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**Technology Stalled: Exploring the New Digital Divide in One Urban School**

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*A wide array of information and communication technologies (ICTs) are fundamentally changing the literacy lives of developing readers and writers (Coiro, 2007; Greenleaf & Hinchman, 2009). Our exploratory study examined the current practices and challenges for 21<sup>st</sup> century literacies – defined broadly as the skills, cultural competencies, and experiences necessary for active participation in the 21<sup>st</sup> century – and asked the question, How is technology used for literacy learning in the classrooms of one urban K-8 school? Although computer and multimedia technologies were available for use by teachers and students in many spaces throughout the school, technology did not play a significant role in literacy learning. Implications for literacy instruction within the context of 21<sup>st</sup> century literacies are discussed.*

*Keywords: digital literacy, technology, 21<sup>st</sup> century learning, information and communication technologies*

A wide array of information and communication technologies (ICTs) are fundamentally changing the literacy lives of developing readers and writers (Coiro, 2007; Greenleaf & Hinchman, 2009). The Internet, computers, handheld computers, cell phones, smart phones, iPods, iPads, and text-to-speech programs are just a few examples of the ICTs that can support students' active participation in classroom learning communities. New technologies offer the promise of innovative ways to help learners develop skills and independence in reading and writing in the classroom, while making connections to the new literacies in which students engage outside of school (Alvermann, 2008). Our personal experiences as university faculty members and observers of classroom life tell us that these potentials are sometimes being fulfilled, but that in other schools they are being neglected.

Technology is no panacea, yet it holds promise for literacy instruction that addresses 21<sup>st</sup> century skills and experiences when skilled professionals carefully match technology with students' needs. Indeed, the National Council of Teachers of English (NCTE)'s (2008) definition of 21<sup>st</sup> century literacies states that students must "develop proficiency with the tools of technology" in order to be successful readers and writers in the 21<sup>st</sup> century (para. 1). Therefore, this paper presents exploratory research focused on the question: *How is technology used for literacy learning in the classrooms of one urban K-8 school?*

Our study, which examined the current practices and challenges for 21<sup>st</sup> century literacy in urban classrooms, was conducted by the Literacy Educators Research Network (LERN), a multi-university group of researchers in the Mid-Atlantic region of the U.S. For this report, we examined the use of technology in one urban, K-8 school and found that, although computer and multimedia technologies were available for use by teachers and students in many spaces throughout the school, technology did not play a significant role in literacy learning. Below we discuss the methodologies, the specific findings, and the implications for literacy instruction within the context of 21<sup>st</sup> century literacies.

### **Theoretical Background**

In addition to developing technology proficiency, NCTE (2008) identified several related competencies that learners must address in order to be successful readers and writers today. Students must

- Build relationships with others to pose and solve problems collaboratively and cross-culturally
- Design and share information for global communities to meet a variety of purposes
- Manage, analyze and synthesize multiple streams of simultaneous information
- Create, critique, analyze, and evaluate multi-media texts
- Attend to the ethical responsibilities required by these complex environments (para. 1).

These competencies share several elements in common with information literacy standards (American Association of School Librarians, 2007), the Standards for Reading Professionals (International Reading Association, 2010), as well as the Partnership for 21<sup>st</sup> Century Skills' (2009) interdisciplinary Framework for 21<sup>st</sup> Century Learning, suggesting that these core elements are widely accepted among professional educators as part of the foundation of teaching and learning in the 21<sup>st</sup> century.

Using the NCTE framework as a base, our conceptualization of 21<sup>st</sup> century literacies is further informed by an interdisciplinary perspective that draws on several theoretical concepts. First, our understanding of 21<sup>st</sup> century literacies is based on the deictic nature of literacy; in other words, the notion that the literacy environment (including technology) is always changing. The ability to flexibly adapt to a fluid environment, to move between contexts and technologies, is seen as a necessary skill for success in economic and cultural spheres that are “based increasingly on the effective use of information and communication” (Leu, Kinzer, Coiro, & Cammack, 2004, p. 1581).

