatekeeper for some teachers.

Both of these teachers said that their understanding of literacy had changed, but their main challenge was not having access to technology. Ann said that she was trying to use more technology,

> ...but not at all in the way that I think would be most ideal. I would consider our school pretty limited in technology. We do have three computers in my classroom, and they're used. And as far as sharing original source documents and stuff like that, I can project from a computer to a screen, and we use that a lot and other digital tools that I can share in that way, but as far as the students being able to create, that's very limited.

In Ann's case, having limited access to technology prevented her from doing more, although she did try. She expressed the importance of students being able to create with technology, which was a challenge with only three computers in her classroom.

Hannah reported that her understanding of literacy changed, but because she did not have access to much technology, she was not able to integrate technology in her teaching:

> I feel, I guess, the class really helped me think about the whole new literacies concept, but honestly I don't feel like a lot of that has transferred into my teaching. My new school does not have a lot of technology available....If I had more technology available I would be able to do more.

For Hannah, not having technology made it difficult for her to think about using it with her students. In addition, Hannah was an ESL teacher who spent the majority of her day going into other classrooms or pulling students out to work in small groups with her. She described her teaching in this way as limiting her use of technology: "But honestly I mainly teach guided reading, so with guided reading you don't use a lot of technology anyway. It's just the kids and the books, you know."

Hannah viewed guided reading as a traditional instructional approach with print-based books, so including technology did not make sense to her. Another pedagogical factor that influenced Hannah's technology use was having to share a classroom with a second ESL teacher. She worried about "disturbing the other class that is taking place in my room at the same time." In this way, she saw technology as something that might be distracting for students who were not engaged in the lesson with her, so her choice to not include technology was also a management and space issue.

Ann and Hannah did express their understanding and belief of the importance of technology integration and teaching new literacies. The main factor that kept them from using technology – access – was strong enough that they were not able to develop alternatives for including technology in their instruction in the same way that the other teachers did. They may have felt their teaching was constrained in their schools, and their actions exemplify the enactment of teaching literacy within their specific contexts.

Testing is a prominent barrier for many teachers, preventing them from teaching the way they want (Au, 2007). That access to technology was another barrier is important because it continues to be an issue for some teachers when schools or their districts do not prioritize access for all students (Miranda & Russell, 2011). At the same time, the other teachers in the study who were able to get around the issue of access show that this barrier can be overcome when they are determined enough to use technology. As we interpret the data, then, a strong desire to implement technology with a belief that it is important is what set the eight teachers who used more technology apart from the three who did not.

Discussion

We cannot make claims about the teachers' beliefs changing since we did not collect data on this specifically. However, we can infer that the teachers agreed with and understood the importance of using technology stressed during the graduate course, because they actively worked on incorporating technology into their instruction. For Skylar, this meant taking on a leadership role; for Brittany, knowing more about digital tools was important in helping her use them with her students. When access was an issue, Emily was able to think creatively about using digital tools that were available, such as old computers, her own iPhone, and the iPad purchased for her to use for assessments.

Professional development may be important for helping teachers integrate technology, while teacher beliefs and attitudes about technology also may be important. It makes sense then that professional development could support teachers by targeting their beliefs and attitudes. In this study, the graduate course served as a form of professional development in which we provided hands-on experience in the writing camp. In addition, we used the course readings, discussions, and assignments to build understanding and address beliefs and attitudes about literacy and technology as well as teaching and learning. Together, the course experiences along with teaching in the camp gave teachers opportunities to expand their understanding of literacy and technology and the importance of technology integration while gaining experience with using digital tools.

Our approach to addressing technology should be situated within a broader view of literacy. Rather than emphasizing technology as the main point, we focused on new literacies (as recommended in Collett, 2013). This approach allowed us to address literacy as situated practice, which in turn, allowed us to conceptualize technology as more than just an add-on (as in Hutchison & Reinking, 2011).

We then saw how teachers carried new literacy practices into their teaching, such as Carly allowing her students to find images on the Internet to support their phonemic awareness and Tara's use of blogging in her class for students to respond to their readings. As teachers' understanding of literacy was expanded to include a new literacies perspective, they were able to find ways in which technology could support literacy practices, rather than focus solely on ways to use technology for the sake of using it. In this way, the use of technology meaningfully supported their teaching and goals (as also happened in Harris & Hofer, 2011).

