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Evolving Classrooms: Unlocking Teachers' Perceptions and How They Impact Digital Literacy Practices

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"Come on! You know what I mean. It's not *real* reading and writing." This was the start of a conversation I had with my students when I asked them about their digital doings when they left school each day. These particular students were not struggling, but what I call resistant. They did the bare minimum for what was required and didn't "get" English class because they had not seen any purpose to it – yet. Instead, they saw their out-of-school literacy skills as completely separate from English class. I didn't understand it; how did they get to my class thinking they weren't active readers and writers when their digital selves were quite active and involved within their respective online and face-to-face communities?

After thinking about this question, I began to wonder how a teacher's perceptions on literacy skills, specifically digital literacy practices, impacted his or her classroom and the students within it. In other words, I wanted to know how my students were actively consuming and producing out-of-school, and why they didn't feel their digital literacy practices were validated in school. Here, digital literacy practices are quite simply how one is reading, writing, and communicating within digital spaces. For this reason, I knew I had to talk to the source of validation: teachers.

The problem is that while there is significant research done on digital literacy practices, which some schools are using, there is still a fine line between "too many digital doings" in schools and none at all, specifically regarding social media usage. While we know that adolescents are constantly using social media for a variety of reasons, many schools do not consider social media a viable or safe way to meet standards with students (Alvermann & Wilson, 2007; Alvermann, Beach, & Boggs, 2015; Beach, 2015; Dowdall, 2006; Dredger, Woods, Beach, & Sagsetter, 2010; Kajder, 2007; New London Group, 2006; Witte, 2007).

Furthermore, digital doings are often not validated within schools, especially in the traditional English classroom, which garners comments like the one from my students.

While I can understand the need to meet standards and set appropriate regulations for digital literacy practices for students, I also think researchers and teachers cannot continue to deny that many of our struggling and reluctant students are actually quite engaged in literacy practices outside of our school walls – whether they realize it or not (Alvermann & Wilson, 2007; Alvermann, Beach, & Boggs, 2015; Beach, 2015; Dowdall, 2006; Dredger, Woods, Beach, & Sagsetter, 2010; Kajder, 2007; New London Group, 2006; Witte, 2007). From remixing memes to blogging on a Ford F-150 discussion board, today's students are navigating these mediated intersections in smart ways that schools are not necessarily acknowledging or willing to acknowledge.

Furthermore, I believe that we, as researchers and teachers, need to understand more clearly how and why our students are choosing digital spaces to create and share their identities while building relationships with people all over the world. The more we can connect with our students and understand how they view themselves and their literacy practices (Sandlos, 2009, p. 69), the more we can help make connections for them to their in-school literacy practices.

While many teachers feel that they are behind when it comes to using technology within the classroom (Bulcher & Moran, 2012, p. 65), they must also take into consideration that students are going to use it and be active within social media whether they do or not. "What [our] students walk away with today [from our classrooms] will [only] be re-digested multiple times and be a part of what they become" (Bulcher & Moran, 2012, p. 66). Thus, it is time for educators to acknowledge the potential that students' social media use has to do with not only

who they are, have been, and can become, but also that literacy, as we know it, is evolving as we speak.

Though many are using new literacies practices in schools, many are still not thinking about the deeper implications these practices have in regards to creating lifelong learners (New London Group, 1996). Furthermore, if teachers are not using digital literacy practices within their classrooms, then how will students acknowledge that they are literate in many ways not always valued by state-mandated tests? How will students see that "we use reading, writing, speaking, and listening as a means to position ourselves in relation to the greater world around us" (Fecho, Davis, & Moore, 2012, p. 143)? For this reason, we need to focus not just on what our students are doing on their own, but also on how teachers are or are not using those skills on a daily basis.

Theoretical Framework

For this study, the critical theory tradition was used as my framework. It is important to remember that critical theory's goal is "not just to study and understand society but rather to critique and change society" (Patton, 2002, p. 131). Glesne (2011) states that the critical theory tradition is "guided by a *historical realism* ontology," which means that it is shaped by "social, political, cultural, economic, ethnic, and gender values" (p. 9). In addition, Glesne (2011) also states that the critical tradition makes use of and makes others aware of "*standpoint epistemologies*" (p. 10). In regards to my study, the group that has been traditionally "oppressed" by the devaluing of digital literacy practices would be my participants' students; however, the teachers were also oppressed in the sense that they felt limited due to things they felt they could not control (Freire, 1970; Ranciere, 2011). In fact, the idea of "emancipation means: the blurring

of the boundary between those who act and those who look; between individuals and members of a collective body" (Ranciere, 2011, p. 19). Thus, in order for teachers to validate their students literacy practices, they must not wait on the collective powers around them to decide what their students are doing is important; instead, they must individually act to create an awareness and validation of their students' literacy practices.

For these reasons, the critical tradition will help me not only interpret my participants' perceptions, but also to critique the fact that teachers, their schools, and their school communities in general may not necessarily validate their students' authentic (digital) literacy practices, even if they do consider and are using them within their classroom, due to the limitations they feel are out of their control.

Research Design and Methods

In this interpretive multicase study, I conducted interviews with three teachers of various grade levels (including elementary, middle, and high school) who are located throughout the United States in public schools and analyzed their perceptions on digital literacy practices in order to understand how their perceptions may impact their classrooms.

Within the case study approach, "the purpose is to gather comprehensive, systematic, and in-depth information about each case of interest" (Patton, 2002, p. 447). Since my goal was to understand how teachers' perceptions may impact how digital literacy practices are considered and used within their classrooms, I felt the case study design would be most effective in achieving it since this design takes into consideration interview data and contextual information (Patton, 2002, p. 449), which I gathered through individual interviews. Essentially, I developed my initial themes of analysis, which helped me build three individual case studies.

Furthermore, because this is an interpretive study, I am focusing on how my participants' perceptions on digital literacy practices "interact with language and thought of the wider society" (Glesne, 2011, p. 8). In other words, I will not attempt "to reduce the multiple interpretations to numbers, nor to a norm," which is considered qualitative methods (Glesne, 2011, p. 8). Instead, my job was to access my participants' perceptions of digital literacy practices by asking questions and interacting with them to gain this information and apply it "in terms of the wider culture" (Glesne, 2011, p. 8). This focus was imperative if I was to truly create case studies that effectively show my interpretation of the participants' perceptions on digital literacy practices.

Thus, the purpose of this study was to better understand how current perceptions of literacy education is being affected, if at all, by digital literacy practices carried out by teachers and students in and out of school contexts. The following research questions were used for this study: What do teachers understand digital literacy practices to be within their classroom, school, and school community? In what ways do these teachers' perceptions on their students' digital literacy practices impact their pedagogical strategies within their classrooms? How do they include digital literacy practices?

Research Participants

The participants, an elementary, a middle, and a high school teacher, may seem randomly chosen, but they were not as I had personal connections to them before the study took place as they are family and friends. In addition, "purposeful sampling with small, but carefully selected, information-rich cases" can be "selected and studied precisely because they have broader relevance" (Patton, 2002, p. 581). Thus, while I had access to a number of teacher family members, friends, and colleagues, I choose these teachers purposefully because they had varying

years of teaching experiences across varying grade levels, located in schools with very diverse student populations, and varying levels of access to technology.

Marie (pseudonyms used throughout) is a third grade elementary teacher who teaches in the southwestern part of the United States in a more rural town. Her Title I school is predominantly biracial, with many races stemming from Hispanic or Native American origins, and it has an active family resource worker who helps make sure that her students are fed in and out of school, clothed, and supplied with the necessary materials they need for school. Marie's principal has acknowledged her as a technology leader in her school, which means she helps other teachers integrate technology into their classrooms. Her definition of digital literacy is "using technology to introduce and model to students the 21st century skills that they do not have access to outside of school." Yet, while Marie has lots of technology in her room, such as iPads, iMac computer stations, Neo devices, and school-wide technology available to her, such as an iPad cart, she still feels limited by what she can do within her room regarding digital literacy practices for a variety of reasons, such as students' out-of-school resources, teacher resistance across all grade levels within her school, and internet connectivity issues throughout the school.

Kathleen also works at a Title I school in the mideastern part of the United States in an urban location. She teaches sixth, seventh, and eight grade multi-level history classes where she works with a population of students that is approximately 60% Caucasian, 30% African American, and 10% biracial with Hispanic and Asian origins. Her definition of digital literacy is "using technology for reading and writing skills in the classroom." Kathleen thinks her small class sizes and a focus on community relationships are important components of what makes her school unique. However, she doesn't feel that her and her colleagues get enough credit for all

they accomplish, especially with limited resources. For example, many of the computer labs and laptop carts in her school do not work. Yet, she is hopeful that the new school year will bring a "promised" new one-to-one Chromebook initiative to her school that she feels will help tremendously with incorporating digital literacy practices within her classroom.

Jessica, a high school English teacher, teaches at a Title I school, too. Her school is located in the southeastern part of the United States in a suburban area. The student population here consists of approximately 80% African American, 10% Hispanic, and 10% Caucasian and Asian. Her definition of digital literacy is "using technology to help students become engaged with the classroom lesson." Jessica's school uses a lot of its funds with its two-to-one laptop initiative and maintaining a SMART Board in every classroom. However, with technology at her fingertips, and the knowledge that her students are very tech savvy, Jessica feels disheartened when she tries to integrate digital literacy practices within the classroom because not many of her colleagues see the value in what she does and she is not always able to bring in students' resources, such as a smartphone, so she loses confidence when using those practices.

Data Collection

As mentioned above, I knew each participant individually long before this interview study. For this reason, it was especially important for me to "work to make the [interview] relationship less hierarchical" (Glesne, 2011, p. 127) in nature. Thus, my intention for selecting family and friends was to create a familiar and comfortable interview setting, even though it was online, with teachers who would see me as an "equal" and not just as a "researcher." Whether considered a new friend (high school), an old friend (middle school), or a direct family member

(elementary), each person was not surprised by my topic or the manner in which I interviewed them (via technology).

At the end of the day, interviews "affect people" (Patton, 2002, p. 405). In fact, we ask questions of our past, present and future (Patton, 2002, p. 353), and it is my hope that these interviews will only help to have an impact on the future of literacy education as it becomes increasingly digital.

Before I began the actual interviews, I worked to ensure that my interview guide (see Appendix A) was focused enough to help give my participants an idea of the questions I would be asking. Using an interview guide was also helpful because it ensured that "the same basic lines of inquiry are pursued with each person interviewed" (Patton, 2002, p. 343). For my study, especially since I was interviewing across grade levels, I wanted to make sure that all participants received the same questions. In addition, within my interview guide, I focused on adding a variety of questions that were open-ended so that I could be as clear as possible with my participants (Patton, 2002, p. 348). This focus also helped me be "anticipatory" (Glesne, 2011, p. 121) in my interviewing methodology and think critically about potential confusion my participants would encounter, as well as preparing myself to answer any tough questions thrown back at me.

Due to the location and schedules of the participants, each interview was conducted via Google Hangout and/or FaceTime. I made sure that I recorded the audio only from our interview through QuickTime, and I knew before hand what volume I needed my computer to be set on for the best clarity. In addition, I made sure that I had a notepad beside the computer to jot down key points made (Patton, 2002, p. 383) versus typing on the computer to limit potential noise

interference. Thus, I felt that I had a complete interview environment to conduct my interviews. Finally, I scheduled time after each interview to begin transcription immediately so that I could ask questions for clarification if needed. This last point was exceptionally important to ensure that my notes and the interviews were fresh on my mind and as accurate as possible.

Data Analysis

A constant case comparison, which is pulled from grounded theory analysis, was used in this study in order to see how each case varies "in terms of such things as events, participants, settings, or words used (Glesne, 2011, p. 187). I felt this was an important way to analyze my data because it would allow me to look at all three cases and compare them in a way that would acknowledge their differences and highlight their similarities.

Furthermore, since it stems from grounded theory analysis, I found that it works well to lead to the potential development of a new theory surrounding digital literacy within classrooms. "The constant comparative method, which can be seen as the 'core category' of grounded theory, includes that every part of data, i.e. emerging codes, categories, properties, and dimensions as well as different parts of the data, are constantly compared with all other parts of the data to explore variations, similarities and differences in data" (Hallberg, 2006, p. 143). In other words, a strength of this design and analysis approach is that it allowed me to look at all three cases even though the participants were from a variety of backgrounds.

However, though this design and analysis approach worked well, there are some weaknesses, including the fact that I did have a personal relationship with the participants. As Glesne (2011) states: "When studying in your own backyard, you often already have a role – as a teacher or principal or caseworker or friend. When you add on the researcher role, both you and

those around you may experience confusion at times over which role you are or should be playing" (p. 41). Thus, my participants admitted after the interview that they felt they should've said more about digital literacy or more about how they did use something within their classrooms. This reminder is important for researchers, like myself, to keep in mind because it suggests that when we go into the field, and people know us, they are always going to want to say everything just right or feel like we are expecting something from them when in reality, we just want to listen, analyze, and interpret what we found within their stories.

I also think it is important to note that before the interviews, I did not examine any official artifacts and documents. However, I now think that perhaps going back to look at each participant's school website and/or personal website would have been helpful to see how digital literacy is portrayed in online spaces, too, especially since websites are often seen as an extension of the classroom. Yet, despite these limitations, the data provided by the interviewees was rich enough to answer the research questions of this study, which will be highlighted later within this paper.

The data analysis included thematic coding of the interview transcripts in order to interpret how digital literacy practices were perceived by teachers. However, it is important to note that these emerging themes fit and explained the interview data versus being forced on the data by any preconceived notions (Hallberg, 2006, p. 144). The themes developed represented the similarities and/or differences between the teachers' perceptions on digital literacy practices and whether or not those perceptions had an impact on literacy practices within the classroom.

As noted previously, the constant compartive approach to data analysis allowed me to look at each indiviudal data set and beginning to develop codes and categories. As Charmaz

(2014) states: "Coding is the pivotal link between collecting data and developing an emergent theory to explain these data. Through coding, you *define* what is happening in the data and begin to grapple with what it means" (p. 113). With this point in mind, my job was to grapple with what I found in the interviews and make meaning from them, which, in this case, was to see if the teachers' current perceptions of literacy education is being affected, if at all, by digital literacy practices carried out by them and their students in and out of school contexts.

As I worked to develop my codes (see Appendix B), I realized that going line by line really helped me focus solely on the data and not any preconceived notions that I had due to the fact I knew about the participants' schools ahead of time. In addition, grounded theory "prompts [one] to keep interacting with [one's] data" (Charmaz, 2014, p. 115) and helps the researcher to "relive and re-view [one's] earlier interactions with participants" (Charmaz, 2014, p. 116). The following codes show how I continuously interacted with the data to make my codes as specific as possible: Classroom (General classroom), ClassR (Classroom resources), ClassO (Out-of-classroom connections/resources), and Class21 (Classroom 21st century literacy skills).

When I first started to develop my codes, I started very generally before working down into the intimate details of what Marie, Kathleen, and Jessica's comments were. Pulling from the codes listed above, I focused on anything classroom related with the "Classroom" code to start; then, I moved to the specific examples of digital literacy skills and resources that they would give. For example, when moving to the "ClassR," Marie stated that she had resources within her classroom, such as iPads, iMac stations, and Neos; Kathleen had limited resources that didn't always work; and Jessica had laptops and a SMART board. These distinctions were important for me to start to see how the participants viewed digital literacy practices.

However, after I developed my codes, I knew I had to begin thinking about how each individual case would matter in the big scheme of things related to the purpose of this study: to see how teachers' perceptions may or may not impact digital literacy practices within the classroom.

In order to make connections across the codes and begin to really use the constant comparative approach to data (Glesne, 2011, p. 208), I really worked to focus the analysis on Marie, Kathleen, and Jessica's individual perspectives. After all, if [I] ignore, gloss over, or leap beyond participants' meanings and actions, [my] grounded theory will likely reflect an outsider's, rather than an insider's view" (Charmaz, 2014, p. 121). For example, Marie said: "My principal supports me, but my colleagues don't," which resonated with Jessica's feelings on when she incorporated digital literacy practices within her classroom. Yet, Kathleen felt that most teachers and administrators were on board with technology; they just couldn't get it to work. For this reason, I found connections across the data while still valuing each participant's voice and experiences.

Findings

Essentially, I began to see four key themes stand out: school support with digital literacy practices, school non-support with digital literacy practices, digital literacy practices within the classroom, and "at-risk" labels used within the classroom that impact digital literacy practices.

School support with digital literacy practices is defined by positive experiences with digital literacy practices within the school setting at the district, school, or classroom level. This theme means being open to technology use, providing technology resources, and using technology resources. These types of characteristics are evident when all educators are focused

on what most benefits the students through the use of technology. For example, Marie said, "My principal is willing to get us what we need to use in our classroom, so I tell him what I need" and "My two iPads are always out . . . my iMacs are always up and running . . . there is always something they can use to continue learning and exploring." In addition, Kathleen said, "Our school operation plan includes opportunities to add more technology for our students to use . . . my administration expects us to use these tools . . . and we do have a district person come in that will meet with us individually to help us set up anything we want." Also, Jessica said, "I'm still learning [how to use technology effectively] . . . my district is trying to build in a technology rollout to work with what our students have and what they can have through the system." Here we see that all three teachers have shown that from the classroom, school, and district levels, they have support to provide them with the tools they would use to integrate digital literacy practices within their classrooms.