Second, we observe that meaning representation in multiple modes is increasingly privileged *outside of school* (Jewitt, 2008). Everyday literacy practices such as text messaging and instant messaging provide young people with a means of experimenting with power, identity, and control within the context of peer social relationships, away from their parents’ gaze (Campbell, 2006; Clark, 2005). On the popular social networking website Facebook, youth make visible their participation in Discourses through the often playful and experimental uptake of the tools afforded by the website (such as the ability to upload pictures, video, and web links from outside Facebook, and to write status updates and wall posts) in order to connect with people and organizations (Knobel & Lankshear, 2008).

Effective communication involves knowing the affordances (technical, cultural, social, historical) of these various modes. At the same time, while students’ multimodal literacy practices are valued as powerful in non-school settings (Alvermann & Hagood, 2000; Lewis & Fabos, 2003), traditional conceptions of print-based text continue to dominate classroom instruction for a variety of reasons, including a lack of understanding of and training in the affordances of various modes, and high stakes testing-driven curricula (Alvermann, 2008; Alvermann, Huddleston, & Hagood, 2004). However, we recognize that there are points of intersection between young people’s everyday and school-based literacies that offer opportunities for making learning relevant to their lives, as well as opportunities to address issues that might arise for youth in their everyday practices (Stone, 2007). For example, mastery of what Gee (2007) called “good” video games requires skills such as collaboration, problem solving, and other learning principles that are also valued in school settings.

Furthermore, we understand that active citizenship in the 21<sup>st</sup> century should be informed by a critical stance. Critical literacy in a 21<sup>st</sup> century context moves beyond the use, production, reproduction, and dissemination of texts in new modes, to include interpretation, meaning negotiation, and text creation and transformation (Gounari, 2009). As Myers, Hammett, and McKillop (1998) suggested, “writers in a hypermedia medium may juxtapose images, music, and text in ways that expose underlying issues of power, equity, or cultural bias” (p. 62). Critical literacy in today’s digital context should include reflective practice, social awareness, critical thinking, and knowledge of digital tools.

Finally, while conceptions of 21<sup>st</sup> century literacies often focus on students’ learning within a school environment, it is important to acknowledge the broader social and cultural contexts within which any discussion of 21<sup>st</sup> century literacies must be situated. We see Jenkins’ (2006) notion of participatory culture as a particularly useful way of understanding the literacies that are

currently valued by society at large. Jenkins (2006) used the term participatory culture to suggest that our focus as a society has shifted toward an emphasis on using technology for production (rather than consumption) of information and other texts.

Furthermore, Jenkins (2006) argued that, with the widespread penetration of Internet access, low-cost web-based tools for publishing on the web (e.g., blogs and wikis), and a shift toward production as increasingly valued by society, we are effectively seeing a re-conceptualization of the digital divide, changing “the focus of the conversation about the digital divide from questions of technological access to those of opportunities to participate and to develop the cultural competencies and social skills needed for full involvement” in a participatory culture (Jenkins, 2006, p. 4). While more students in the United States have access to computers and the Internet than ever before, the primary concern of the second digital divide revolves around unequal access to the kinds of cultural and social capital that are increasingly needed for success in a digital world.

In summary, our conceptualization of the skills, cultural competencies, and experiences necessary for active participation in the 21<sup>st</sup> century may be articulated in terms of the following key concepts, which draw on the NCTE framework and the literature described above: communication; critical evaluation of information; flexibility/adaptability to changes in the technological and social environment; the centrality of creation and production of texts using multiple modes; critical thinking; problem solving/decision making; responsibility; the ability to maintain and leverage interpersonal/social relationships. These skills, cultural competencies, and experiences are not only supported by technology, but also echo a broader, societal trend toward the use of technologies (and particularly ICTs) as necessary for full, active participation in the 21<sup>st</sup> century.

### **Methodology**

Data for this study were collected at Bellview (pseudonym) Elementary/Middle School during school year 2008-2009. In this qualitative study, data included interviews (or questionnaires) of all key stakeholders, and observations of student learning and technology use in classrooms.