Another important aspect of our approach to the graduate course was the use of the writing camp. It helped teachers bridge theory to practice, giving them time to try new instructional approaches. Rather than just reading about and discussing new literacy practices, teachers were able to apply their learning immediately by working with children in the camp. The daily minilessons they created to support the campers' use of technology pushed them to teach with digital tools while also supporting campers' composing practices. In this way, their use of technology was grounded in authentic writing instruction, and they could see how the campers benefitted in real time. The teachers appreciated this model of including camp with the new literacies course. For example, Skylar said,

> I think it was a really good professional development because most professional developments you go and hear adults speak about a topic, and you're just supposed to go back and implement it by yourself. This was like you heard the adults speak, and then you actually had real kids to try it with.

The experience with the new literacies course and camp gave teachers an opportunity to extend their understanding of literacy, try out different digital tools, and apply their learning by working with children. This combination of factors was important for helping them integrate technology in their classrooms and supports what the literature says about helping teachers to do so, such as immediately being able to apply their knowledge (e.g., Jaipal-Jamani & Figg, 2015).

A camp setting is quite different from a regular classroom setting, however. The student-to-teacher ratio is drastically smaller, there was no testing, there were no administrators, and the camp was specifically focused on technology use—to name a few. Without having the pressure that comes from being a full-time classroom teacher, our teachers were able to focus on technology integration in a unique way. Although the transfer from the camp setting back to their classrooms seemed to work well for the teachers, because the two

settings were different, some teachers may have had more difficulty in applying course concepts, such as Hannah who taught small group ESL instruction.

Finally, this study showed the negative impact of testing. Testing detracted from some teachers' time to teach and try new pedagogies. An overemphasis on testing is commonly reported as limiting teachers' pedagogical control (Au, 2007) and disrupting other aspects of teaching (e.g., time, materials, and standards taught). Although its effect on technology integration is not commonly discussed, our research found testing to have consequences for the teachers' use of technology.

Implications and Conclusion

While we worked only with in-service teachers, we acknowledge the importance of helping preservice teachers develop an understanding of teaching with technology as well (e.g., as asserted in Bai & Ertmer, 2008; Sadaf, Newby, & Ertmer, 2012). Just as we engaged in-service teachers in a study of new literacies and gave them the opportunity to work with children in the writing camp, preservice teachers should be given similar opportunities, either as part of their field experiences or in a separate class. Giving preservice teachers time to work with digital tools and try out technology integration in their instruction would support them as they move into their own classrooms and understand what is possible with technology.

To this end, teacher preparation course work should be grounded in a new literacies framework to broaden their teachers' understanding of literacy as well as ways to integrate technology. This framework can help preservice teachers adopt a broader perspective of literacy and understand how literacy has changed because of technology. For example, when the teachers in our study had the opportunity to learn about a new literacies framework and then actively engage students in using digital tools, they expanded their understanding of technology integration and were able to connect this back to their classrooms.

Teacher educators should, therefore, broaden their own conceptions of literacy and how they talk about literacy with preservice teachers. As teacher educators reflect on their literacy methods courses, they might think about how to organize these courses to address the core content through a new literacies framework. This kind of revision of course work should allow time for preservice teachers to have hands-on experience with digital tools, address how to effectively use technology with students (Pope & Golub, 2000), and think creatively about technology implementation. At the same time, preservice teachers need to think about how to obtain technology should they find themselves in a teaching context where technology is sparse. As part of their teacher preparation, preservice teachers can learn about the value of grant writing.

Our findings also have implications for teacher educators who should take into consideration the challenges teachers face related to not only their own dispositions, but also related to their specific contexts – in particular, contexts where testing is emphasized. The enormity of testing in shaping literacy practices is troublesome as the field considers how to help teachers adopt and teach broadened views of literacy (e.g., Bai & Ertmer, 2008). It has been well documented that an overemphasis on testing disrupts teachers' practices and leads to narrowing the curriculum (Au, 2007). This study indicated that teachers' ability to integrate technology is yet another area impacted by time spent on testing. This issue is important to acknowledge in order to help teachers think through ways to navigate contexts where testing is overemphasized.