However, school non-support with digital literacy practices is not far behind the positive experiences. This theme developed from the negative experiences noted with digital literacy practices within the school setting at the district, school, or classroom level. It essentially means being turned off by the idea of technology use, not using available technology resources, and worrying about the use of technology. These types of characteristics are evident when all educators are not focused on what most benefits the students through the use of technology. For example, Kathleen said, "Most of the teachers just choose to use technology 50% or they just didn't do it" and "[technology] hasn't been the top priority . . . so I'm not sure what he [the principal] would say [about getting working resources in the classroom]." In addition, Marie said, "Some of my colleagues complain about using tech even when it's something that could help their students! They just don't want to do things differently, which makes them hard to

work with and help." Also, Jessica said, "At times I feel like it [technology use] is jail-like because everyone is scared to use it, so they [the administration] tend to put limitations on how and what can be used."

Yet, despite the negative situations, all of the teachers found ways to use digital literacy practices within the classroom, which is why this theme was important as well. Data falling under this theme included strategies and resources used within the classroom that incorporated technology. This means that the participants noted using technology in order to engage students, encourage collaboration, and explore digital doings. These types of characteristics are apparent when educators are using technology to challenge, engage, and motivate students by providing them with opportunities to utilize 21st century literacy skills. For example, Jessica said, "Students, I think, are naturally drawn to social media [or digital literacy practices] . . . and if I can bring that into the classroom at least through association, that will make them understand what we are doing better." In addition, Kathleen spoke with enthusiasm about using a webquest to help her students learn about various key historical events "even though they may never be able to go visit those places in person." Also, Marie said, "I try to incorporate videos [through the YouTube app on Apple TV] almost daily to prove to people [in her school] that there are little ways to help our students, but more importantly to give my students different ways of learning and reinforcing materials for them . . . they pay attention to a video clip!"

Though I was not surprised at the first three listed themes, I was surprised by the development of the last theme mentioned because it appears that while these teachers' schools are very diverse, they are labeled as "at-risk" in ways that seemed to limit how they could use or had access to digital literacy practices. For this study, this theme focuses on labels placed on

students that would normally marginalize them based on learning ability, race, or socioeconomic status (SES). These type of characteristics are prevalent in many schools in order to identify and label "at-risk" students based on a variety of factors, such as those listed above, so that educators can take a proactive role in ensuring their success, as well as potentially receiving funding in order to help them achieve.

For example, Marie said, "We are trying to help our students learn the basic social and life skills because they do come from rough homes . . . if their families don't have access, as in a ride to and from, the community resource center, then they're really left behind some of the others . . . especially when my students can't all have a device in their hands within my room and sometimes there is frustration because they want it [the device] all to themselves, to play by themselves." Kathleen's students aren't taught from a young age about the importance of education because many of the parents didn't finish education and started work instead to support their family, so "sometimes I wonder if funding for more technology and programs would matter if they won't stay after school to get help." In addition, Jessica notes that it is a 50/50 whether her students will have resources they can use when they leave school and that she thinks "a part of the reason they [teachers/her school] are scared of having technology out is because of theft [which has happened a lot]. It's one of the reasons why they [the school administrators] haven't pushed for it."

Yet, despite these limitations, all three teachers alleviated the problems associated with this label by taking a positive position on what digital literacy will mean to their students. Marie used the example of one of her students who is new to the country and wanted to be a mechanic like his father. She differentiated her instruction by helping him learn about hydraulic fluids and

other airplane mechanical components through her iMac stations and from a flight engineer from the local military base. Here she was able to show her student how computers are used to make the planes fly, how to conduct research online, and the real world application from all that they do in the classroom. “My job is just to expose them . . . to make them think.”

In addition, Kathleen feels that even though she would have to spend extra time to show her students how to use technology [especially if that technology isn’t consistently working], she would like to give them opportunities to use technology as much as possible since she knows access is limited at home. She used the example of preparing her students for what’s to come and that it is her hope that eventually she won’t be teaching technology but just using it. “I need to make sure my students still learn [curriculum] . . . I need to have patience and be more positive . . . and ultimately I want technology to enhance what I do because I know that it does . . . [I need] to give them something [a device] that helps them learn and gives them the power to do so.”

Also, Jessica shared that though many of her students didn’t have direct access at home, they could usually find it at a friend’s house, a cousin’s, or the local library. She said, “I send out a survey at the beginning of the year to get a better idea of what they [her students] have access to, and then I work with what I know they have or what I can give them.” Taking the fact that her students are working on-the-go due to potential limited access, Jessica uses many free programs, such as Google Docs, so that her students always have access to their work. “We live in a world where not having technology isn’t an excuse to get the job done; I want to give my students as many options, as I can so they can’t be limited.”

Ultimately, the most powerful emerging theme I saw develop was how the “at-risk” label was being used for reasons why these teachers had access or did not have access to technology,

and how they felt these students were benefitting or were not benefitting from the use of digital literacy practices. Thus, even though these teachers were finding ways to use digital literacy practices, sometimes it appeared that their biggest obstacle was getting over the perceived limitations of the at-risk label in order to effectively implement those practices within their classroom and school culture.

Discussion

The interviews with these three teachers led me to better understand how their perceptions of literacy education is affected by digital literacy practices used by their students within their classrooms and school communities. In fact, their interviews even suggest further information regarding how professional development could enhance the use of digital literacy practices, how diverse student populations may benefit from digital literacy practices, and how teachers do or do not use digital literacy practices within their classrooms.

First, it is important to note that I did not provide the teachers with my definition of digital literacy practices because I wanted to better understand how *they* viewed the term. I found that all three teachers used the term as a basic way of describing reading and writing skills using digital tools. They also continually noted how they still used digital literacy practices despite whatever limitations they faced. For this reason, if district, school, and classroom educators work together to use technology resources effectively, students may potentially be more engaged with their school work and prepared for the real world with 21st century literacy skills that extend beyond the classroom walls. However, teachers need support in the form of professional development, for example, in order to bring about those changes within their classrooms.

In addition, despite the potentially negative connotations associated with "at-risk" labels, the three teachers showed that there are ways to make connections with all students through technology. Even "at-risk" students will use technology positively when given the opportunity to do so to challenge, engage, and motivate them with their own learning.

Furthermore, when teachers utilize digital literacy practices within the classroom, students are given more differentiated opportunities to apply 21st century literacy skills within the classroom and in the real world. These teachers reminded me that while technology will always change, it's our job to be open to those changes and model for our students what life long learning looks like in the real world.

In addition, since I have a lot of experience with digital literacy within the classroom, I picked up on a lot more information that my participants did not necessarily even register as being a part of a "digital literacy practice/experience." For this reason, not all of the digital literacy practices their students did outside of school were used in-school even though all three acknowledged that their students used a variety of apps, for example, in their personal lives. I think that even though teachers may be incorporating digital literacy practices into their classrooms, they are not necessarily thinking about the hows and whys behind doing so, as well as perhaps limiting those practices to only what *they* know. For this reason, as stated previously, the more teachers have access to support before, during, and after they integrate digital literacy within their classrooms, the more likely they will start to think critically about how it can help their students. When teachers feel liberated by positive support, they, too, feel like they have the power to validate their students through digital literacy practices.

Further Implications

This multicase study helps us all look at how teachers in a variety of locations that include a diverse student population, such as with Marie, Kathleen, and Jessica, view literacy education. Even though "we live in an era surrounded by [digital] media that bombard us with messages through text, images and sound" does not "necessarily mean we recognize or understand its content or intent" (Considine, Horton, & Moorman, 2009, p. 472). Furthermore, when we bring an "understanding of ideology, power, and domination" to help us and our students explore "how power, media, and information are linked" (Kellner & Share, 2007, p. 8), our marginalized and subsequently often silenced and labeled as "at-risk" students have new realms for their voices to be heard within all things digital. I believe that a future, follow-up study that include even more teachers' voices, who work with diverse populations from all over the United States, would be valuable to help guide professional development and offer support to teachers as they strive to validate their students digitally literate identities and practices.

Thus, teachers need support. This support doesn't just mean to hand them a new iPad, but instead give them opportunities to play, learn, and grow so that they can model what real learning looks like and make real changes within their classroom culture. After all, "becoming literate is a lifelong process" (Glenn, 2012, p. 7). For this reason, what makes this issue even timelier is the fact that "we need to develop [media] literate readers and writers; but we need to accept the fact that schools are largely anachronistic and unwilling to accept the cultural texts that students engage with" (Glenn, 2012, p. 27). In other words, if we don't give teachers the support they need in order to value these new, digital literacy practices, then we are not valuing all that our students are bringing into the classroom today.

Finally, teachers, like myself, need to remember that we hold the key to setting our students free: validation. The more we validate and help our students make connections between their in and out of school literacy practices, the more success we will see in our standards-based classrooms. Furthermore, if our students are using digital spaces to define how they want to be seen by a particular audience, then we can also help them better understand how important digital citizenship is in today's world by opening up the doors of communication between the adults in charge of education and their students. When we focus on what works best for our students, when we give teachers the support they need, and when we make an effort to validate students versus just seeing them as a testing number, then that is when we will find true success within our schools and see that digital literacy practices can help play a part in that success within our evolving classrooms.

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Appendix A

Interview Guide

The guide I have here contains some general questions that come to mind when I think about digital literacy; however, I imagine that as we talk, there may be a few more questions that come up from our discussion together.

As stated in the consent form that you signed, all information will be confidential, and pseudonyms will be used in the transcription for the interview. Again, while the interview will be recorded to help with transcription, I will delete or destroy the audio-file at the completion of the project.

We can start any place you'd like to begin, and we will just go from there. Please keep in mind that you may decline any question or stop the interview at any time should you become uncomfortable with it. The interview will last for approximately 45 minutes to one hour. I want to know about your experiences and thoughts.

To begin, I would like to discuss your school culture.

A. School Culture → How would you describe your current school environment?

- General demographics in terms of race, socioeconomic status, or any other break down you feel is unique to your school
- Describe the students you work with
- General school strengths
- General school weaknesses
- Technology available in school
- Any other area you feel is important to explain

Now, I would like to discuss how your classroom is currently set-up.

B. Classroom

- How do you use digital literacy within your classroom?
- What technology do you use in the classroom?
- How has using technology been a challenge for you?
- How has using technology been beneficial to you?
- How do you see others using technology in your school?
- What do others say has been a challenge with using technology?
- What do others say has been beneficial with using technology?
- How do your students react when you use technology?
- What forms of technology are considered your "go-to" tools?
- Why are these forms of technology your "go-to" tools?
- What has been your favorite digital "doing" within the classroom with your students?

Since I have a better idea of how your learning environment is set-up within your classroom, I would like to discuss how your students are using technology outside of home.

C. Out-of-School / School Community

- How do your students use technology at home?
- What type of devices do your students have access to at home?
- Have you seen any connections between the technology you have used in-
- school and how your students use technology outside of school?
- What technology platforms, if any, do you use to help your students outside of school?
- What digital spaces do your students participate in? (e.g. Facebook, Twitter)
- Do you ever attempt to connect their out of school digital literacy practices to their literacy practices in school? If so, how have you created those connections?
- How often do you talk to your students about their literacy practices?
- Do other teachers in your school reaffirm students' out of school literacy practices?

I now have a strong grasp of how you and your school utilize digital literacies. Thus, I would like to ask you some general, more personal questions regarding your views on standards and how you see technology playing out with your students.

D. General / Personal Opinions

- How do you see technology playing a role in your students' lives now and in the future?
- What digital spaces do you see creating bridges between students' in and out of school literacy practices?
- How is your school open to using technology especially at the middle school level?
- Your school has adopted the Common Core State Standards from what I have gathered, correct? Do the new Common Core State Standards allow your school to have more access to technology if the testing is all done on computers?
- How can teacher educators, like us, help other resistant teachers become more open to technology?
- Why do you think so many people only focus on the digital tools and not the literacy practice?
- What do you think the focus should be on when considering how schools should incorporate digital literacy practices in the classroom today?

E. Anything else?

May I call you again if I need more information? Also, please don't hesitate in contacting me with any questions that you may have. Thank you very much for your time and help shedding light on this important issue to me!

Appendix B

Code Book

Classroom	General classroom
ClassR	Classroom resources
ClassO	Out-of-classroom connections/resources
Class21	Classroom 21st century literacy skills
NonSup	General non-supportive
NonSupD	District nonsupport
NonSupS	School nonsupport
NonSupC	Classroom nonsupport
Sup	General supportive
SupD	District support
SupS	School support
SupC	Classroom support
Risk	General “at-risk” label
RiskLA	At-risk due to learning ability
RiskSES	At-risk due to SES

RiskR	At-risk due to race
Teach	General teacher comment
TeachP	Personal teacher comment

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An Online Inquiry Tool to Support the Exploration of Controversial Issues on the Internet

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Abstract

This paper describes a theoretically informed Online Inquiry Tool designed to support the exploration of controversial issues on the Internet. The tool's design is grounded in principles associated with theories of online research and comprehension, argumentation for learning, representational guidance, and cognitive load. The purpose of the tool is to help students organize, monitor, and regulate several complex cognitive activities likely to present challenges during online inquiry. Supports are embedded into the digital tool to help students plan their information search around a controversial issue, identify supporting arguments and counterarguments related to this issue, critically evaluate and synthesize information from multiple sources, and use a filled in representation of what they learned to organize and compose a cohesive essay.

Keywords: online inquiry, Internet, argumentation, representational guidance

Introduction

In contemporary society, learning from Web-based resources is a common classroom practice. Research suggests learning from online information requires students to locate, evaluate, compare, contrast, and integrate ideas from multiple sources (Leu, Kinzer, Coiro, Castek, & Henry, 2013; Rouet, 2006). When asked to explore online information involving complicated issues in society, mature learners also consider ideas from multiple perspectives and identify how different viewpoints are supported and opposed (Barzilai & Zohar, 2012). Unfortunately, many adolescents engage with online sources in a superficial and uncritical manner (Walraven, Brand-Gruwell, & Boshuizen, 2008) and they are unable to understand how to take full advantage of different points of view in order to learn and think more deeply about issues (Kirschner & van Merriënboer, 2013).

To prepare students for learning with information they encounter in complex online spaces, it is essential that we begin to design both digital and instructional supports. To date, there have been very few efforts in this area. Some researchers have created digital supports to scaffold students' ability to plan, regulate, and reflect as part of online inquiry (e.g., Stadtler & Bromme, 2008; Zhang & Quintana, 2012). Further, researchers in the field of argumentation have developed and tested representational tools to support students' collaborative argumentation skills (Marttunen & Laurinen, 2007; Munneke, van Amelsvoort, & Andriessen, 2003; Suthers, Weiner, Connelly & Paolucci, 1995). However, to our knowledge, no online digital scaffolds explicitly take into account the combined demands of exploring arguments while reading to learn in open Internet spaces. In this article, we introduce a newly developed Online Inquiry Tool and describe features explicitly designed to help students navigate the challenges of reading, thinking

deeply about, and synthesizing arguments across multiple and disparate sources while exploring controversial issues on the Internet.

Theoretical Underpinnings

The design of the Online Inquiry Tool is based on four theoretical underpinnings. First, we drew from a new literacies perspective of online research and comprehension (Leu, Kinzer, Coiro, & Cammack, 2004; Leu et al., 2013). This perspective frames online reading as a problem-based inquiry process that involves at least five complex practices: generating important questions, locating information, evaluating information critically, synthesizing information, and reading and writing to communicate learned information. Accordingly, these practices require new literacy skills and strategies over and above those required when reading and learning from printed books (Coiro, 2011). Elements in the Online Inquiry Tool are designed to guide students as they engage with these challenging online research and comprehension practices.

A second theoretical framing of our work assumes the critical role that argumentation plays in students' deep-level understanding of content and learning (Nussbaum, 2008). Argumentation refers to transactive reasoning aimed at investigating and evaluating evidence and alternative arguments (Kruger, 1993). Transactive reasoning involves the questioning, clarification, explanation, justification, and elaboration of ideas (Kruger, 1993; Munneke et al., 2003). Argumentation is particularly important when students explore open-ended questions with many alternative solutions and views of different stakeholders (Marttunen & Laurinen, 2006).

Because the Internet contains vast amounts of information with varying quality and purposes, the need for strong argumentation skills when reading online is even more pronounced. When using the Internet to explore a controversial issue (i.e., an issue about which there is more

than one set of beliefs), students need to carefully consider different perspectives, identify arguments, and critically evaluate the quality of writers' argumentation. Further, learners need to consider not only supporting arguments and counterarguments but also how to integrate them into an overall final position (Nussbaum, 2007). Consequently, a theoretical lens of argumentation for learning was used to frame elements within the representational tool, including prompts to guide students as they explore issues from multiple perspectives, search for relevant supporting arguments and counterarguments, and integrate these supporting and competing views to present their own informed opinion.