### **Site and Participants**

Bellview Elementary/Middle School is located in a large, urban, mid-Atlantic school district. A Title I school, Bellview students are predominantly African-American (92%). This school is considered successful, as it met Adequate Yearly Progress (AYP) in all categories except Special Education in Reading and Mathematics in 2009. For this study, participants included students, teachers, administrators, staff, parents, and members of the broader Bellview School community.

### **Data Collection and Data Sources**

Data were collected from multiple sources:

**Interviews.** One-on-one structured interviews (see Appendices A-C for the interview protocols) were conducted with 19 students (two from primary grades, seven from intermediate grades, and 10 middle schoolers) to explore their current perspectives and definitions of literacy, their range of literacy engagements in and out of school, and their visions for literate citizenship in the

future. In addition, four teachers, four administrative personnel, and twelve community members were interviewed to understand their definitions of literacy and vision for 21<sup>st</sup> century literacies.

**Observations.** Non-participatory classroom observations (Denzin & Lincoln, 2000) were conducted throughout the 2008-2009 academic year by teams of researchers focusing on one of the five participating classrooms in each of these grade levels: first, second/third combination, fourth, seventh and eighth grade (7<sup>th</sup> and 8<sup>th</sup> grade English Language Arts was taught by the same teacher). The number of analyzed observations in each classroom ranged from 4-19. Researchers also viewed technology use in the computer lab, on one occasion when the 1<sup>st</sup> grade classroom teacher took students to the lab. The observation field notes revealed important information about the range of technology-supported literacies and literate strategies currently enacted in the classrooms. As part of the observations, classroom artifacts were collected.

**Surveys.** A survey (see Appendix D) was distributed to all parents of students in participating classrooms to gather information about their vision for 21<sup>st</sup> Century literacies, as well as to gauge their levels of technology ownership, access, and experience. Forty-six parents responded, representing voices covering all grade levels.

### **Data Analysis**

Interview data were coded using the constant comparative method (Glaser & Strauss, 1967). Observational field notes were coded using a combination of open coding and key terms. The observation teams from each grade level initially used open coding, supported by NVivo software, to code a sample of their own data consisting of three, randomly selected observations. After the initial coding, the teams collaboratively identified codes that were present across this subset of the data. Monthly meetings were held throughout the year to compare notes across teams. As a result of these meetings, key terms were identified and temporary themes were revised as new codes emerged; data were recoded accordingly. At the time of this writing, broad themes included: locus of power, cognitive acts and talk, assessment, and classroom literacies.

For this paper, a larger subset of the observations (four 1st grade, six 2nd-3rd grade, 19 fourth grade, seven 7<sup>th</sup> grade, and eight 8<sup>th</sup> grade) were examined by two of the authors that focused specifically on technology. Key technology terms were used to search the field notes for technology during classroom observations, including but not limited to: computer, cell phone, overhead projector, Internet, ELMO (a type of digital document projector that functions much like an overhead), PowerPoint, laptop. The researchers found that the following categories emerged from this analysis: technology resources for instruction; technology talk; computer literacy instruction.

Finally, for this report, survey data were analyzed using descriptive statistics and constant comparative analysis for open-ended questions. For this paper, we explored themes across above-mentioned observations, all of the interviews, and all of the survey data to explore how technology was used to support 21st century literacy learning at Bellview Elementary/Middle School. Below, we share the results of these analyses.

## Findings

### Access to Technology in the School and Local Community

In the school, and to a lesser extent in the community, there was adequate access to hardware and software. The amount and variety of technology available for use by students and teachers was a positive attribute of this urban school (see Table 1). One of the researchers observed:

There are a lot of computers - 46 between the two [public lab] spaces. The computers are relatively new, fast, and have all the necessary software and accessories to mount a digital storytelling workshop... There is also a wireless network in the middle school building, but it's password protected.

At the same time, while the computer lab and information resource center were well equipped, in the classrooms, computers and Internet access were not always readily available. The number of computers in the 4<sup>th</sup> and 7<sup>th</sup>/8<sup>th</sup> grade classrooms fluctuated during the year from 1-3 computers, as older model computers were replaced with newer models. Furthermore, computers in the 2<sup>nd</sup>/3<sup>rd</sup> grade and 7<sup>th</sup>/8<sup>th</sup> grade classrooms did not have wired Internet access until midway through the school year (January). Lack of consistent access to computers and the Internet within several of the classrooms does not lend itself to planning for technology-supported teaching.