Finally, teacher educators can help teachers understand that implementing technology into instruction is a process of learning and may require new teaching practices, such as releasing more responsibility to students, similar to what Samira discovered was possible and important with her first graders. It may be easiest for teachers to start with small goals and make a few changes here and there, as opposed to becoming overwhelmed by making dramatic changes to their entire pedagogy. Despite the feelings of discouragement that may come from trying new approaches to teaching, growth and increased insight are inevitable.

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Appendix A
Interview Questions for Small Group Interviews

1. What are the main things you are learning during camp?
2. What has surprised you? About yourself as a teacher? About the campers?
3. In what ways has camp been similar to teaching in your classroom?
4. In what ways has camp been different from teaching in your classroom?
5. How can you take what you have done with the campers and apply it to your teaching context?
6. What role do/should digital texts and tools play in teaching? What if access is an issue?
7. What goals do you have for your teaching related to multiliteracies and teaching with digital tools?
8. What questions do you still have about new literacies and digital tools?
9. What support do you need to incorporate digital texts and tools into your teaching?
10. What are some of the things that have gone really well during camp? Describe something (an interaction, a conversation, an event) that went really well during camp.

Appendix B
Questions for Individual Interviews

1. How is your school year going so far? Tell me about your class and your school.
2. In reference to the graduate course this last summer, what are some of the ways that your understanding of literacy changed? And how has that looked in your teaching?
3. Also in reference to the graduate course, what are some of the ways that your teaching has shifted to incorporate new literacies? Describe some of the specific ways you are incorporating digital tools.
4. What aspect of the class had the most impact on your teaching?
5. What are some of the affordances you have found of using technology in the classroom?
6. What are some of the constraints?
7. In reference to the camp, in what ways did the class and camp experience together served as a form of professional development?
   a. What were some of the benefits of that model?
   b. What were some of the limitations or drawbacks?
8. How did the camp experience influence your understanding of the content addressed in the graduate course?
9. How did working with a mixture of kids from different places in the city influence your teaching as opposed to teaching the same kids in your school? What kinds of connections did you make back to the students at your school?
10. Do you feel an experience similar to this would be appropriate in your school? What might that look like?
11. In the class many students expressed the need to align assessments with new literacy practices. Have you been able to align the two in your classroom this year?
    a. If so, what does that look like?
    b. If not, what are the challenges of doing so?
12. What are some new questions that you have arisen for you in relation to the course content and what would support your development?
13. Is there anything else you would like me to know about your teaching, the class, or you?

Appendix C
Example of Category Development Chart

Category	Data Example
1. Teachers developed new understandings of literacy, new literacies, and using technology in the ELA classroom.	"The concept of "new literacies" was unknown to me before this course. Through our readings, discussions, and lectures, I now understand that new literacies is not simply about incorporating new digital technology into our teaching practices; it's about a new way of thinking about literacy." (Meredith, Final Paper, 07/30/13)
2. Teachers need support (e.g., professional development) to use new literacies and technology in their classrooms.	"I think it was a really good professional development because most professional developments you go and hear adults speak about a topic and you're just supposed to go back and implement it by yourself. This was like you heard the adults to speak and then you actually had real kids to try it with." (Skylar, Interview, 10/28/13)
3. Teachers learned how to integrate technology into instruction by working with campers.	"Seeing the project carried through in young writer's camp kind of brought it all home. This is what they're talking about. The kids can do this, they can figure things out better than you can, you just have to go with it." (Carly, Interview, 07/25/13)
4. Teachers experienced challenges related to using technology in the classroom.	"Learning has been disrupted at times due to the challenges new literacies can uncover, for example, technology access, cost, unsupportive administration/districts, and lack of professional development." (Brittany, Final Paper, 07/29/13)
5. Teachers planned for how they would use technology and made changes in order to implement technology.	"I plan to incorporate the technology tools we learned about into my instruction to enhance student learning. In addition, I will apply the ideas of the importance of balance between technological and other activities, and the importance of instructional context, into my instruction as well. I feel confident that my students will benefit as a result." (Hannah, Final Paper, 07/30/13)
6. Feedback from teachers can inform teacher educators about how to design experiences for teachers to help them integrate technology into instruction.	"I almost wish we were with the students, had more time with them. And it would have been nice to be able to collaborate more with the group leaders of the camp because there was kind of like a disconnect from there to us. I think it would have been more beneficial for the kids if we had more time to collaborate. So maybe if part of that time would have been where we could sit down with the camp leaders and have discussions and talk about the students." (Linda, Interview, Fall 2013)