A third theoretical underpinning is Suthers' (2003) theory of representational guidance. Elements of a representational tool, or representational notations as described by Suthers, demonstrate a particular guidance toward practices considered beneficial for learning. Representational tools may provide elements that help learners construct, examine, and manipulate external representations of knowledge. Graphical representational tools may also help learners frame their conception of the task, make more explicit their relations between arguments (Suthers, 2001), and monitor their progress in the task (Veerman, Andriessen, & Kanselaar, 2002). Moreover, representational tools can mediate collaborative interaction by providing opportunities for learners to represent their emerging joint knowledge.

For the most part, representational tools used in previous research (e.g. Cho & Jonassen, 2002; Salminen, Marttunen, & Laurinen, 2010; Scheuer, Loll, Pinkwart, & McLaren, 2010; Scheuer, McLaren, Weinberger, & Niebuhr, 2014) are not specifically designed to support reading, analysis, and synthesis of argumentative online sources. In addition, they lack scaffolds to help learners critically evaluate the reliability of online sources or monitor their use of online sources needed to complete complex inquiry tasks (Leu et al., 2013). With this in mind, the

current tool was designed to support these central practices as students engage in online inquiry around controversial issues.

The fourth theory informing the design of the tool is cognitive load theory. Because all learners have a limit to their cognitive capacity, instructional design should optimize the load that directly contributes to learning (i.e., germane load), and minimize the load that is not necessary for learning (i.e., extraneous load) (Kester, Paas, & van Merriënboer, 2010). Online inquiry in argumentative contexts already imposes a heavy cognitive load on learners as they are expected to negotiate and organize multiple complex cognitive processes (Brand-Gruwel, Wopereis, & Vermetten, 2005; Coiro & Dobler, 2007). As a result, the tool's interface has been kept as simple as possible in order to minimize any extraneous cognitive load. The inquiry tool is specifically designed to optimize germane load, or the effort associated with processing new schema to construct a cohesive synthesis (Chipperfield, 2006). In essence, the Online Inquiry Tool provides learners with a carefully sequenced but flexible set of opportunities to monitor and control their cognitive steps toward deeper knowledge construction. This knowledge construction could be prompted by a number of different reading and thinking tasks. Here, we focus on how features in the tool could be combined with the exploration of controversial issues to support challenging elements of online inquiry and argumentation.

Previous Research on Online Inquiry and Argumentation Skills

Previous research has shown that students at a range of grade levels have difficulty with several aspects of online inquiry. On the Internet, students often quickly flutter from one piece of information to another without a proper plan (Kirschner & van Merriënboer, 2013). Some students struggle with locating relevant information online because they lack skills for using proper search terms (Guinee, Eagleton & Hall, 2003) or for how to revise their search strategies

when they encounter a problem (Kiili, Laurinen, & Marttunen, 2009). Students also struggle with critically evaluating the quality of information in online sources (Coiro, Coscarelli, Maykel, & Forzani, 2015; Kiili, Laurinen, & Marttunen, 2008; Walraven et al., 2008). However, Britt & Anglinskas (2002) report some evidence that even minor supports may improve students' critical evaluation skills. Others have found that students may possess the skills to evaluate information but they do not necessarily apply these skills without prompting (Walraven, Brand-Gruwel, & Boshuizen, 2009). In addition, it appears that integrating ideas from multiple web sources during online inquiry is difficult for readers (Goldman, Braasch, Wiley, Graesser, & Bridowinska, 2012).

Furthermore, both secondary school students and university students struggle with different aspects of argumentation. Many have difficulties identifying arguments and analyzing even single argumentative texts (Larson, Britt, & Larson, 2004) or critically evaluating arguments (Brem, Russell, & Weems, 2001; Larson, Britt, & Kurby, 2009). One of the major weaknesses in both oral and written argumentation is the lack of counter-argumentation (Knudson, 1992; Koschman, 2003; Leitão, 2003). There is a tendency to support one's own position with little consideration of opposing points of view (Nussbaum, Kardash, & Graham, 2005). Scaffolding systems embedded into instruction and digital tools have been found to help students develop a more balanced argumentation discourse that considers both supporting arguments and counterarguments (Newell, Beach, Smith, & VanDerHeide, 2011; Nussbaum et al., 2005).

Online Inquiry Tool

The representational tool, called the Online Inquiry Tool, is presented in Figure 1. Next, we describe how the tool is designed to support at least nine complex cognitive online reading

processes (see also Table 1) as students explore controversial issues on the Internet. For our purposes, a controversial issue is one about which "there is more than one set of firmly held beliefs" (CDIP Project, n.d., p. 2). Notably, in the context of an increasingly diverse student body and disparate collections of online texts, almost any issue has the possibility of being controversial. An example of a controversial issue for older adolescents might revolve around whether the use of social media increases or decreases one's quality of life while for younger middle school students, the issue might examine whether or not energy drinks should be sold in the school cafeteria. Specific prompts and visual spaces within the digital tool interface are designed to encourage learners to grapple with new ideas, understand opposing views, and articulate their own beliefs as part of their online inquiry.

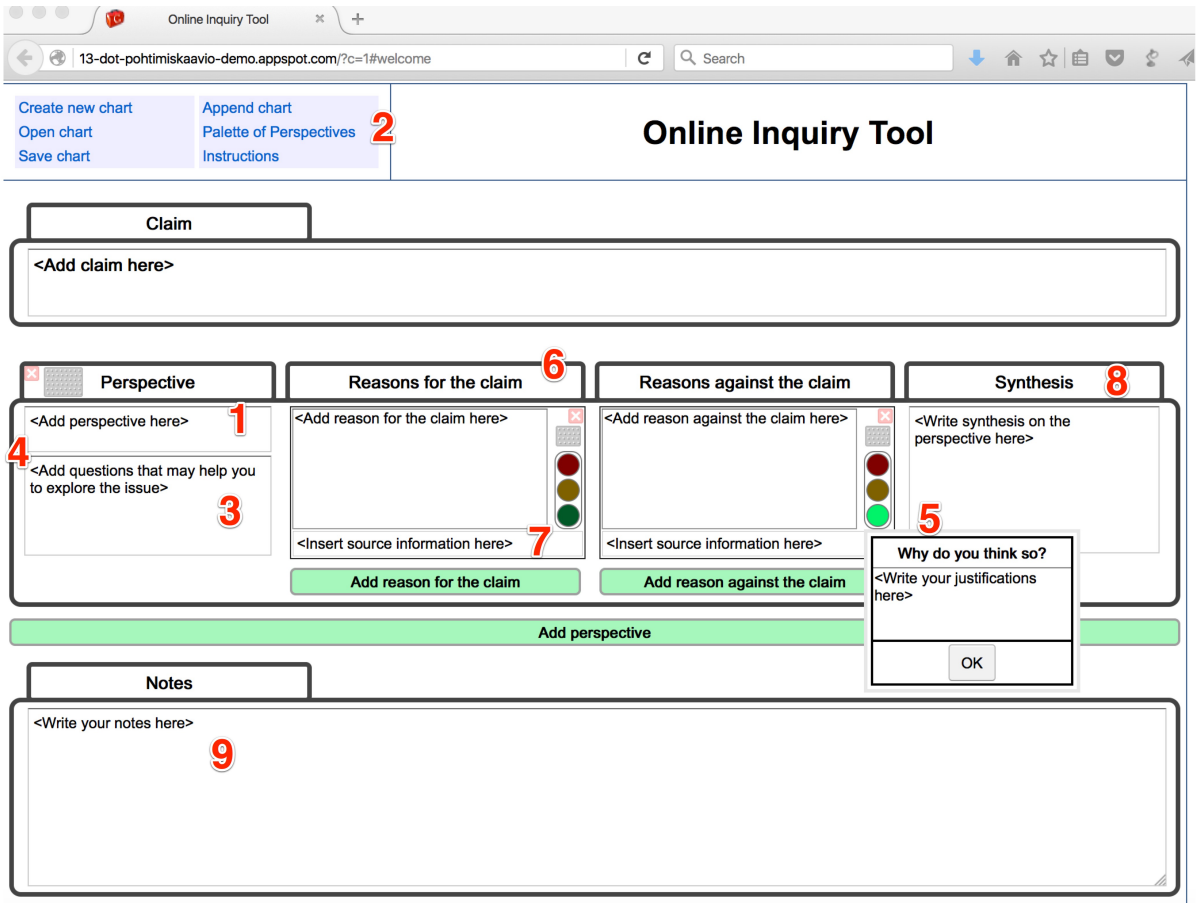

Figure 1: Screenshot of Online Inquiry Tool with embedded supports

Note. *Numbers 1-9 correspond to the nine embedded supports outlined in Table 1*

Supports for Planning Information Search

As students begin their web-based exploration of a controversial issue, they are offered a "Palette of Perspectives" to help them initially ponder the kinds of perspectives from which they could approach the issue at hand. When the link is selected (see the upper left corner of Figure 1), the pop-up palette (see Figure 2) highlights possible points of view to guide students' thinking toward suitable perspectives for their topic. This additional support was added to the tool when we noticed it was difficult for adolescents to think of possible perspectives around an issue without any help (Coiro, Kiili, Hämäläinen, Cedillo, Naylor, O'Connell, & Quinn, 2014). Once students choose a perspective to start with, they type it into the perspective box and formulate questions that help concretely connect that perspective to the issue at hand. Learners can then use these questions to guide choices of proper terms for their search queries. As they progress in their inquiry, students can click the green "add perspective" bar to add new perspective rows into their graph to represent their deepening understanding of the issue. However, the tool is designed to help students concentrate on one perspective at a time and thus, provide a proper structure within which to deepen their understanding.

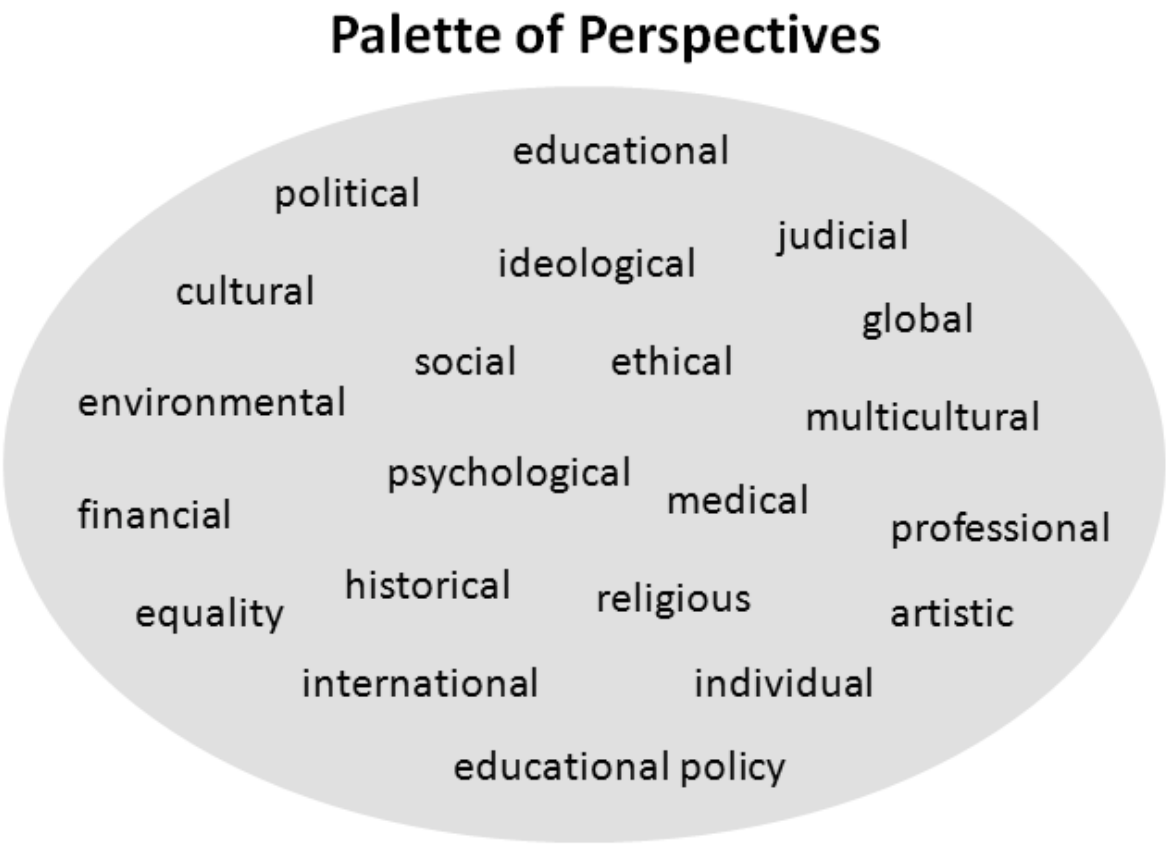

Figure 2: Supports to help students identify perspectives suitable for considering the topic at hand

Supports for Analysing Argumentation of Online Texts

Students' construction of the argument graph within the Online Inquiry Tool interface begins by writing an overall claim for inquiry against which they then reflect on related arguments found online. It is important that the claim is clear and unambiguous. Then, the tool encourages students to search for, identify, and organize reasons in support of the claim and reasons against the claim. This frame also helps students visually monitor and determine whether or not their argumentation is balanced (i.e., whether it includes both reasons for and against the claim within each perspective).

Supports for Critically Evaluating Online Information

The tool prompts readers to evaluate online information by asking them to judge the trustworthiness of their sources. First, they select the most fitting traffic light -- green indicates the source appears to be reliable, yellow warrants some degree of caution, and red suggests the information/source may not be reliable. Students justify their evaluations in a pop up box that appears after choosing the appropriate traffic light. Once the justification box is closed, the traffic light remains lit up as a quick visual reminder of their previous credibility evaluations. These quality indicators may, in turn, inform their selection of arguments to include in their final synthesis of each perspective. Students can also copy the URL-address into the box beneath each reason so they can easily return to the online sources they found earlier. Thus, the tool helps students record, organize, and revisit online information sources they found most useful.

Supports for Synthesizing Information

The URL-addresses students insert below each reason also help them monitor their use of online sources and whether they are relying on a single source or multiple sources in their argumentation. When students use the tool, synthesis processing is sequenced so that students can concentrate on creating their synthesis of one perspective using one limited set of source documents at a time. The tool's design visually prompts students to look across both sets of reasons concerning a certain perspective as they compose each segment of their synthesis, rather than asking students to list reasons in the sequence in which they were found. Concentrating on one perspective and on a limited amount of ideas may help students integrate supporting and competing reasons into a more coherent whole.

When students compose their final concluding synthesis (e.g. an essay) across multiple perspectives, the tool enables them to take advantage of efforts to synthesize previous information on a smaller scale without having to hold in memory the set of documents they

encountered at each different point in their search. Finally, students can print a report of their work and use it to help them develop a logical structure for their essay by following the sequence of perspectives and related insights they collected in their inquiry. Thus, the synthesis boxes serve as representational scaffolds to guide students' reasoning of supporting and competing views around a controversial issue from multiple perspectives.

Concluding Remarks

Online inquiry is a multifaceted practice that requires learners to organize, monitor, and regulate complex cognitive activities (Quintana, Zhang, & Krajcik, 2005). The Online Inquiry Tool is designed to support learners to handle these complexities when they are reading across multiple online sources. Table 1 summarizes the supports that are embedded into the digital tool.

Component of online inquiry	**Embedded supports**
Planning	1. Prompt readers to start the task by pondering perspectives from which to approach the issue at hand
	2. Offer readers a Palette of Perspectives to help identify perspectives suitable for the topic at hand
	3. Ask readers to formulate guiding questions that may help them recognize effective search terms

Locating information	4. Help readers structure their information search by concentrating on one perspective at the time
Evaluating sources	5. Prompt readers to rate the trustworthiness of each source with the traffic lights and use a pop-up box to justify their evaluations
Identifying arguments	6. Help readers focus on identifying arguments in source texts while encouraging them to search for both supportive arguments and counterarguments
Synthesizing information	7. Help readers record URL-address to monitor their use of online sources and easily revisit for details
	8. Allow readers to build a synthesis one perspective at the time and helps include arguments both for and against the issue with each perspective
Composing an argumentative text	9. Help readers develop the structure for their essay and move beyond their own perspective in their writing

Table 1: Supports embedded into the Online Inquiry Tool to scaffold a student's use of several complex cognitive processes during online reading and writing from sources

Given the range of other digital tools designed to support argumentation, several features highlight how this particular online inquiry tool is different. Probably the most unique feature is that the Online Inquiry Tool is designed specifically to scaffold learners both sequentially and visually through a series of overlapping online inquiry processes that research has suggested are quite challenging. By visually mapping cognitive prompts (e.g., a pop-up palette of perspectives, visual traffic lights, explicit questioning techniques) to particular boxes in the interface, students can use the organizer to fill in the appropriate content and automatically see how it relates to other ideas they gathered. Empty boxes with labeled prompts remind learners of often overlooked inquiry processes caused by cognitive overload; this feature easily highlights what still needs to be completed or which areas of reasoning could be better fleshed out before forming a conclusion. For example, after using the perspective palette to prompt discussion that considers a variety of stakeholders, the blank perspective boxes are designed to scaffold thinking beyond idea collection to a more abstract level of thinking required to generate common perspectives around these collected ideas.