**Table 1. Technologies at Bellview School**

Space	Technologies Present (Hardware/Software)	Location in Room
1 <sup>st</sup> grade classroom	3 IBM computers - Windows operating system - Internet Explorer - wired Internet access - headphone/microphone headsets	Clustered at the back of the room
2 <sup>nd</sup> /3 <sup>rd</sup> grade classroom	Overhead projector ELMO	Front of room
	Electronic timer	Carried by teacher
	3 IBM computers - Windows operating system - Internet Explorer - wired Internet access (in January)	Clustered at the back of the room
4 <sup>th</sup> grade classroom	Overhead projector	Front of room
	1-3 IBM computers (number varied as old computers were replaced during the year) - Windows operating system - Internet Explorer - wired Internet access	Clustered at the back of the room
7 <sup>th</sup> /8 <sup>th</sup> grade classroom	Overhead projector ELMO (replaces overhead in January but it is not hooked up to a computer)	Front of room
	Teacher personal PC laptop	
	1-3 IBM computers (number varied as old computers were replaced during the year)  - Windows operating system - Internet Explorer - wired Internet access (in January)	Clustered at the back of the room



<b>Computer Lab</b>	32 IBM ThinkCentre computers with Intel Pentium 4 HT processors - Windows XP - wired Internet access - DVD Multiplayer drive - CD Read/Write drive - Office 2003 - QuickTime player - Photoshop Album 2.0 - Windows Movie Maker - Internet Explorer - headphone/microphone headsets - 2 external speakers	In clusters of 4, and on 2 long tables on either side of room
	HP Photo Printer	At the teacher's desk
<b>Information Resource Center</b>	14 IBM ThinkCentre computers - same software and accessories as the computer lab	In the back of the Center, on long tables configured in U-shape
	ELMO	On cart next to librarian's desk
	PC laptop	
	Digital projector	
	Promethean Smart Board	
Scanner		

The survey of parent technology access and use ( $N = 46$ ) found that about half (26) had computers at home; in addition, 48% of parents used computers at school, 34% used computers at work, and 50% used the computers available in the public library in the community. Twenty-four parents had Internet access at home; and 36% used the Internet at school, 30% at work and 45% at the library. While these findings are drawn from a small sample size, they reflect national computer ownership data: In 2003, for example, 41% of families with an income of \$20,000-\$29,999 reported having access to a home computer, a significant increase in home computer access from 1997, when only 20% of families in the same income range reported home computer access (Snyder, Dillow, & Hoffman, 2008).

### Technology for Literacy Instruction: Presentation and Information Sharing

Observations of classrooms and the computer lab revealed low-level use of technology by teachers and students. In the elementary grades (1 - 4), technology used for literacy instruction revolved primarily around the overhead projector or the ELMO, as a means for sharing information with the whole class. One illustration of the use of the overhead projector occurred in the 2nd/3rd grade combined classroom during a literacy activity in which students were asked to distinguish facts from opinions:

The teacher read aloud from a transparency titled "Honeybee Talks," with the students gathered on the carpet in a half-circle while looking at the passage from the overhead projector. ...After reading, the teacher asked individual students to use an orange marker to underline Facts, and a green marker to underline Opinions. The student then read aloud the sentence underlined and tell the class why it was a fact or opinion.

This technology-mediated activity was teacher initiated, as were the majority of the activities observed across grade levels. In this case, student involvement with the technology was limited to teacher-selected reporting back or sharing of work. These patterns were evident in the 4th grade classroom, as well:

The teacher shares an article with the students, projects it [using an overhead projector] so that all of the students can read the article along with her.... After reading the article, the teacher removes the article and replaces it with a worksheet with questions about the article.

During the spring, the overhead projectors in most classrooms at Bellview were supplemented with ELMOs. Although the ELMO provided more affordances than the overhead projector (including the ability to record audio and video, as well as the ability to hook up and project a laptop computer), the elementary teachers rarely used these affordances. The 7th/8th grade teacher did connect his personal laptop to the ELMO on more than one occasion in order to show video clips and student-generated PowerPoint presentations, as noted in this example from the observation data:

The teacher shared a YouTube video about the Holocaust that he found at home last night...he really wanted to share more information about the Holocaust, especially visually.

The middle school teacher's use of YouTube videos and other visual media provide a rare example of digital media being incorporated into the classroom, and also provides an example of multimodality. Nonetheless, as with the overhead projector examples, the videos were used for presentation of information, with the students taking on a passive, watching role. There was an important exception to this in March, when the teacher directed all students to do a book report and provided multiple options for presentation. Some students chose to use PowerPoint for their book report projects. Benina (all names are pseudonyms), for example, made a mock website as part of her PowerPoint presentation.

Although, as noted in Table 1, each of the classrooms were equipped with at least one computer, during the observations the computers were rarely used to support instruction. In the 1st grade classroom, there was one instance of student computer use in which three students used the classroom computers to play with Starfall, a website that has a wide variety of free games to help young students learn to read using a phonics approach. Each student wore a pair of headphones while using the computer. During this observation, the other students were engaged in completing a math worksheet with teacher assistance.

Analysis of the classroom observations showed that technology was sometimes used during recess or for other non-instructional purposes. The classroom computers were used on occasion in the 4th grade classroom, including one occasion in which the computer was used to occupy a visiting student who was placed in the classroom by another teacher. During this same class session, several male students were observed as they gathered around a computer during a 10-minute recess; they were playing electronic checkers. However, neither of these instances reflects the use of technology to support literacy instruction.

These non-instructional instances of classroom computer use were unique in that: a) they were examples of technology used in the classroom space, and b) they were limited instances in which



the students were engaged in self-directed computer use. In both examples, students were allowed to choose which game to play (although limited to one website, and the software that was available on the computer). While a 21st century literacies framework suggests student-initiated, student-directed technology use for communication, critical analysis of information, production of multimodal texts, etc., it is clear that such activities, if present at other times, were not supported by technology in classrooms observed at Bellview, as discussed in the next finding.

### **Technology and Classroom Control**

While many of the technology tools needed to promote 21st century literacies were available, the school was not using the technologies in ways that support 21<sup>st</sup> century literacies. As described above, technologies such as the overhead projector and ELMO were used to support teacher-directed instruction, in which students played a mostly passive role. Instances of student technology use revolved around drill and practice type instruction, particularly in the 1st grade classroom. One 1st grade observation took place in the computer lab, where each student was seated at his or her own computer and worked independently on the Starfall phonics website (mentioned above). Students were allowed to select which phonics game to play, but the games were limited to drill and practice type exercises.

Our analysis also revealed that technology was most often used for teacher control of instruction, as well as for teacher control of student behavior. Classroom uses of the overhead projector and ELMO, described in the previous finding, point to technology as a tool for teacher control of the instructional environment. Similar instances were also observed during 1<sup>st</sup> grade computer instructional time in the school's computer lab or in the artifacts of students' computer work. In some cases, the teacher used technology as a means of behavioral control. For example, in the 1st grade classroom, time in the computer lab was used as a reward for good behavior, as in this observation:

As the class made its way to the computer lab, the teacher said to her students, "If you are talking you are not going to computer [lab]. Straight line." On the stairs, the teacher calls student names one by one.... "Now get quiet or I will take everyone back."

In the 7th grade classroom, technology was used also as a reward for good behavior. The teacher often used the ELMO to project a book for teacher and student read-aloud; on these occasions, a student who was deemed to have been well-behaved that day was selected to turn pages and to "freeze" the image of the book page on the ELMO screen.

On occasion, students used technology as a means of subverting teacher control. These instances of off-task behavior were observed on several occasions in the 4th grade classroom, when a particular student was reprimanded for using a handheld electronic video game during instructional time. This provides an interesting example of everyday technology making its way into the classroom, but not in a way considered appropriate by the teacher. In this same classroom with the same teacher in charge, students were observed using a Sony PSP (handheld game system) to play Grand Theft Auto (a video game) during a class break. This was deemed acceptable behavior given that it was not instructional time.