While many argumentation and/or concept mapping tools are designed to illuminate students' argumentative discussions (Scheuer, Loll, Pinkwart, & McLaren, 2010), they are not explicitly designed for analyzing and generating arguments across multiple online texts. In addition, many interfaces expect students to generate content as well as the connections between ideas while not losing sight of the need to consider multiple dimensions of an issue. The Online Inquiry Tool combines explicit supports and visual markers around these challenging issues. Over time, the aim is that these overlapping processes and balanced considerations will become an internalized part of reading and reasoning across multiple online sources.

Another unique feature that pilot work (Coiro et al., 2014) has shown students and teachers find especially useful is the inclusion of blank boxes that prompt students to synthesize across the pros and cons of an issue from one perspective before considering how these ideas interact with those of other perspectives. Not only do the synthesis boxes prompt and simplify reasoning across multiple perspectives during inquiry, placement of the boxes also allows students to more easily transition to extended writing about these ideas after inquiry. Learners can use the vertical sequence of synthesized ideas as an initial organizer for their essays, and then be encouraged to look across these integrated ideas to notice original patterns that can inform a well-reasoned conclusion across perspectives.

By design, the tool's framework is relatively open-ended so that it can be used in different disciplines, for multiple purposes, and for building either individual or collaborative understanding. In a pilot study of the Online Inquiry Tool (Coiro et al., 2014), teachers designed tasks that invited students to explore controversial issues related to disciplines including history, language arts, science, and sociology. Some ways to use the digital tool in any of these disciplines include engaging students with a careful argumentative analysis of a single text, an analysis of an issue from multiple perspectives, source-based writing, decision-making, and/or preparation for a discussion or debate. Results of this study also suggested that different tasks support students' use of the tool differently. This finding aligns with Säljö's (2016) notion that it's not the digital environment that supports students' meaning making per se, but rather how we design tasks that direct students' engagements with the tool.

In addition, the tool can be used either individually or collaboratively. So far, the tool embeds supports to enhance collaborative knowledge building in face-to-face situations, but plans are now being made to integrate additional features that enable synchronous collaboration

with partners in different locations. Digital recordings of these interactions can also be used to gather evidence of previously hidden complex inquiry processes that precede and support performance on the final task (e.g., information search, relevance judgments, note-taking, and credibility evaluation).

It should be noted that presently, the tool features are grounded primarily in theory and our review of previous research around elements of online inquiry and particularly challenging dimensions of these practices for younger and older students.

We are currently testing the efficacy of the Online Inquiry Tool in both individual and collaborative learning situations in high school and university settings (Coiro & Kiili, 2014-2016; Marttunen & Kiili, 2015-2016). In addition, it is important to explore how the tool mediates collaborative interaction as well as possible drawbacks of using such a tool. With the help of the Online Inquiry Tool, researchers can form a better understanding of the complexities of online inquiry and further refine the tool and instruction to support students' knowledge construction and the ability to reason about real world issues from multiple perspectives.

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Multimodal teaching and learning: researching digital storytelling on iPads in the primary school classroom to develop children's story writing

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Introduction

This small-scale exploratory case study was undertaken in the summer of 2014. Its primary aim was to investigate whether using iPads to create multimodal digital stories can support children's motivation, confidence and skills in story telling, structuring and writing. A further aim was to explore the practical issues relating to making successful digital stories on iPads in a primary school environment.

According to Robin (2008), "Digital storytelling at its most basic core is the practice of using computer-based tools to tell stories" (p. 429). In the context of this study, the tools were iPads and the iMovie application. The resulting stories were short (2-3 minute) audio-visual narratives, consisting of voice recordings of children reading scripts they had written, combined with digitised images of their own drawings and other visual material and images from the internet. Opening and closing titles were the only form of written text visible in the stories.

The study was conducted over a four week period in an inner-city 3-11 Primary Community School in the north east of England. The participating Year 5 class (age 9-10) of 26 pupils was described by the class teacher as "very mixed", containing a range of attainment in literacy from PIVATS (Performance Indicators for Value Added Target Setting – for pupils whose statutory assessment performance falls below national expectations) levels to National Curriculum levels 5 and 6. Five children did not have English as their first language and four had Individual Education Plans for their additional support needs. One child was statemented and the education psychologist was involved with two more.

The class teacher had taken a systematic and highly structured approach to teaching story writing prior to the intervention. This included the children reading stories and breaking them

down to understand how they are constructed, as models for their own writing. There was close integration of spelling punctuation and grammar (SPAG) instruction. The children would spend half an hour each morning working on a SPAG topic such as extended noun sentence or personification and then write sentences using that feature in their own stories. It would take three or four weeks to write a full story in this way, incorporating the modelled devices and SPAG features.

In her view, this approach had led to some 'outstanding progress' in writing over the year, but she was concerned that the children's imaginative writing needed developing. She attributed this to her perception that, apart from a few girls, most children in the class did not read many books outside school and therefore lacked a sufficiently rich store of ideas and models to draw upon when it came to writing their own stories.

With reference to the ICT environment, the school had recently made iPads the central vehicle for ICT use in the classroom. Five iPads were permanently on charge in the classroom; they were used frequently and children were confident operating them. The room was equipped with an interactive whiteboard and digital projector with wireless AirPlay facilities for screening the completed stories. The class teacher had undertaken iPad training within school and was a confident user.

Theoretical framework

In the following section, the intention is to present a brief introduction to the forms and purposes of digital storytelling. An attempt is made to define what is meant, in the context of this study, by terms such as "multimodality", "text" and "traditional" and "new" literacies. Ideas about the "affordances" of digital storytelling and the powerful influences of digital devices such

as iPads on literacy will be presented, alongside a critique of recent writing development practices in the face of instrumental approaches to state-mandated education policies. It is not the intention to provide a detailed account of writing development theory and practice.

The model on which much digital storytelling practice is based was pioneered by the Centre for Digital Storytelling (CDS) in the USA, which focused mainly on adult and youth participants exploring significant personal experiences. In this tradition, digital storytelling is characterised as a democratic form of storytelling, allowing unheard voices to be heard and celebrating the "creative expression of the common folk, of the non-professional artist" (Lambert 2010, cited in Gregori & Pennock, 2012). The digital media tools used make it suitable for self-reflection, self-discovery and for exploring issues of identity, sometimes for therapeutic purposes.

However, claims are also made for the educational value of digital storytelling for young people and children in schools. Adding "digital stories that examine historical events" and "stories that inform or instruct" as categories to supplement the "personal narrative" genre pioneered by CDS, Robin (2008) claims it can be a "potent tool for students who are taught to create their own stories" (p. 431), helping to generate interest and engagement, social learning and skills such as research, communication and critiquing.

In making their digital stories, the children in this study were involved in creating multimedia, or rather, "multimodal" texts. "Text" here is taken to mean "anything that can be read and comprehended or constructed to share meaning and includes reading, writing, speaking, listening and viewing practices" (Skinner & Hagood, 2008, p.13).

This all-encompassing definition of text comes from a "new literacies" perspective, which recognises that literacy is no longer print-bound and that 21st century digital demands require the understanding and use of both print and non-print formats. This view has been formally accepted in the English language curricula of some education systems. Singapore, for instance, expanded teaching of the four language skills of reading, writing, speaking and listening to include "viewing" as a fifth (Churchill et al, 2008).

Andrews & Smith (2011) make a useful distinction between "multimedia" and "multimodal": "multimedia" refers to the vehicles through which communication is made – pen and paper, computer screen, mobile phone, radio, etc.; whereas "multimodal" refers to the different modes of communication – speech, writing, still or moving visual image, physical gesture, etc. According to Nordmark & Milrad (2012), digital technologies have been the cause of a "paradigm shift" towards multiple and especially visual modes of communication, meaning that "Speech and writing simply no longer suffice as sole means for understanding communication and meaning making" (Nordmark & Milrad, 2012, p.10). Andrews & Smith agree that "it is no longer possible to conceive of 'English' and writing development in terms of teaching and learning a single, monomodal system: written script" (Andrews & Smith, 2011, p.100).

Neverthless, Parry (2010) argues that literacy has for some time been a particular target of centrally regulated curriculum strategies such as the National Literacy Strategy, which in terms of writing placed a "strong emphasis on teaching grammar and spelling, word- and sentence- level objectives separated from their context" (Parry, 2010, p.63). Further, high stakes testing has encouraged teacher-led activities that leave little time for children to explore their

own ideas in independent writing. Andrews & Smith (2011) argue that this over-emphasis on writing as a *system*, which children clearly need to learn, nevertheless separates their writing from its contexts and purposes in the wider world; they argue that a new theory of writing development is needed that addresses this imbalance and places writing development within a theory of multimodality in a digital age.

According to Skinner & Hagood (2008), a social practice perspective of literacy recognises the sophisticated literacy competencies, cultural resources and purposes that children and adolescents bring to literacy learning. These include multimodal, digital texts related to popular culture that are "highly motivating, and, as such, can serve as valuable scaffolds for students' academic learning" (Skinner & Hagood, 2008, p.12). This expansive view of what counts as 'literacy' can empower boys who "revel in non-traditional school text" (ibid. p. 24). Robin (2008) argues that digital storytelling can support not only the traditional literacies of reading and writing print text, but a wider "Twenty-First Century Literacy", which includes visual literacy, information literacy, technology literacy, global literacy and digital literacy. From this perspective, literacy is "no longer an end point to be achieved but rather a process of continuously learning how to be literate" (Leu, 2001, cited in Brown, Bryan & Brown, 2005).

Yet national policies dictate that teachers focus "almost exclusively on foundational literacies, the literacies needed to be successful in school such as: decoding and reading comprehension of print-based texts; written composition of academic texts; and oral fluency with Standard English grammar and vocabulary" Skinner & Hagood, 2008, p. 13). According to Sylvester & Greenidge (2009) "state-mandated" assessments of writing have contributed to students identifying themselves as "struggling writers" and "Teachers who are ensconced in

inequitable literacy practices that limit students' writing opportunities to experiences that prepare them for testing … are, to a degree, silencing their students as writers" (p. 286). Their research shows that creating digital stories can be a motivating and engaging experience for different types of "struggling writers". For those who are reluctant to review or edit, making a "movie" gives their writing purpose and a more immediate sense of writing for an audience, which encourages them to write more clearly and critically. For those who are easily distracted from the solitary, linear task of traditional story writing, the multiplicity of interactive and often collaborative tasks involved in making a digital story absorbs the learner and reduces distractions. For writers who struggle with detail and plot development, the use of storyboards in digital storytelling helps them to visualise the unfolding of the story and reveals gaps in detail.

Similarly, in a study of the role of film and media in developing children's understanding of narrative, Parry (2010) argues that "When they are offered opportunities to create stories in a range of media forms, some children can demonstrate an understanding of story far richer than they can express in writing" (p. 69). She concludes that "children must be supported to draw on their holistic understanding of narrative in order to move from one media to another when reading and making their own stories" (p.58).

While practices that are prescribed by national strategies may be one reason for relatively limited use of multimedia digital technology to advance literacy, teachers' lack of technological know-how and confidence, along with concerns about equipment, infrastructure and support, may be another. With reference to digital storytelling, Nordmark & Milrad (2012) voice their concern that it is the 'digital' part that has received the most attention, and that this can alienate teachers. In fact, they argue, the technical features of digital storytelling can be very simple; it is

the story itself and the multimodal processes involved in telling it that should be the main focus. Their study centres on using mobile devices for digital storytelling in the form of smartphones and iPod Touch devices. They argue that these devices are already well integrated into children's lives and can offer unique affordances for the seamless integration of formal learning activities and informal play (and therefore for learning and self-expression), which the more stationary kinds of technology, such as PCs and laptops cannot provide.

With specific reference to iPads, Flewitt et al (2014) argue that such mobile digital devices are playing an increasingly direct and significant role in experiences of early literacy. As digital devices become more and more integrated into home and community life, children are becoming immersed in digital communication at the same critical period of their lives as that in which their literacy skills are emerging and their identities as learners are being formed. The devices act as cultural tools or artefacts, opening new "worlds" to children through which they "figure" whom they are: "As mediating artefacts, we posit that iPads are one of many cutting-edge, culturally powerful yet enigmatic technological tools with the potential to invoke empowering "figured worlds" for young learners concerning themselves and their attitudes towards literacy" (Flewitt et al, 2014, p. 3).

Method

Digital storytelling activities with the children took place over four consecutive Monday afternoons in the Year 5 classroom.

In week 1, the children were introduced to the project and shown a digital story that had been especially made to fit with their current topic on the wonders of the ancient world. Following further discussion and sharing of ideas, they were tasked with making their own

digital story. The stories were to be no longer than 3 minutes/350 words and incorporate sound (voice narration) and images (a combination of their own drawings and internet images). The story had to have a main character and be told in the first person, from that character's viewpoint, as the character undertook a journey to a real or imagined "wonder of the world".

The first step was to storyboard their ideas, using simple sketches to outline each stage of the story, as opposed to the detailed written plans they were used to making. Once completed, they were encouraged to tell their stories to a partner, using the storyboards as their structure, so they could hear what it sounded like. Writing up the story as a script was set for homework and the children were also given the rest of the week to complete their illustrations (full page, colour versions of the storyboard sketches) and to source other still images.

A group of six children (four boys and two girls) had been selected by the class teacher for initial training in how to make a digital story. The group was also the focus group for two interviews with the researcher. They were selected to reflect a range of ability in literacy and for having the necessary confidence to contribute in the interviews and to lead a group of their peers. They created their digital stories in weeks 2 and 3 and showed them to the rest of the class on the interactive whiteboard. Each member of the lead group then began the process of teaching four or five others to make their digital stories. By the end of week 4, all the completed stories had been screened.

Data collection

The case study was based on qualitative data collection methods, namely observations and interviews.

Observations

The researcher and the class teacher acted as participant observers during all the activities. This allowed the perspectives of both the "insider" (in this case the class teacher), who is in tune with the context and understands the significance of what is happening (Campbell et al, 2004), and the more general perspective of the "outsider-looking-in" to be reflected in the data, though the researcher's active involvement in the lessons quickly led to him being absorbed into the natural setting of the classroom as an "active-member-researcher" (Adler & Adler 1994, cited in Punch, 2009). Observation notes were compared and discussed immediately after the lessons and were written up as soon as possible afterwards by the researcher as a full narrative account of the lesson, with the addition of interpretive comments, questions and reflections.

The observations took place in the natural setting of the classroom and other areas where the activities took place. In this fluid and dynamic situation, observers noticed and recorded anything they felt to be relevant while simultaneously interacting with, supporting and managing the children. However, observations were also semi-structured in that observation sheets contained the following prompts, arising from the review of literature, as areas for investigation:

- Motivation & engagement (including the effect of multimodal learning on engagement)
- Imagination and storytelling ideas
- Communication skills
- Social learning
- Self-esteem

- Ease of use (of technology, for children and teachers)

Punch (2009) states that combinations of unstructured and structured observation approaches are possible, depending on the research purpose and context (p. 155). In this case, the research purpose, i.e. to test the hypothesis that there was potential value for the integration of digital storytelling into writing practice, and the research context of a short timescale, made some structure desirable, while at the same time leaving space for recording unanticipated phenomena.

Interviews

The researcher conducted two semi-structured focus group interviews with the six children who formed the lead group. The first was conducted at the start of the project, to capture their attitudes towards story writing in school. The second was conducted at the end, to capture their reactions to making and showing their digital stories. Both interviews took place in the respondents' natural setting, i.e. a classroom and the school library. They were recorded with the informed assent of the children, who had been told from the start that this was a research project and that they had an active role as co-investigators, helping us to identify what was positive or negative about digital storytelling. They knew we would share the findings with trainee teachers at the university, a role they could identify with through their past experiences of student teachers in their own classroom.

One advantage of using group interviews was that it enabled the researcher to gather data from children with a range of writing ability in a time-efficient manner. Group interviews can increase the comfort level of participants and be useful for revealing beliefs, attitudes and feelings (Wilson, 2009).

The researcher also conducted an evaluation interview with the class teacher. This was semi-structured in that an interview schedule was devised and followed. However, in line with the symbolic interactionist view "where the interview is seen as a social event based on mutual participant observation" (Punch, 2009, p. 152), the interview also became a dialogue in which both participants attempted to make meaning.

A thematic analysis of the transcribed interview and observation data was conducted using the themes identified in the literature review. At the same time, there was iterative and rigorous analysis of the data to identify any significant unanticipated themes.

Data analysis

In this section, the most frequently occurring and significant data from the thematic analysis are integrated with significant unanticipated findings to form four new themes for discussion:

- Motivation and engagement (including the effect of multimodal learning on engagement)
- Access to the curriculum (including streamlining of the composition process, imagination and storytelling ideas and impact on self-esteem)
- Social learning (including sharing and communication)
- Ease of use (technical and logistical)

Motivation & engagement (including the effect of multimodal learning on engagement)

Motivation and engagement levels were high throughout the four sessions:

> Fully engaged, discussing ideas and already talking through their story. Using iPads to research area and 7 Wonders. (Class teacher's observation notes, lesson 1)

> The overall atmosphere in the class was one of engagement and concentration on 'getting on' with the task – very task focused. (Researcher's observation notes, lesson 3)

This led to some notable individual successes, especially for some of the lower attaining pupils, as will be shown.