### Technology Talk

While digital technologies were rarely used to support high level literacy learning, technology concepts were present in the classroom through teacher and student talk. For example, technology concepts (“computers” and “Internet”) were included in a word wall list in the 4th grade classroom. Similarly, the 7th grade teacher engaged in explicit instruction of vocabulary concepts related to technology (prior to the time the Internet was available in the classroom), when teaching about text features, including “URL,” “dropbox,” “hyperlink,” and “sidebar:”

Teacher: “What is a hyperlink?”

Male student: “A hyper link is a link you can click on and it will take you to another page.”

Teacher: “What about a drop box?”

Student: “It’s like something that you pull down and make a choice.”

Teacher: “URL?”

Male student: “A URL is the address we can use.”

The teacher ended this exchange by stating that “we are not going to use the Internet, instead we are going to use a textbook and magazines, but it is important for you to know these [concepts].” Hands-on computer literacy instruction was limited in this classroom, especially during the fall semester prior to classroom access to the Internet.

These same teachers - 4th grade and 7th/8th grade - used the Internet as a personal resource to support their instruction. During an activity with her students, the 4th grade teacher referred to the Internet as a resource for information, stating, “Now I want to show you this on the overhead... This is an article I found on the Internet. We are going to follow along.”

The 7th grade teacher also shared with his students that he had found information on the Internet, in this case relating to data on the diminution of the Jewish population during WWII. At the same time, he reminded his students, “As we know, not everything on the Internet is true,” and discussed his reasons for being suspicious of these particular data. This was the beginning of a critical stance.

While neither teachers nor students used the Internet during class time, technology was part of the academic discourse in these classrooms. For example, in speaking about vocabulary concepts, students spontaneously used references to technology:

Teacher: “Can you use it [the word “contrast”] in a sentence?”

Student: “When my game screen gets light I go to “contrast” and get it darker.”

On another occasion, a student drew on her experience with computers to define the word “invalid,” which appeared in a lesson:

Teacher: “What do you think that means?”

Student: “When I put a word in the computer it says “invalid” if I put the wrong word in and it won’t work.”

Students used their personal experience with technology to make connections with concepts that weren't specifically related to technology. In the 7th grade class discussion of the poem "Casey at the Bat," one student told the class that she plays baseball on the Wii (a popular video game console sold by Nintendo Corp.). These student responses are particularly interesting in light of the previous findings; although not significantly used in instruction, students' out of school experiences with digital technologies provided a bridge to their understanding of school-sanctioned literacy.

### **Student Use of Technology Outside the Classroom**

In their interviews, students reported that they use computers outside of school in more creative, authentic and active ways than they did in school. In their daily lives (implicit to the definition of literacy) the students, particularly those in 4<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grades, revealed that they used technology in these ways: cell phone texting, games including simulations, social networking websites such as MySpace or Facebook, word processing for the writing of poetry or plays, and finding information of various types on the Internet. For example, Lana said that she used her computer to "write in my journal at home. I express my emotions and look at myself to make myself better. I also write songs and essays."

When she was asked "Do you read on the computer?" She answered, "No," although she later remarked, "I go on-line and get advice from older people." So, though she didn't explicitly identify digital reading, she had integrated the use of digital texts into her personal life. This seemed to be true of many of the adolescents. Occasionally, these older students were able to link their use of technology to other aspects of their lives, even school. For example, Clay, an 8<sup>th</sup> grade student, spontaneously reflected on how he used an at-home digital literacy when he went back to school:

MySpace helped me remember a word that was on my test the next day. I said, 'Ah, I need to use that word [that was] on MySpace.'

As with the technology talk described in the previous finding, such instances provide a glimpse of the potential from students' out-of-school experiences with technology that could be brought to bear on their in-school learning.

### **Discussion**

The digital divide was previously defined as the gulf between those who have access to computer technology and those who do not. Access to technology in schools has grown in recent years, and was available to some degree to the teachers and students at Bellview. At home, the gap in access to computer technology between high- and low-income families – the first digital divide – is decreasing at a slower rate, although it is narrowing as well. While access to technology is a crucial first step, we have argued, along with Jenkins (2006), that we must pay attention to the growing second digital divide.