The quality of the stories provided another indication of the high levels of engagement. Some were notable for having used a great deal of vocal expression in the recording of the script. Others used quite sophisticated storytelling devices and structures, for example openings that immediately grabbed the viewer's attention and put the viewer inside the story. Many were lively and energetic stories, where the pictures worked effectively with the script to move the story along and some were quite mature in their understanding of narrative in a short video form. In adapting to this form, children showed they were able to build on the foundations provided by their usual story writing instruction and practice.

For the class teacher, the multimodal nature of the activities had a strongly motivating effect that in turn led to some high levels of self-organisation and independent learning. Each child made a storyboard, wrote a script, selected internet images to fit with the story, drew and photographed their own images, recorded their scripts and synchronised images to the soundtrack:

> It was the combination of everything together … they loved that because there wasn't time to get bored. It was literally like - next job, next job, next job - and their imagination just suddenly took off with them … They were almost organising themselves into little timetables, which was very interesting. (Class teacher, in interview)

This corresponds to Walsh's (2010) description of a naturally integrated and holistic learning experience.

The multimodal nature of the activities also appealed to the children:

> I enjoyed it much better because you are doing 3 different things. So you will draw your pictures, which is fun to make, then you do your writing which is only 350 words which isn't too much and then you do the fun part of doing your digital story so there's an order to it. (Madeleine, in group interview)

Scripts were written, but writing was not the only or dominant mode. Rather, it was one of a number of inter-related modes that were creatively combined to make a story. As Andrews & Smith (2011) suggest, multimodal approaches bring the act of writing closer to composition:

> by changing the emphasis to composing rather than writing, the pressure is taken off writing as a medium of instruction and as a system to be learnt. There is no doubt that it still has to be learnt. But when writing is seen as composition, the wider aperture brings colour to the act of writing. (p.136)

This, for some, clearly helped to move to one side a barrier. However, for a very small minority of boys, the loosening of teacher control and structure presented more of a challenge and one or two did not complete a digital story.

During the final lesson, one girl volunteered that she had downloaded and used iMovie at home and made three of her own digital stories. An impromptu show of hands followed, in which all of the 26 children present said they had access to a smartphone, iPad, or other tablet at home; 15 said they had also tried iMovie since starting the project. The researcher was wary of this evidence, given the mixed social and economic nature of the school catchment area and the possibility that children would not want to appear the "odd one out". However, the class teacher thought the numbers were credible, having had several conversations with children who were saving money from Christmases and birthdays to fund the cost of a device. A recent evaluation of an iPad project across a network of primary schools in Cardiff (Beauchamp & Hillier, 2014), indicates high levels of home ownership of technology, with all the parents surveyed (from a range of catchment areas) saying they owned at least one mobile device, 94% of which had internet capability and 55% of which were Apple iOS[8] devices, using the same operating platform as iPads. It is important to note however that this was a small-scale survey (52 parents in 4 schools).

Access to the curriculum (including streamlining of the composition process, imagination and storytelling ideas and impact on self-esteem)

There were wide variations in how easy or difficult individual children found it to generate ideas, but the difference was that all the children who normally struggle with writing completed a digital story:

> I think what was nice was you saw closure of each story, they had a middle, beginning and end. A lot of my children have fantastic starts but because it takes them so long to write it I never get an end. (Class teacher, in interview)

A particularly notable case was Thomas. Thomas was described by the teacher as having "brilliant ideas", but a block when it comes to writing things down, due to poor pencil skills and, as a result, experiences low self-esteem as a writer. However, he demonstrated an immediate connection and engagement with the concept of digital storytelling that led to swift progress in the first lesson and his "promotion" by the teacher to the lead group in the second lesson, following which he led a small group of four or five others, teaching them how to make their stories in turn: "His self-esteem soared, he even ran out of school telling his mum that it [his digital story] had been shown, you know, so brilliant!" (Class teacher, in interview). It has been shown elsewhere that when a teacher identifies a skill or interest of a child and values it, it can transform self-esteem and behaviour (Cooper, 2011).

Using storyboards as a quick, visual planning tool (as opposed to writing out at length the details of plot, character and setting) was a significant factor in helping children to establish the "narrative arc" for their story. It gave them a ready-made structure, which, in Thomas' case, he was then able to turn into paragraphs:

> he did such a fantastic story because he could write it on a storyboard so it had no writing on. And then he told me the story before he wrote it, it became so easy for him to do … it was his ideas and he even put them into paragraphs. I've never seen him write a paragraph, yet because he had a storyboard to choose [he was

> saying] "right, new paragraph for that box, that box…" (Class teacher, in interview)

Thomas explained how storyboarding helped him:

> when I'm writing a story I try to throw more and more words in. In that [a digital story], I can work out what I actually want to put instead of just describing word, describing word, describing word, describing word (Thomas in group interview)

This suggests that Thomas is aware of the requirement to make his story interesting through use of language, yet focusing on these technical aspects prevents him from executing his narrative ideas. This time, having quickly formulated the narrative structure in the storyboard, he was highly motivated to produce a written script, helped further by the fact that its purpose was to provide a soundtrack for his video, a medium he clearly understood well and felt confident about. Interestingly his script, when written, naturally incorporated rhetorical questions, exclamation marks, ellipses and colourful, action-oriented verbs that enhanced the narrative. He was also immediately conscious of mistakes in his writing when he recorded it, suggesting that there is the potential for later editing and improving for re-recording. Thomas' experience ties in with the view of Andrews & Smith (2011) that "An over-emphasis on form and structure tends to drain energy from the writing process which involves motivation to write, engagement with the audience, the formation of ideas or elements to be included and *then* a concentration on form" (Andrews & Smith, 2011, p.17).

Able writers who struggle to write imaginatively also benefited from a multimodal approach:

> Diana is a brilliant writer but she's very set in her ways, very gifted and talented, brilliant mathematician, but she cannot step away from the real world. She doesn't get fiction … she'll go "what's the point?" … but then working with her partner she suddenly got the ideas … about three pictures into the storyboard she changed it to hers. For her, the grin across her face - she got it, she knew what she was doing, she could succeed in it (Class teacher, in interview).

Children whose first language is not English experienced some success through the digital storytelling process. Philip, an English as an Additional Language (EAL) learner who also has serious learning difficulties, surprised and delighted the class teacher by completing a storyboard: "[Philip] was actually willingly writing sentences! - "the got hum dint see nofing." (Then when he got home, he didn't see anything). In Sept. he had no phonic knowledge" (Class teacher's observation notes, lesson 1).

Another EAL learner showed unexpected confidence and persistence while recording his story script on the iPad in the presence of two adults and two other children:

> I think it was lovely that David, who … didn't speak the first two years he was here, had the confidence to do that and yes there were gaps in it, but he kept going and it was just so moving … (Class teacher, in interview).

So "struggling writers" were motivated to complete their digital stories through a streamlining of the creative process (through the use of storyboarding) and the multimodal possibilities of the iPad device. It would be interesting to investigate whether prolonged use of these methods would result in further impacts on self-esteem and whether these children could begin to "reposition themselves as competent writers" (Greenidge & Sylvester, 2009).

Social learning

There were many opportunities for social and collaborative learning, including: sharing ideas in whole class discussions; sharing story ideas and responding in pairs and small groups; helping each other to record their scripts; instructing each other; and sharing completed stories on the big screen. It was particularly evident how respectful of each other the children were during the activities. They were silent when required during recordings and appreciative during screening. When the lead group of six became the teachers, their role as group leader was respected, even in the case of Thomas who, the teacher said, did not always find it easy to communicate with peers or be accepted by them.

Observations showed that the sharing of an iPad between four or five children led to highly collaborative learning. Stories were recorded and put together one at a time and all group members took an active part in supporting whoever was being instructed, offering encouragement and suggestions as to the best way of achieving certain effects. The activities seemed to encourage patience and sensitivity to each other's needs:

> I watched Olivia teaching David [an EAL learner] and noted how she talked everything through with him … While she pushed him along quite quickly, she was also very clear and patient in the way she explained things, checking by using questions what he wanted and checking at the end of each stage if he was happy with the results (Researcher observation, session 4).

This corresponds closely to findings from another recent iPad study:

> Staff in all settings commented on the children's collaboration around the iPad: they frequently and patiently shared activities, took turns, supported each other's learning and rejoiced in each other's successes. Teachers were able to build on this spirit of collaborative endeavour by sharing their achievements as a class' (Flewitt et al, 2014)

The project ended with each child's completed story being screened on the interactive whiteboard. This provided the teacher with many opportunities for individual praise and further enhanced, through the immediacy of the images and the authentic voices of the children, the atmosphere of sharing something important and an awareness and appreciation of each other. It is suggested here that this kind of activity helps to promote empathic relationships between children and between children and teacher, which are also very positive for learning (Cooper, 2011) and which therefore make screening one of the major affordances of digital storytelling.

Ease of use

Observations showed the children were adept at touch-screen technology and they adapted to a new application and picked up new techniques very quickly. iPads are very quick to load, thus saving time, and the iMovie application saves content automatically, meaning work doesn't get lost. The children were able to take photographs, source other images from the internet and record sound, all on the same device. There was easy wireless access to the internet, which also provided the children with inspiration and ideas for their stories as they researched the settings and sourced images.

As mobile IT devices, the iPads afforded great flexibility: for example, they could be taken into another room for recording when a quiet space was needed. This concurs with the findings of Nordmark & Milrad (2012), who note that "Adding a mobile dimension to the established methods of digital storytelling brings new scopes and innovative modes for producing and sharing stories and messages, both collaboratively and individually, regardless of time and place" (Nordmark & Milrad, 2012, p.11).

All of the above served to streamline a process that would have been more cumbersome with laptops or PCs and enabled children to develop their stories quickly, providing a sense of progress and achievement leading to further motivation.

Other themes arising from the data

Equality and diversity implications were evident in that not only did the activities empower the children with weaker traditional literacy skills, but they appeared to appeal to both genders equally.

From the teacher's perspective, the activities provided a rich array of opportunities for assessment, especially speaking and listening and the development of social skills. The potential for deeper learning through self-assessment should also be noted, in that the children often critiqued their results naturally, without being prompted, probably because their stories were more "real" and "there for all to see" on the big screen.

This idea of the stories as real objects may be significant in another way. There is something about the physical processes involved in making them and the satisfaction of creating a finished product that could be said to be similar to crafting an artefact. This has the potential to

appeal to children like Michael who said "I don't really like writing any stories because I am more like a practical person, so I don't like just sitting writing a story" (Michael, in group interview 1).

Conclusions

Dreon et al (2011) remind us that "the development of a curricular vision for technology integration requires that teachers see effective examples modelled" (Dreon et al, p.5). The acid test for evaluating this small-scale study was whether a busy Key Stage 2 class teacher would consider it worthwhile investing further time and effort to make digital storytelling a part of her future practice, or whether limited pedagogical benefits or technological issues would prove significant barriers to adoption. In the evaluation interview, the teacher was very positive about making it a part of her practice and had already thought of ways in which she would do this. She said she wanted to make digital storytelling a part of her core literacy teaching to support future writing development (the study had taken place as part of project work during "creative curriculum" time). She also described ways in which she would use it to support an engaging curriculum and further access to the curriculum for children with weaker literacy skills.

Teachers who are considering using digital storytelling might wish to consider the contributing success factors from this case when planning their own activities. The project was grounded in the topic the children were already working on, so themes and ideas for stories were stimulated by existing knowledge. Good story writing knowledge and practice was already embedded and helped them to link existing skills to the new medium. Showing them a model digital story helped them to envisage an outcome and using storyboarding as a planning tool streamlined the process and enabled weaker writers to realise their ideas. The IT infrastructure

facilitated the project and there was a good solution in place for screening the stories. Additional adult support (in this case, the researcher) was critical, firstly for training the lead group and secondly for managing the fluidity of the lessons as children worked at different paces and spread out in search of quiet areas to record their scripts. Ensuring that there are suitable spaces available for quiet recording is critical, as is planning in sufficient time for children to re-record when they make mistakes. Script writing and illustrating are also time-consuming and adequate time should be made available in class, rather than using homework time, which in this case meant that a small minority of children did not complete.

Implications for practice and further research

According to Dixon (2010; cited in Andrews & Smith, 2011), there was a "shut-down in thinking about writing development in the 1990s after the imposition of staged "progression" in high-stakes testing regimes" during which teachers' efforts to find the best ways of developing writing were "pushed aside in the interests of setting national tests" (p. 1). Teachers may wish to reflect on whether this narrowing of the writing curriculum means that the kinds of writing in which children and young people engage outside school are not valued in the classroom, thereby creating "a tension between the functions of writing in wider society and those in schooling and assessment" (Andrews & Smith, 2011, p. 4). They may wish to consider the potentially motivating effects of bringing the genres of writing in school closer to genres in the wider social world through working with multimodal texts, in which the paradigm shift from the dominance of written text and the book to image and the screen (Kress, 2003) is recognised. In this context, writing is no longer purely linear and sequential but requires students "to consider and understand features of design such as layout, composition, use of text and image or graphics […]

and the way these would suit a specific audience" (Walsh, 2014 p. 215). These are the "new literacy" skills which could empower some "struggling writers" because they are closer to their social and cultural experiences outside school.

In terms of further research, a longer study would be needed to investigate whether there is a sustained impact on motivation and whether there is the transformative potential for "struggling writers" to see themselves as competent writers. A longer timescale would also allow for exploration of what makes a good digital story and how the informal, multimodal approach used in digital storytelling can best be combined with the more formal approaches used in traditional literacy to improve children's story writing. The potential for developing reflective and deeper learning through self and peer assessment of digital stories could also be explored.

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Preparing Pre-Service Teachers to Use Internet Technology for Early Reading Skills: Insights from an Action Research Project

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Abstract

The purpose of this study was to explore how pre-service teachers applied technology pedagogical and content knowledge (TPCK) as they developed lesson plans for early readers. Qualitative analysis of the lesson plans and technology therein, along with a survey, checklist, panel interview, and project/presentation revealed how pre-service teachers used Internet technology, the sources from whom or which they learned about the technology, the criteria they used when choosing technology, and their perceptions of how technology training for early reading instruction could be improved. Themes were noted within and across the data sets with implications for teacher educators as they design pre-service teacher technology learning experiences in the literacy content areas.

Keywords: technology, pre-service teachers, teacher education, TPCK, literacy, reading

The Internet has the potential to radically alter instruction for early readers. Thousands, if not millions, of free teaching and learning tools are available to help teachers engage readers and individualize instruction. Little research exists, however, to drive the efforts of teacher educators in developing teachers who are aware and capable of implementing this technology into the literacy curriculum (King, Schenider, Kozdras, Minnick, Welsh, Brindley, Feger and Kurby, 2013; Stobaugh and Tasell, 2011). The aim of the action research described in this paper was to evaluate the efficacy of teaching initiatives in an undergraduate reading methods course designed to build pre-service teachers' competencies in integrating technology into early reading skills lessons. The research questions were:

1. To what extent and how did pre-service teachers use Internet technology in their lesson plans for early readers?
2. What sources did the pre-service teachers find most valuable for learning about technology for reading instruction?
3. What criteria did the pre-service teachers use when choosing technology for their lessons?
4. What perceptions do pre-service teachers hold regarding the technology training they received and how it might be improved?

The International Society for Technology in Education (ISTE), 2013, has identified the ability of teachers to integrate technology within specific content areas as an area of critical importance. This exploration of how pre-service teachers use, find, and choose technology, along with understanding their perceptions of what constitutes effective technology training, will provide information and ideas for other teacher educators who are committed to developing

teachers who can harness some of the potentiality of technology in the literacy content area by implementing it into early reading skills lessons.

Theoretical Underpinning

Technological, Pedagogical, and Content Knowledge, or TPCK (Harris, Mirsha, and Koehler, 2007; Mishra and Koeler, 2006), is the primary theoretical model underpinning this study. The TPCK model captures the challenges of teaching with and through technology. Each area of learning (technological, pedagogical, and content) is imaged as a separate type of knowledge, with overlaps between any two or all three forming other types of knowledge. Technology and content knowledge, for example, combine to form technological content knowledge (TCK) that "supports the decision-making processes and skills necessary to choose appropriate technologies to support content learning," while technology and pedagogy form technological pedagogical knowledge (TPK), or the ability to "design lessons and activities that use technology to assist in the acquisition of the content" (Young, Young, and Shaker, 2012, p. 26). Both TCK and TPK are relevant to a broad range of literacy education, because as teachers plan for instruction they need to make informed decisions in order to integrate and use technology effectively. Consequently, in this study, TPCK theory informs the integration of technology into early reading skills instruction.

Review of Literature

Both in-service and pre-service teachers are challenged in integrated technology into the curriculum, but there is indication that some types of technology training opportunities can make a difference. Teacher integration of technology in the curriculum is minimal (Leu, 2006; Stolle,

2008). Hutchison and Reinking, 2011, explored this phenomenon more specifically in the reading content area. In a large-scale nation-wide survey of classroom teachers who were members of the International Reading Association, they found that while the vast majority had access to computers and the Internet (86%), and technology support (98%), that few used technology in literacy/reading instruction. Only 20% used the Internet as a supplement or replacement for existing reading materials and instruction**,** 15% for tutoring, and 13% as a source of alternative texts. Many teachers who did not use technology cited lack of understanding and shortage of time to learn the technology as major barriers. Further analysis revealed that the teachers who *did* use technology for literacy instruction shared the characteristics of having a positive stance toward technology and a higher perceived self-competency rate.

Al-Ruz and Khasawneh, 2011, also reported a correlation between teacher technology competency and a higher usage rate, and noted further that the perceived quality of technology training received impacted the likelihood that they would put what they learned into practice. Other researchers have looked more closely at the qualities of effective technology training for teachers. They found that teachers feel more competent in using technology when they see modeling of specific examples of technology use in content areas and receive support and coaching as they learn to use it (McKenna and Robinson, 2005; Wepner and Tao, 2002). They are also more likely to integrate technology when they perceive that it is useful (Barcy and Barcy, 2008; Greer, 2008; King, et. al., 2013; Lambert and Gong, 2010; Stokes, Kaufman, and Lacey, 2002) and relevant to their content area (Ertner & Ottenbreit-Leftwich, 2010; Wepner and Tao, 2002) and when they have the opportunity to create instructional materials tailored to their students' specific learning needs (Angeli and Valanides, 2005; Polly, Mims, Shepher, and Inan 2010; Koeler and Mishra, 2005).

Like in-service teachers, pre-service teachers are more likely to use technology in their placement settings when they perceive that it has classroom applicability, although their decisions seem to be weighted toward meeting the minimum requirements set forth by the instructor (Vratulis, Clarke, Hoban, and Erickson, 2011), and they seem to veer toward using more teacher-centered technology (e.g. video presentation of material) even if they were fully engaged and felt competent in using more learner-centered technology applications (e.g. interactive learning games) (Graham, Tripp, and Wentworth, 2009; Vratulis, et. al., 2011).

These studies indicate that the extent to which both in-service and pre-service teachers integrate technology into the curriculum is at least partly dependent on the quality of training they receive. Effective training teaches them about specific curriculum-relevant technology so that they don't have to spend extra time finding and learning how to use it, is relevant to their immediate classroom needs, and helps them feel competent and confident. What this training might look like, for in-service and pre-service teachers alike is an area much in need of study. The purpose of this action research study, therefore, was to evaluate the efforts of a multi-faceted semester-long initiative designed to expose and encourage pre-service teachers to incorporate Internet technology into reading instruction. Qualitative data in the form of lesson plans and the technology referenced within, along with a survey, checklist, panel interview, and technology project presentations provided information and insight on the ways in which pre-service teachers used technology in their lessons plans, how they learned about that technology, the criteria they used in choosing technology, and suggestions they had for effective technology training. These insights may offer guidance to literacy teacher educators as we work together to ensure that pre-service teachers are adequately prepared to make use of the vast possibilities afforded by technology.

Method

Participants and Context

The participants in the study were twenty students in two sections of a junior-level, field-based literacy assessment and instruction course. They were in their second semester of an undergraduate teacher certification program in Early Childhood Education (PK-5) (n=17) or Special Education (PK-12) (n=3) at an open-access public teaching college located in an ethnically and economically diverse urban county in the southeastern United States. There were eighteen females and two males. Three students were African-American, one was of Hispanic heritage, and sixteen were White. Students ranged in age from 20 to 45 years old, with most in early to mid-twenties.

The pre-service teachers attended class on campus two hours and 50 minutes one morning of the week. In the campus portion of the course they learned about assessment, instruction, and technology for early readers. During the twelve weeks of field experience the pre-service teachers interned a total of 190 hours in 2nd and 3rd grade classrooms at one of six Title 1 schools within the same urban school district. In the first six weeks of the field experience each pre-service teacher assessed and informally tutored one early reader and assisted the classroom teachers in administrative and teaching tasks. Simultaneously, during the college classroom instruction part of the class, they learned how to access and use technology related to the needs of the student they were tutoring. The instructor implemented research-based practices by providing explanations for applying the technology that specifically targeted the content area (McKenna and Robinson, 2005; Wepner and Tao, 2002). Additionally, she incorporated research into her approach that suggested that technology use be modeled (Al-Ruz and Khasawneh, 2011;

Lambert and Cuper, 2008; Polly, Mims, Shepher, and Inan, 2010). Finally, in accordance with a social-constructivist learning framework (Vygotsky, 1978) and consistent with research on effective teaching of technology (West & Graham, 2007) she provided opportunities for peers to work together with coaching and guidance from the instructor.

Each instructor-led mini-lesson lasted about twenty minutes in each of five of the first six weekly class periods. These lessons included modeling, coaching, content-specific explanations, and the opportunity to use the technology for authentic purposes, all qualities reflected in the research supporting the likelihood of technology integration. In one lesson the instructor taught the pre-service teachers how to find lesson plans from Readwritethink.org. In another the pre-service teachers learned about making practice materials on Puzzlemaker.com and using ideas from Pinterest.com to create materials. On another day the instructor explained how to access high-interest/low reading level reading materials on Nationalgeographic.com and Timeforkids.com. There was another mini-lesson on how to develop interactive flashcards using Quizlet.com, Scholastic.com, and Proprof.com for interactive practice, and one on how to use Audacity.sourceforge.net to practice oral reading skills and perform reader's theater scripts. Additionally, the pre-service teachers worked in small groups to create a brochure of an assigned comprehensive reading skills website (bbc.co.uk, readingrockets.org, abcya.com, roythezebra.com, and starfall.com), which they presented and distributed to the class during one class period.

In the second six weeks the pre-service teachers developed and taught five lessons that were geared toward their student's specific reading skill needs. The rubric for grading the lessons had a scoring area for use of materials, that could, but did not require that they include

technology. Each pre-service teacher had access to an interactive whiteboard, the cooperating teacher's classroom computer, and at least three computers per classroom for student use. Additionally, there were 25 computers in each school library that were available to everyone. Each computer in the classroom and in the library was outfitted with a variety of software and website subscriptions, that included literacy-related applications on Brainpop, Accelerated Reader, Spelling City and Study Island. All schools had wireless Internet access throughout the building. The pre-service teachers could work with their assigned student in the classroom or library and had access to all of the school software when teaching and preparing lessons.

Data Collection and Analysis

The pre-service teachers' lesson plans provided insight on what technology they used in their lessons and the way in which it was used. A checklist determined the sources from whom or which they learned about the Internet technology in their lessons (see Appendix A). A student project/presentation (see Appendix B), three survey questions (see Appendix C), and the first question asked in a panel interview of six participants (Appendix D) offered perspectives on the criteria they used in choosing the technology. Two additional survey questions and the second question from the panel interview indicated the participants' perceptions of how technology training might be improved.

The lesson plan technology was sorted and tabled by participant, the name of each technology, and its purpose the within the lesson. In cases where the nature of the technology was not immediately apparent that technology was accessed and its qualities fully analyzed. Frequency counts provided an indication of how many times content area technology applications were used by each pre-service teacher across the five required lesson plans (Miles

and Huberman, 1994). After tabulating the total technology use per participant, the name of the technology, its type, and its purpose within the plan were decontextualized (Marshall and Rossman, 2006) by sorting and counting each column separately. Common themes within each data set were analyzed according to Tesch's (1990) model of open coding with a constant-comparative approach (Glaser & Strauss, 1967) as the categories were developed.

Seventeen of the pre-service teachers filled out a checklist**.** The sources from whom or which pre-service learned about the technology were determined by tallying the checklist responses for each category (Miles and Huberman, 1994) and triangulated by the first question in the panel interview. Seventeen of the twenty study participants filled out an open-ended survey on the technology they used in their lesson plans.

The brochure projects offered a glimpse into what the pre-service teachers deemed to be the most important qualities when choosing technology for learning. Students worked in small groups to explore the assigned comprehensive website list the broad and specific reading skills that could be learned and practiced using this site, decide what was special or appealing about that site and how it would appeal to children and teachers, and then create a brochure to "sell" their site to their classroom peers. Each group presented the brochures on the document camera and distributed copies to each class member.

How Did Pre-Service Teachers use Internet Technology in Their Lesson Plans? The twenty pre-service teachers had used technology applications in their lesson plans 156 times. Every student used technology at least six times and 70% of the students used technology over ten times throughout their five lessons. This technology use fell into six categories: interactive

practice, interactive learning, digital text, stand-in teacher, learning materials, and pedagogical knowledge. Each category is listed in Table 1 and explained in detail below:

Interactive Practice. Interactive practice made up 35% of technology uses. Interactive practice was distinguished from interactive learning by its place at the end of the lesson where the student was practicing a skill independently. These were activities with a clear beginning and end with a goal such as earning points, getting on a new level, or receiving verbal positive reinforcement. The interactive practice activities allowed for multiple attempts, provided varied levels of scaffolding, gradually increased in difficulty, and involved multiple modalities of learning.

Interactive learning. Interactive learning made up 29% of technology use, and was distinguished by its place within the lesson as an active opportunity for knowledge construction. Examples included a site where students could move animals to zoo pens labeled with their beginning letters, and one where the student would click on a picture, listen to a word, and click on the picture of the letter that made the beginning sound. A few pre-service teachers used technology as a tool for more student-centered teaching such as writing acrostic poems using an on-line template and discerning differences in prosody among characters in popular commercials.

Digital text. Twenty-five percent of total technology use served as reading material context for practicing or teaching a reading skill such as digital versions of written text that included high-interest passages, poems, songs, and raps.

Stand-in teacher. Introducing or modeling a skill or topic made up 16% of uses. The technology served as a passive means of information delivery, doing little more than taking the place of a lecturing teacher.

Learning Materials. Two percent of the technology was used to locate resources with printed learning materials to be used during or after the lesson, such as cut-and-paste activities, flashcards, puzzles, word finds, worksheets, and assessments.

Pedagogical knowledge. Two percent of technology was used in building the pre-service teachers' own background knowledge prior to the lesson. These included lesson planning ideas, directions for a lesson activity, and building teacher content knowledge, such as finding lists of phonograms for the student to learn.

What sources did the pre-service teachers find most valuable for learning about technology for reading instruction? The majority of the technology (57%) was found by the pre-service teachers independent of what they had learned about in the instructor-led mini-lessons. They had learned an additional 31% of the technology from peer project presentations and 12% from their field cooperating field experience teachers. The least amount of technology used was learned through the instructor mini-lessons (4%). These categories were repeated to the same general degree in the survey question answers (see Table 1)

What criteria did the pre-service teachers use when choosing technology for their lessons?

An open-ended survey, the brochure project, and the second question from the panel interview triangulated one another (Lincoln and Guba, 1985) in understanding the criteria by which the pre-service teacher chose technology. These findings are summarized in Table 1.

Criteria from survey data. Of the fourteen students who answered the questions about the sources they did and did not use, seven responses indicated that the source was "easy to use", seven said that they were "fun", three stated that they were the "best way to learn the topic", and two mentioned "lots of ideas/lessons". Five respondents put that they did not use technology that seemed "difficult", and three didn't use technology that they felt was "boring". Three said that they just didn't think to use it. One respondent felt that none of the technology met the needs of her students. The third question was "Do you plan to use any of the sources above in lesson planning for teaching literacy in your future classrooms? If so, which ones and why?" All seventeen of the survey participants responded to this question. The most frequently mentioned technology were the websites teacherspayteachers.com, pinterest.org, readwritethink.org, starfall.com, readingrockets.org, abcya.com, bbc.co.uk, brainpop.com, scholastic.com, flashcardmaker.com, mybrochuremaker.com and kidsnationalgeographic.com, and learning.org. Again, the purposes for using particular resources (from most to least common) were that they were "fun", had "lots of good resources", were "easy to use", and were "effective".

***Criteria from brochure project data*.** Descriptive words for what was "special" about their sites fell into categories of quantity/types of resources (5 groups); was easy to use (4 groups); had a novelty/fun factor (3 groups); had an attractive appearance (2 groups); could foster parent involvement (2 groups); could increase professional knowledge (2 groups); was free of charge (2 groups); offered the ability to interact (1 group); offered language support (1 group);

had many features (1 group); were developed by qualified professionals (1 group) and had high quality content (1 group). Within the the six brochure projects they listed that the sites offered interactive games (33 times), scaffolded reading opportunities (21 times), materials for learning (15 times), oral language and listening practice skills (10 times), skills practice (6 times), and contained professional development tools (3 times).

Criteria from the panel interview. The second question asked in the panel interview was "What were some benefits or non-benefits about using technology in your reading lesson plans?" The participants in the panel interview were in agreement that using technology in the lesson plans had many positive benefits. Individual responses were confirmed by the group as a whole, which included that technology helped them work efficiently with their early readers; provided more hands-on, interactive instruction; made learning interesting, and resulted in better lessons overall. This was reflected in comments like Shemika's: "The kids seemed to love it…it's easy to use and it keeps them engaged" and Stephanie's: "There is a lot to still learn, but I do like how its interactive and how much the kids enjoy it – their learning style and how it adapts to that."

What perceptions do pre-service teachers hold regarding how technology training might be improved? The fourth question on the survey asked, "Do you have any suggestions of other ways in which pre-service teachers could become knowledgeable about technology sources for literacy instruction?" Responses fell into categories of continued learning opportunities, more interactive training, more practice opportunities, presentations from peers, and more demonstrations by the instructor. This data was triangulated with the third question from the panel interview, which asked, "How can professors improve the quantity and range of

instructional technology used in literacy lesson plans?" The interview participants thought that professors could improve the quantity and range of instructional technology used in literacy lesson plans by providing continued learning opportunities, including workshops on the basics of using technology for those who needed help. The interview participants also suggested providing interactive training where they could follow along with their laptops as the instructor demonstrated. They suggested more opportunities for practice, and peer-to-peer teaching.

Table 1: Themes Within Data Sources

	Research Question #1: Technology Uses	Research Question #2 Sources from Which Technology was Learned	Research Question #3 Criteria for Choosing Technology for Lessons	Research Question #4 Suggestions Regarding Training
Data Source	Lesson Plans	Checklist/ Survey	Survey/Brochure Project/Interview	Survey/ Interview
Number of Participants	20 with 5 lesson plans each	17/17	17/20/6	17/6
	Interactive Practice (35%)	Found independently (57%)	Easy to Use (50%) / Not Difficult (29%)/Easy (6%)	Continued learning opportunities (29%/100%)
	Interactive Learning (29%)	Peer Presentations (31%)	Fun (50%)/Not Boring (18%)/Fun (12%)	Interactive training (6%/100%)

	Digital Text (25%)	Cooperating Field Experience Teachers (12%)	Best Way to Learn the Topic (18%)	More practice opportunities/ (12%/100%)
	Stand-In Teacher (16%)	Instructor Mini-Lessons (4%)	Lots of Ideas (12%)/Variety of Ideas (24%)	Peer teaching (12%/100%)
	Learning Materials (2%)		Just Thought to Use It (18%)	
	Pedagogical Knowledge (2%)		Met Needs of Students (6%)/Effective Resources (18%)	

Discussion and Implications

Pre-service teachers seemed enthusiastic and flexible in how they used Internet technology for teaching early reading skills. Everyone used technology in her lesson plans multiple times and for different purposes in the lesson, and the most common theme mentioned for improving technology training was that they wanted to learn more. They used technology in the beginning and middle of the lessons as a means of interactive learning and at the end of the lessons for interactive practice, and some accessed digital texts to use throughout the lesson. That technology was used in an interactive and learner-centered fashion was an encouraging find in that research supports teaching approaches such as this for early readers (see Roschelle, Pea, Hoadley, Gordin, and Means, 2000 and Rose and Meyer, 2002, for example).

Most of the technology used in the lesson plans was learned from peers or found independently. The peer-created brochure project and presentation assignment seemed to be a

worthwhile endeavor to expose themselves and their peers to the features of websites they could use in their lessons. Since so much of the technology was found independently teaching the skills involved in finding and critiquing technology may be more aligned with pre-service teachers preferred ways of learning and more relevant to the ever-changing technology environment.

Interestingly, very few of the mini-lessons offered by the instructor seemed to inspire the pre-service teachers to use that technology in their lessons. When looking back over the instructor-led mini-lesson topics (on the checklist in Appendix A) a common characteristic became apparent: the technology from the mini-lessons all required preparation, whereas most of the technology used by the pre-service teachers was instantaneously available for use in the lessons. To some extent this phenomena also explained why few pre-service teachers used the resources listed on the class website. Going to the course D2L site to access these suggested websites and spending the subsequent time to go through them also required some extra effort, even if the sites themselves held instantaneous interactive experiences.