In the context of literacy learning in formal school settings, we see an opportunity to address the second digital divide through the development of skills, cultural competencies, and experiences –

such as communication; critical evaluation of information; flexibility/adaptability to changes in the technological and social environment; the centrality of creation and production of texts using multiple modes; critical thinking – that are needed to effectively and actively participate in the full power of technology for “new forms of creativity, learning, entrepreneurship, and innovation” (Palfrey & Gasser, 2008, p. 15). For example, supportive teachers could encourage divergent thinking about literature or other texts by asking students open-ended questions that they can respond to on their cellphones or other hand-held devices using free, web-based polling software such as polleverywhere.com (<http://www.polleverywhere.com>).

Overall, our findings show that the ingredients for 21<sup>st</sup> century literacy were missing from the constellation of technology-supported school activities at Bellview School. Technology was used to support literacy learning by some teachers, although these uses were primarily teacher-driven, and focused on whole group read-alouds, vocabulary training, and drill-and-practice phonics activities. Furthermore, technology was used as a tool for teacher control of student behavior and learning; there were very limited student-directed independent uses of technology, or even teacher-directed instruction that allowed for student agency. One exception was the 8<sup>th</sup> grade teacher working with several students after school to complete book reports using PowerPoint, which allowed the students to use technology for communication, and encouraged the creation of texts in multiple modes, two of the 21<sup>st</sup> century competencies described above. For the most part, students were not guided nor supported to use technology in ways that require creativity, imaginative production, or inquiry. As an example of student-centered inquiry and production, teachers might ask students to identify and interview an important member of their community, then select a way to represent their findings: in a digital story video, an interactive PowerPoint, or using Voki (<http://www.voki.com/>), a website that allows users to create a talking avatar. In short, at Bellview School the uses of technology did not illustrate a model of technology integration that moved forward the agenda of 21<sup>st</sup> century literacies in these classrooms.

Some of the older students reported the use of digital texts in ways that were seamless and usual in their out-of-school lives, but did not go beyond the use, production, reproduction, and dissemination of texts in new modes to include interpretation, meaning negotiation, and text creation and transformation (Gounari, 2009). In addition, we note that technology can be a means of helping students to engage with critical literacy (Myers, Hammett, & McKillop, 1998). For example, a teacher might model how to navigate among a variety of websites, evaluate the authority and validity of the websites, and synthesize information from multiple digital texts. In the observations at Bellview School, technology was rarely used to support critical literacy.

Why were these 21<sup>st</sup> century skills and competencies missing from technology-supported instruction at Bellview? We offer some initial thoughts based on the literature. In their definition of new literacies, Coiro, Knobel, Lankshear, and Leu (2008) encouraged an agentic stance for students to fully use and grow with literacy that emerges from developing technologies. However, as Cummins, Brown, and Sayers (2007) pointed out:

The accountability mandates of adequate yearly progress (AYP) and high-stakes testing have resulted in a pedagogical focus on teaching to the test in many schools serving low-

income and minority students. Because drill-and-practice transmission pedagogy predominates in these schools, computer use tends to conform to the same orientation. (p. 91)

As with many schools today, Bellview was concerned with meeting AYP and being considered a successful school within that framework. Given that the uses of technology to support teaching and learning are closely tied to pedagogical strategies, it is perhaps not surprising that student-directed, agentive uses of technology were missing from Bellview classrooms.