The criteria used in the decision-making process supported these themes. The most common theme throughout the criteria was that the technology they chose was “easy to use”. The pre-service teachers did not elaborate on what they meant by “easy” but no doubt being able to access the activity instantly rather than having to do preparatory work was probably a major factor. Another major theme was “lots of variety”. Again, they saved them time and effort when all that they needed was on one site. Another word that occurred repeatedly in the data was “fun”. This criterion supported the data showing that technology was used primarily for interactive teaching and learning activities, which were most likely engaging and highly motivating to their students. Efficiency and engagement, while important, are not the only

considerations when choosing appropriate technology for lessons. Teaching pre-service teachers to critically evaluate Internet technology is an important next step, especially since so much of what they used was found independently. Research is needed to adapt existing or develop new criteria specifically for evaluating technology in the reading area (among other content) and in how to teach that criteria to pre-service teachers.

The idea of interactive and engaged learning came full circle in the pre-service teacher recommendations for improving technology training. They wanted more opportunities to learn and practice technology but through interactive opportunities independently or with peers rather than having more instructor-led mini-lessons. This finding refutes the notion that the same conditions under which in-service teachers are likely to adopt the technology applies to pre-service teachers. Despite the efforts of the instructor in this study to emulate the research on successful in-service technology training (by modeling specific examples of technology use in the content area, providing support and coaching, and showing how the technology was useful and relevant to the specific needs of their students), the pre-service teachers adopted very little of the technology in which they had been instructed.

In sum, the pre-service teachers in this study embraced technology and enthusiastically used it to make learning engaging. They looked for the most efficient ways of finding and using technology, embraced technology presented to them by their peers, and explored and learned about technology on their own. Action research is needed to explore the effects of peer-based learning opportunities such as the brochure project. Additionally, the limited criteria they used in choosing the technology points to the fact that pre-service teachers need training not so much in what technology to use but in how to qualitatively assess the technology they find beyond the characteristics of “fun” and “easy”. Action

research, therefore, is also needed in how to teach pre-service teachers to apply more appropriate criteria in making their selections.

Limitations

This study is subject to the limitations inherent in qualitative action research. First, when the instructor of the course and the primary (and only) investigator are the same person, bias may infiltrate interpretations of data. Efforts were made to examine and re-examine the data findings to ensure a logical chain of progression that best supported the interpretations (Lincoln and Guba, 1985). However, bias from knowing the participants and having created the course activities and assignments may have colored the findings. Secondly, self-reported data is sometimes not reliable. Despite efforts in this study to triangulate multiple data sources the pre-service teacher participants may have said things to please the researcher or refrained from saying thing that they believed might not please her. The enthusiasm expressed in the interviews and surveys, therefore, may have been inflated. Finally, this study took place within one classroom setting and is thus not generalizable, although the findings may be transferable to the experiences of instructors teaching similar reading courses to similar populations of pre-service teachers. All of these limitations point to the need for more action research to bolster these findings and possibly some naturalistic inquiry where the researcher and the classroom teacher participant are not the same person.

Conclusion

The purpose of this action research project was to explore Technology Pedagogical and Content Knowledge (TPCK) in the literacy content area to evaluate and refine current practices in the classroom. Wepner, Ziomek and Tao state that teacher educators "…need to see ourselves as catalysts for change because of the nature of our positions as leaders of educational thought

and practice; in other words, the impetus and incentive for students to think of technology as an essential component of their teaching" (2003, p. 60). This initial foray into how pre-service teachers choose, use, and learn about technology for teaching early reading skills may provide insight for other teacher educators as they explore pertinent and effective techniques in creating technology-based learning experiences. This study and others like it serve to interpret TPCK in the context of reading instruction and further the goal of preparing teachers who possess the ability to enhance reading instruction in the myriad of ways that technology has to offer.

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Appendix A

Technology Checklist

Thank you for agreeing to participate in this study. This semester you may have used technology for teaching and/or learning in your literacy tutoring lesson plans. As best you can, please put a checkmark next to the sources from which you learned about that technology:

_____**Searched independently on the Internet (including tablet apps)**

_____**Found independently as a link from another site**

_____**Found in textbook for this class from this semester**

_____**Found in textbook from another semester or class**

_____**Found in a professional journal or other teacher book you found on your own**

_____**Explained at your field school this semester as a professional development session**

_____**Learned about from cooperating teacher or other teachers at field school**

_____**Explained by peer but not as part of an assignment for class**

_____**Explained by peers in the Internet site brochure/ presentation.** (abcya.com, bbc.co.uk/schools, roythezebra.com, readingrockets.org/strategies, starfall.com)

_____**Explained by professor and used in your own college classwork** (scholastic.com flashcards, proprof.com flashcards, puzzlemaker.com, pinterest.com)

_____**Explained by professor and practiced as part of an in-class group project** (Word or scholastic.com brochure maker, audacity.com)

_____**Explained but not used in instruction by your classroom literacy professor** (prometheunplanet.com; readwritethink.org; freereading.net; montessorimom.net; rigginst.org)

_____Looked through the list of technology resources instructor posted on D2L but did not model or explain.

ilovethatteachingidea.com

wordgametime.com/grade/1st-grade

pbskids.org (Sesame Street and Between the Lions)

ldshomeschoolinginca.org/vft.html

kids.nationalgeographic.com/kids/

reading.ecb.org/teacher/strategies.html

http://teacher.scholastic.com/activities/scrapbook/

http://www.khake.com/page96.html

http://interactives.mped.org/view_interactive.aspx?id=110&title=

http://landmark-project.com/evaluation/dic1.php

http://www.readwritethink.org/files/resources/interactives/flipbook/

http://www.worksheetworks.com/miscellanea/graphic-organizers.html

_____Can't remember

_____Other (please explain)

Appendix B

Brochure Project Directions

You will create a brochure to convince the rest of the class to "use" your assigned website in their classrooms.

1. First, explore your website and take notes on what kind of resource(s) it offers (e.g., videos, interactive games, etc.)

2. Secondly, list the broad and specific reading skills that could be practiced using this site:

    concepts of print

    alphabet recognition

    phonological awareness (phonemes)

    phonological awareness (graphemes)

    word families

    sight words

    fluency

    comprehension

3. Under the broad category list the specific skills that can be practiced on this site.

4. Next, decide what is special about your site and how it will appeal to children and what will appeal to teachers, for example:

5. Put all these things into a brochure and decorate it. You can print it out and decorate or decorate with printer colors.

5. Present it to the class and make copies of the brochure to hand out to your classmates.

Group 1: http://www.abcya.com

Group 2: http://www.bbc.co.uk/schools/

Group 3: http://www.roythezebra.com/reading-games-word-level.html

Group 4: http://www.readingrockets.org/strategies/

Group 5: http://www.starfall.com/

Appendix C

Survey Questions

Please explain why use chose the sources you chose and didn't choose.

1. The sources I DID choose:

_____

2. The sources I DID NOT choose:

_____

3. Do you plan to use any of the sources above in lesson planning for teaching literacy in your future classrooms? If so, which ones? Why?

4. Do you have any suggestions of other ways in which pre-service teachers could become knowledgeable about technology sources for literacy instruction?

5. Do you have any other comments?

Appendix D

Panel Interview Questions

1. What were some benefits or non-benefits about using technology in your reading lesson plans?

2. If you did use technology in teaching and/or learning, explain how you learned about that technology:

3. How can professors improve the quantity and range of instructional technology used in literacy lesson plans?

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Evidence of New Literacies in Seniors' Health-Related Literacy Practice

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Cultural assumptions about senior citizens' abilities to use technology often are pessimistic and disparaging: we either assume seniors cannot use technology or are surprised when they can. For instance, in a 2014 article in the popular online magazine Mentalfloss.com, the author describes a video that captures seniors' first-time uses of the then-new technology, Google Glass. Patronizingly titled, "Adorable Elderly People Test Out Google Glass," the author alternately pokes fun at the older users' reactions ("the results are hilarious") and expresses surprise at their facility ("some of them actually know it's Google Glass!") (McCarthy). This blatant fun-making of seniors' efforts to use technology is acceptable discourse in our culture, and this discourse can affect how seniors are viewed and treated. Studies on age and technological literacy practices are beginning to deconstruct these stereotypes and complicate our understanding of seniors' uses of technology. In this article, I continue that deconstruction by presenting data that shows seniors' complex, nuanced uses of new media as they acquire health literacy.

In this study, senior participants were asked to talk about the literacy practices they use to explore health concerns or other bodily issues. The literacy practices were defined only as "reading and writing" activities that somehow relate to their bodies. What's striking is that in the course of discussing their literacy practices, seniors described using a variety of media to obtain health literacy, including listening to iTunes, attending seminars, and searching Google. Seniors' descriptions of these activities reveal what Knobel and Lankshear call a "new literacies mindset" (Knobel & Lankshear, 2007; Lankshear & Knobel, 2011), meaning that they are enculturated into the new media landscape. This finding characterizes seniors' uses of technology as more complicated than is typically depicted in our culture and prompts additional research questions

regarding the development of technological literacy programs for seniors and the depiction of seniors and technology in popular culture.

Seniors' Complex Relationship with New Media

Much of the research in rhetoric and composition about seniors' literacy practices has focused on their practices with technological literacy. For example, McKee and Blair (2006) provide technological literacy programs for seniors, recounting national statistics that show how older adults are less likely to use computers. They write, "older adults who do not use the Internet are at an increasing disadvantage in terms of developing social relations, participating in civic discussions, and gaining valuable knowledge on issues such as health care" (p. 14). McKee and Blair note that a lack of technological literacy is partly to blame for this shortfall in the senior population. Their experiences working with senior technological literacy programs show that there are a number of "barriers" to seniors acquiring technological literacy including health and physical limitations, financial restrictions, and internalized ageism that results in a lack of confidence. McKee and Blair provide some suggestions for developing programs that help to break down these barriers and to capitalize on the benefits that they have seen flourish in their programs.

The internalized ageism that is a barrier to technological literacy (McKee & Blair, 2006) has been found to be prevalent in media marketed directly to seniors (Bowen, 2012). Lauren Marshall Bowen systematically analyzed AARP publications and social media posts to examine the ways they represent seniors' uses of technological literacy. She found that the publications "promoted discourses of fear, reinforcing the widespread idea that old people are, or else should be, afraid of new technologies" (p. 450). She provides examples of AARP articles that show the

dangers of technology and that perpetuate the idea that seniors' mental abilities are weakened with age and that seniors are vulnerable to online scams.

This study shows that when seniors talk about reading, they talk not only about decoding text on paper and screen, but they also include in their discussion of reading a variety of media that does not include the decoding of text. In other words, when asked, "Do you read about health, exercise, or the body?", participants often mention specific print linguistic texts that they read, but sometimes they include non-print linguistic texts in their discussions. This response happens throughout a number of interviews and therefore became a category that was further explored within grounded theory analysis. A close analysis of some of the conversations about these other-than-print "readings" reveals that seniors' literacy practices are heavily influenced by new media and show a sophisticated facility with digital technologies that so often is presumed to be outside of seniors' capabilities.

Theories on new media show that compositionsts' interest in digital technologies is undergirded by the fundamental question of how digital technology affects the ways we think about and value texts and literacy practices. At issue are not the flashy images or tools that we can add to texts, but the questions about what changes in humans' engagement with texts when digital technology is introduced. Thus, inquiries into new media are not questions about digital texts, but questions about how writers and readers engage with texts – all texts – in ways that are influenced by our contemporary digital environment.

Ann Frances Wysocki (2004) defines "new media" by the ways writers think about their text construction. Writers create new media texts when they are aware of the "materialities of texts" and to exert agency over materials – the stuff of which texts are made, as well as the

structures in which texts function – to change how texts get constructed and what that construction communicates. She writes,

> we should call 'new media texts' those that have been made by composers who are aware of the range of materialities of texts and who then highlight the materiality: such composers design texts that help readers/consumers/viewers stay alert to how any text – like its composers and readers – doesn't function independently of how it is made and in what contexts. Such composers design texts that make as overtly visible as possible the values they embody. (p. 15)

Wysocki goes on to say that "new media texts do not have to be digital," but that new media texts are ones whose materialities are made apparent and "contribute to how [the text], like its producers and consumers, is read and understood" (p. 15). New media texts are ones that provide evidence that the author considered the materiality important to the message, and that the reader should be aware of this, too. Wysocki writes that we can think in new ways about materialities in part because of the advent of new technologies that allow for texts to be constructed on screen and on paper in a variety of ways.

Similarly, Bolter & Grusin (2000) emphasize that "new media" is not simply adding a digital component to existing media, but it is a transformation of the way in which the media is used:

> The World Wide Web is not merely a software protocol and text and data files. It is also the sum of the uses to which this protocol is now being put: for marketing and advertising, scholarship, personal expression, and so on. These uses are as much a part of the technology as the software itself. (p. 16)

New media, Bolter and Grusin write, encapsulates more than digital components of a technology. It also includes how writing and reading are done differently within the context of what we have constructed new technologies to do.

Knobel & Lankshear (2007; 2011) use the term "new literacies" to describe texts that are produced with a new mindset that has been facilitated by technological change. They write that new literacies are marked by a "new mindset," or "new ethos stuff." They argue that new literacies are practices that promote a mindset that is open, fluid, participatory, and egalitarian, and that has been facilitated by technological change. A literacy practice is new if it promotes a new way of thinking about texts as fluid, shared, and able to be remixed. On the other hand, the old mindset is determined by an allegiance to print, authorship, and strict boundaries that define what is and is not text.

Knobel and Lankshear's new literacies mindset that they term "new 'ethos stuff'" (p. 7) includes anything that prompts a new way of thinking about the literacy practice that one is using:

> New literacies are more 'participatory,' 'collaborative,' and 'distributed' in nature than conventional literacies. That is, they are less 'published,' 'individuated,' and 'author-centric' than conventional literacies. They are also less 'expert-dominated' than conventional literacies. The rules and norms that govern them are more fluid and less abiding than those we typically associate with established literacies. (p. 9)

This "new ethos stuff" can be characterized by a new mindset that embraces the free flow of information and finds value in something that can be widely disseminated (Knobel & Lankshear,

2007). This mindset contrasts with an old mindset that sees text as scarce and thus valuable in its scarcity. They describe how the new mindset is egalitarian, where everyone is an author or collaborator, taking bits of culture and refashioning them into new texts; the old mindset is hierarchical, where the author is a central authority and the distribution of information is based on a model of ownership and unevenly distributed power relations. The new mindset is characterized by its freedom of exchange and use of information, artifacts, and texts to construct new artifacts and texts, and its focus on relationships: people engage in textual production and consumption in order to connect with others. Knobel and Lankshear (2007) call instances of literacies that share both new technology and a new mindset "paradigm cases of new literacies," while those that have only a new mindset are "peripheral cases." In the latest edition of their book, they describe both cases of new literacies as ontologically new, while only paradigm cases possess the "new technical stuff" (2011). On the other hand, literacies that simply redraw a print linguistic text in a digital form and that do not promote the new mindset are not to be considered new literacies.

Knobel & Lankshear's term "new literacies," Wysocki's definition of "new media" and Bolter & Grusin's concept of "new media" align insofar as the concepts refer to texts that have been facilitated by technological change and yet that do not necessarily require technological materials to qualify as new media. The terms relate to this study for the same reason they relate to each other: they articulate the importance of a new way of thinking about texts that is facilitated by technology.

By examining participants' talk about reading, we can see that seniors' conceptualizations of literacy are influenced by the contemporary digital landscape. Specifically, seniors' talk shows

that they oscillate between an old literacies and a new literacies mindset (Lankshear & Knobel, 2011). This also shows that seniors, traditionally thought of as having an "old" mindset, in fact may be at the forefront of engaging with new literacies alongside the "young people … who are now adolescents, [for whom] cyberspace has been integral to their experience of 'spatiality' since their early years" (Knobel and Lankshear, 2007, p. 9).

Methods

In this study, I interviewed participants who were recruited from two senior centers located in mostly white, middle-class neighborhoods in the Midwestern United States. I recruited 12 seniors ages 60 to 80 – two-thirds of whom are female – and recorded conversations with them about how they use literacy practices to manage the body. Semi-structured interviews, which averaged 57 minutes in length, were digitally recorded and transcribed, and the analysis was based on those transcriptions.

I used grounded theory to analyze the data, identifying a number of themes to categorize the ways seniors discuss reading about the body (Corbin & Strauss, 2008). Grounded theory is an analytical process where the researcher reviews the data multiple times and allows for categories that answer the research question to emerge from the data. The data is then coded based on the categories, and the categories are refined to accommodate the nuances of the data. The analytical method allows for complex categories to emerge that otherwise would not be discovered if the researcher approached the data with a preexisting lens.

This study's analysis revealed that when seniors describe reading about the body, they describe it in three ways:

- participants characterize how they use reading to make bodily changes;
- participants discuss obstacles to reading; and
- participants make statements that complexly define reading.

In the third category, two sub-categories emerged. More than half of participants made statements that complexly define reading either by (a) broadly defining literacy practices as including media outside of encoded text, or by (b) identifying a time when they read about the body or health, but then underscoring that it doesn't count as "reading." This article focuses on subcategory (a), which emerged in the interview transcripts of one-third of participants. This argument presents the most salient examples from two of the participants as a way to examine in-depth the complexity of individuals' experiences with and conceptions of literacy practices.

The study is limited in its generalizability because of the number of participants. However, close analysis of a small number of samples can provide researchers with a level of detail and nuance that a larger, generalizable corpus may not allow for. The study also is limited in that the category analyzed here appears in only one-third of participants, yet this low frequency should not deter analysis. Part of the reason for low frequency may be that the interview questions were not designed to extract this category from the data. This is the double-edged sword of grounded theory: categories emerge that were unanticipated at the time of data collection, which allows for a breadth of findings; yet because the findings were unanticipated while data was collected, instruments were not targeted to the phenomenon that ended up emerging. An additional step in grounded theory analysis calls for the application of a category to a new set of data, and a future study might examine this category further.

Results

Participants responded to questions about reading practices with descriptions of non-reading activities. The chart below describes the participants, their gender, age, reader's purpose, and the "reading" activity alternative to decoding text.

Participant	**Gender**	**Age**	**Reader's Purpose**	**Activity**
Charlotte	F	72	To learn about yoga	Speaks with yoga instructor
Ernest	M	80	To learn about health and science	Listens to reports on iTunes
Kay	F	66	To learn about weight management	Attends a seminar
			To learn about heart health	Speaks with sister Attends a seminar
Mildred	F	80	To learn about heart health	Observes the actions of a friend
			To learn about yoga	Watches a woman who does yoga on television
			To learn about general health	Watches Dr. Oz on television

In all of these instances, participants discussed reading practices by substituting for the decoding of text an alternative information-gathering activity. In each example, participants were asked about their reading practices as they relate to the body or health, and they responded with descriptions of activities that were alternative to reading.

Reading is often seen as an information-gathering activity, and this is especially true when people think about reading about health-related issues. Therefore, it does not seem unnatural for participants to focus on the types of information they gather and to deemphasize the way that they gathered it. However, by examining this phenomenon of how participants transition from speaking about reading to speaking about other ways to gather information, we can better understand the ways they conceptualize their literacy practices.

Seniors' New Literacies Mentalities

This subcategory that emerged in the data is a particular type of conceptualization of literacy practices. Each of the participants was asked about reading, and each transitioned into talking about an activity that was *not* reading. This phenomenon begs questions about the ways participants conceptualize the media through which they acquire information. What media – new technologies, or not – are used, and how are they valued by participants? A fine-grained analysis of the most salient examples reveals that participants have a firmer grounding in new media than prior research has found.

Kay, a 66-year-old volunteer at a senior center who also takes the weekly yoga class there, casts a broad net when defining what she reads about her body and includes such non-textual events as seminars and classes. Kay says she has not read much about the body throughout her life. When asked if she reads anything that relates to health or exercise, she says that she has probably done more of that type of reading in the past five or six years on a variety of issues:

> Issues related to blood pressure and heart, and basically better diet and able to keep your heart healthy. And with Kate starting this Lean-On-Me program, we

> did have –. I did go through a weight management seminar type thing where we checked our BMI and did all that with a gal who is in our yoga class. And she was in charge of it. And she works –. She's a nurse, and she works down at, I think it's the Health Group? Down in Townsville. But she did the class, and it was excellent.

When prompted to specifically talk about her reading practices related to health issues, Kay easily transitions into talking about seminars that she has attended to retrieve information about health issues. She gives no sign of pivoting the conversation to a slightly different topic, and she makes no apologies for answering the question in a different way than what might traditionally be expected. Kay begins her answer by naming the topics that she has read about: "Issues related to blood pressure and heart, and basically better diet." Then, she uses the coordinating conjunction "and" to show that she is adding a similar topic to the discussion before speaking about the Lean-On-Me program that hosts sessions and seminars about healthy activities. In addition to discussing the helpfulness of the weight management seminar, Kay goes on to describe additional seminars she attended in the 6-week program that taught her about body toxins, heart issues, and reflexology. While Kay is clearly prompted to talk about reading in this conversation, she transitions easily to talk about obtaining information in ways other than through print linguistic texts, such as through attending and participating in seminars on various health topics.

Kay's discussion of her reading about the body and health issues represents a mentality that is partially indicative of using new literacies. First, Kay decenters the book, a move that brings her away from the "old" mentality in which books dominate: "The dominance of the book

as the text paradigm, social relations of control associated with 'bookspace,' and a discernible textual 'order' are integral to the first [old] mindset" (Knobel & Lankshear, 2007, p. 13). She decenters the book by responding to the question with ideas about high blood pressure and heart health and not on texts about those ideas. She also limits the book's authority by citing a medium other than the book – a seminar – as a source of this information. Kay is not necessarily conscious of these choices, but a new literacies mentality is evident in her discussion of literacy practices.

At the same time, Kay strays away from the new literacies mentality and moves toward the "old" mindset that values expert authority. The old literacies mindset follows norms that are "defined by 'centralized' authorities and experts" and that focus on "credibility" (p. 14). In describing the seminar leader, Kay emphasizes her credibility by noting her qualifications: she is a nurse with Health Group. Furthermore, Kay underscores the nurse's centralized authority by saying that "she was in charge of it." Finally, she reiterates the value of the class based on these attributes by saying, "But she did the class, and it was excellent."

While on the one hand Kay's focus on ideas and mention of a seminar in her discussion of "reading" appeals to the new literacies mindset, her later focus on authority and credibility within the alternative medium of the seminar speaks to the old mindset. If one were to argue that the seminar should be considered a "new" literacy, it would have to be acknowledged as a *peripheral case* of a new literacy because it does not, to our knowledge, contain "new 'technical stuff'" (Knobel & Lankshear, 2007). Still, making the argument that the seminar is a new or old literacy is less important than highlighting the ways Kay's mindset about literacy practices is complexly composed of both new and old characteristics. It seems that in this example, Kay's

approach to this literacy practice falls somewhere along a continuum between the old and the new.

As Kay continues to discuss reading practices – specifically, print linguistic practices – Kay's second diversion from the print linguistic holds additional clues to her new literacies mentality:

> Researcher: You said you've also read about blood pressure. Anything in particular? Any book or anything?
>
> Kay: Just mostly things that I've read on the Internet, probably. No, I can't think of a book specifically. Just knowing that if keep your heart healthy, your blood pressure's going to be better. Watching what you eat so you don't eat bad things, then you're going to put more weight on. I don't read nearly as much as my sister does. She's constantly telling me about things. I'm trying to think. Just mostly trying to eat heart healthy foods and checking my blood pressure. I do take medicine, and we're very fortunate here that we have someone come in a couple times a month – there's usually somebody here every week – to take blood pressure readings. So that helps.

The first interesting transition in the example above happens when Kay begins to talk about reading online materials about health and then transitions into talking about what she knows about health. In response to the researcher's prompting to discuss reading, Kay says, "Just mostly things that I've read on the Internet, probably. No, I can't think of a book specifically." Kay's use of "no" provides an answer to the researcher's specific question, and her pivot to a

new topic is almost unnoticeable. She pauses for three seconds before stating not a text that she has read, but a piece of knowledge she has gained from a text – whether that was in the form of a print linguistic resource, an online source, or even a seminar or class. Kay easily transitions from talking about reading as decoding to talking about her knowledge of the subjects about which one might read; this shows that the focus is not on the text, but on the knowledge she has gained from it. As with the example above, this suggests an attitude that limits the authority of texts, authors, and experts, which is an attitude conducive to using new literacies.

This example also reveals a spirit of collaboration that is part of the new literacies attitude. Kay's focus on the information gleaned from resources coupled with her discussion of her sister who is "constantly telling [her] about things" privileges the importance not only of information but also reveals the relevance of getting information from co-participants in literacy practices (e.g., Internet reading). Knobel and Lankshear (2007) have cited Schrage in arguing that new literacies are more about the development of relationships in the act of engaging in literacy practices, and less about the transmission of information. To that end, new literacy practices have changed the ways social relations and texts interact in our culture: "Conventional social relations associated with roles of author/authority and expert have broken down radically under the move from 'publishing' to participation, from centralized authority to mass collaboration" (p. 14). While we cannot know from this data the extent of the relationship building that happens between Kay and her sister through these literacy practices, what is evident is that the literacy practices happen in relationship with her sister, with the focus less on the authority of the text and more on the exchange of information among users.

In answering the question about what he reads, Ernest, another participant, also shows that he falls somewhere along the continuum between the old mentality and the new literacies mentality. On the one hand, Ernest, age 80, shows he possesses the new literacies mentality by citing media alternative to print linguistic texts in response to a question about reading. On the other hand, his acknowledgment of expert authority reveals some traces of the old mentality:

> Researcher: Do you ever read about physical, body, health, exercise, anything like that?
>
> Ernest: Yeah. Yeah. But I do it on a piece basis. I have some –. I use iTunes for a lot of my stuff. And there are things available on iTunes that relate to National Institutes of Health, relate to some science observations. And in the articles that I get from sources like that, I find a lot of that information. So, I listen to it. The iTunes, I listen to it. And I get a lot of information, and if it seems that I need to learn more about it, then I can Google it in and get all kinds of stuff on it. That's one of the things I really like about the computer. I can take any concept, put it in Google, and I can get something that relates to that. Now, of course, you have to learn how to use it so that you don't grab the first few, 'cos those are ads.

Before providing specific details about what he reads in response to this question, Ernest pauses for four seconds, and then mentions that he uses iTunes, a place for purchasing and storing digital audio recordings, especially music. Ernest's response to a question about reading with a medium that does not include decoding text reveals that he may have a new literacies mentality that lessens the authority of books. Yet Ernest does connect iTunes back to something he can

actually "read" when he notes that, through Google, he can find additional information on a topic that was described in an audio file that he had listened to. That Ernest begins his discussion with iTunes and later talks about related Google searches shows a more fluid conception of information gathering and thus a new literacies mentality. This mentality is one that is opposed to "the dominance of the book as the text paradigm, social relations of control associated with 'bookspace,' and a discernible textual 'order'" (Knobel & Lankshear, 2007, p. 13). At the same time, Ernest's citation of an expert authority, the National Institutes of Health, might reveal an adherence to the old mentality that privileges "authorities and experts" (p. 14).

Still, Ernest's comments about Google reveal he moves toward a new literacies attitude more than the old mentality. Two components of his discussion of Google above connect to two characteristics of the "new" mentality. First, unlike the old mindset where scarcity of goods creates value, the new mindset values availability of information: "In the economy of cyberspace, however, the opposite holds. Barlow argues that with information it is familiarity, not scarcity that has value" (p. 11). Ernest appreciates Google because of its ability to bring him a lot of information on a given topic: "if it seems that I need to learn more about it, then I can Google it in and get all kinds of stuff on it." Ernest values the amount of information and the ease with which he can access it, thus revealing a new literacies mentality. Second, Ernest reveals a new literacies mindset in this part of the conversation when he comments on the value of internetworked sources. Knobel and Lankshear describe the importance of relationship of information:

> Applying certain kinds of copyright and permissions restrictions to the use of information may constrain the dispersal of that information in ways that

> undermine its capacity to provide a basis for relationship. This will, in turn, undermine the potential of that information to work as a catalyst for generating creative and productive conversations, the development of fruitful ideas, the emergence of effective networks, and so on (cf., Lessig 2004). (p. 11-12)

Knobel and Lankshear (2007) note that "information" should have the ability "to provide a basis for relationship" and "work as a catalyst for generating … the emergence of effective networks." This is precisely what Ernest claims to value when he describes Google: "That's one of the things I really like about the computer. I can take any concept, put it in Google, and I can get something that relates to that." Ernest indexes the significance of information by emphasizing that his starting point is a "concept," and he shows that he values the interconnectivity of information by stating that he "likes" that he can "get something that relates to that." This focus on concepts and their relationships with other concepts provides strong evidence that Ernest holds a new literacies mindset.

Ernest continues to talk about his use of Google in a way that sheds additional light on his new literacies mentality. The example does not qualify as something that fits into this grounded theory category because the core of his activity – conducting a Google search – is in the decoding of text, yet his discussion is a continuation of his description of his uses of Google and provides insight into his new literacies practices. Ernest then describes how he uses Google to help facilitate the free exchange of information and the collaboration that are indicative of a new literacies mentality. He notes that Kelly, the yoga instructor, was looking for affordable yoga blocks to purchase and keep at the center:

> She wanted to get some more blocks, but she wanted to get them at a decent price. So over the holidays, I looked at the –. I put "yoga block" in Google, and came up with about several sources of blocks, which is not unusual. So I picked up and checked some of them out. And some of them I recognized, I looked at some of the site before I knew yoga accessories would be a standard business, and there's several things that I recognized. And they were like eight dollars or more per block. Well I happened to scan down, I noticed that there was a listing there that said Wal-Mart and the address. Not in the description, but the address. So I priced that, and I came up to a site, Wal-Mart, they had a package of two blocks and a strap as a package on sale for less than eight dollars. So I sent the message to Kelly, I said, "Hey, take a look at this." She did, and she bought ten packages.

Ernest reveals a new literacies mindset in talking about collaborating with Kelly on a problem. Knobel and Lankshear (2007) state that "new literacies are more … 'collaborative'" (p. 9) and encourage the "free" exchange of information (p. 12). Ernest narrates his interactions with Kelly that take place on a number of spatial levels. He speaks with her in person about a problem, and then he uses Google to search for solutions to that problem. Finally, he communicates with her by sending her a message (presumably an e-mail), and she takes up that information and uses it to solve her problem. This complex network of in-person and online exchanges of information is an example of the "fluid" nature of interacting with new literacies.

In discussions of examples from both Kay and Ernest, I argue that while they possess a new literacies attitude in some ways, they retain the "old" mindset in other ways. In many instances they seem to reduce the authority of text and embrace other media, yet they still show

evidence of bowing to authorial credibility by deferring to those with medical credentials, such as nurses and experts from the National Institutes of Health, even if those authors are not communicating through writing. Knobel and Lankshear (2007) hasten to note that their description of new and old mindsets is not meant to create a dichotomy that divides literacies into one or the other category and that there are other ways of conceptualizing literacies. Still, their descriptions of the "new" and "old" provide a relevant heuristic for prioritizing what is important when considering what counts as a new literacy. While a continuum polarizes the "new" and the "old," a continuum also allows for a number of additional plotted points that reveal the gray area that exists between the two mindsets. The data in this study reveal that some seniors may possess a mindset that is in the process of evolving from old to new.

Conclusions

As seniors, participants show that a new literacies mindset is not limited to the young who are presumed to be more familiar with new technologies. Traditional characterizations of seniors show that they do not have technological literacy and should not have technological literacy (Bowen, 2012), and that they internalize those characterizations to the detriment of their literacy skills (McKee & Blair, 2006). Yet in the examples in this study, seniors show the emergence of a new literacies mentality that reveals that perhaps seniors are not so isolated from the modern world's evolving technologies, or at least the mentalities that come with them.

Importantly, this study does not collect data to specifically examine seniors' uses of technology to manage the body, but instead finds that when some seniors talk about reading, they show evidence of having, at times, a new literacies mentality. Within that conceptualization, seniors show that they fall along a continuum between the old and the new literacies mindsets.

Where they align with a new literacies mentality, they at times use new technologies, which counts as paradigm cases of new literacies; where they don't use new technologies but retain the new literacies mentality, their activities are considered peripheral cases of new literacies (Knobel & Lankshear, 2007). Insofar as the new literacies mentality is evidenced in this data, seniors seem to buck expectations of lacking technological literacy.

The irony here is that it is not the aging body but it is likely society's rhetorical representation of the aging body that prompts seniors to conduct more research on the body; and that research allows them to refine their new media skills. Cultural representations of age have been widely characterized as negative (Faircloth, 2003), and the ailments often associated with age come into being when discursively constructed within society (Rembis, 2008). The body only is old because it is contrasted against the norm of youth, just as the body is only disabled because it is contrasted against the norm of what "most people" can do. Furthermore, as we age, our bodies do change, and that physical change in addition to rhetorical representations of it may prompt seniors to adapt to new impairments. When a body becomes "abnormal" with age, societal pressure and altered materiality prompts the aging to stay young through exercise, diet, products, and so forth. Thus, seniors are prompted to do more research, to look up more of what they perceive to be ailments on WebMD, and read up on more skin-care products than those who fall into the "norm" of youth. This provides this group people deemed least competent in the use of technology the opportunity to become the most competent. That which allows seniors to acquire a new literacies mentality is, in part, the rhetorically constructed ageism that told them they couldn't do technology in the first place.

Expectations of seniors' abilities to use technology within our culture are traditionally low. This study complicates this picture by revealing how seniors' talk about researching their bodies shows them to be somewhat familiar with technological literacy practices. This may lay some groundwork for new questions to be asked: How might this apparent acculturation into new media provide an informed basis on which to develop senior technological literacy programs? How might seniors' voices help to redraw the public conception of their technological literacy? How can a focus on these voices help seniors to redefine their own identities, as Ray (2000) has discovered through focusing on seniors' writing? Future research might begin with open-ended interviews on seniors' technological literacy practices to inform the construction of technological literacy programs, to help seniors define their needs and goals in engaging with these programs, and to characterize representations of seniors and technology in our culture.

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