The issues surrounding technology integration are complex, particularly in an environment where technology access (the first digital divide) meets issues of developing 21<sup>st</sup> century literacies in ways that address the second digital divide. Schools do have an opportunity to play a central role in ameliorating the participation gap, but we do not intend to lay blame at the feet of Bellview administrators and teachers for using technology in particular ways and not in others. In order to move toward technology integration that supports 21<sup>st</sup> century skills, cultural competencies, and experiences, teachers need to be supported to use new technologies (such as blogs and wikis), and also learn how to incorporate them into their content and pedagogical approaches (Koehler & Mishra, 2009). In other words, teachers must develop an understanding of the technology as a tool of the instructional content, and of the practices associated with the production of multimedia texts that are valued by society today. This requires teachers to themselves be practitioners of 21<sup>st</sup> century skills and competences, in order to be a model for their students. More broadly, Greenhow, Robelia, and Hughes (2009) argued that further research is needed to understand how teachers might successfully use social media, and other technologies associated with 21<sup>st</sup> century literacies, in order to foster the types of skills and competencies that literacy learners will need to be active participants in the 21<sup>st</sup> century.

Finally, successful technology integration also requires systemic support at the district and state levels, and a commitment by administrators to provide the support necessary at the classroom level. In our interviews of Bellview teachers and administrators, we asked about their vision for literacy in the 21<sup>st</sup> century; what did they believe would be necessary for their students to be successful in the future? The common theme that emerged from these interviews was the need to break the literacy limits of previous generations: get a high school diploma, get a job, get a college degree. As the fourth grade teacher stated:

“I want to see them be able to have their places in society and be able to finish school...If they don't go to college at least they are interested in working in a trade...They need to work towards getting out [of the the housing project] and make something of themselves.”

The second/third grade teacher echoed this sentiment: “I get notes (from parents) that are spelled incorrectly, aren't even written correctly and I don't want these kids to grow up like that... .” The first grade teacher spoke of fostering a life long love of literacy: “I hope my kids have a positive idea about reading and writing and can pass on that to their kids.” Teachers and administrators rarely mentioned technology in the context of discussions of their visions for the future, goals for their current students, or what they needed to achieve their current goals.

Despite these challenges, we saw that technology was, in some instances, a part of the academic discourse at Bellview. These connections acknowledge that there are technologies and practices that exist in, and are valued by, both the local community and our society at large. It was also clear that some students used digital technologies in their lives outside of school. If this is the case, why should schools be concerned with helping students to develop 21st century competencies, strategies, and experiences? Hague and Payton (2010) argued, “if formal education seeks to prepare young people to make sense of the world and to thrive socially, intellectually and economically, then it cannot afford to ignore the social and cultural practices of digital literacy that enable people to make the most of their multiple interactions with digital technology and media” (p. 3). These reasons move beyond using digital technologies in the classroom to acknowledge students’ powerful practices, or to provide a bridge between in-and-out of school; it is an ethical obligation on the part of teachers and administrators to help students be successful in the participatory culture of the 21st century.

### **Implications**

We find it particularly noteworthy that Bellview School was successful in reaching its AYP in reading, and therefore was considered a success in terms of literacy instruction by the school district and the state educational administrators. This study may be a challenge to educators and policymakers to rethink what it means to be successful, in the context of today’s digital environment. Is success more than test scores or making AYP? Given that strong alignment with curricular goals and school mission is seen as a condition for meaningful technology integration in urban schools (Staples, Pugach, & Himes, 2005), this raises questions about how success is defined by our schools, what role technology has to play in helping us to reach our current definitions of success, and whether or not our understanding of 21<sup>st</sup> century literacies should be brought to bear on re-conceptualizing the meaning of success in literacy classrooms across the nation.

Finally, our study explored the use of technology to support literacy learning at one urban school, and our findings suggest more questions than answers. Further research must be conducted in order to definitively answer a key question: Why did we see evidence of the second digital divide, and of a lack of 21<sup>st</sup> century skills and competences, at Bellview; and in what ways can we support urban schools—and all schools—to integrate technology into literacy learning in ways that prepare students for success in the 21<sup>st</sup> century?



References

- Alvermann, D. (2008). Why bother theorizing adolescents' online literacies for classroom practice and research? *Journal of Adolescent & Adult Literacy*, 52(1), 8-19. doi:10.1598/JAAL.52.1.2
- Alvermann, D., Huddleston, A., & Hagood, M. (2004). What could professional wrestling and school literacies possibly have in common? *Journal of Adult & Adolescent Literacy*, 47(7), 532-540.
- Alvermann, D., & Hagood, M. (2000). Critical media literacy: Research, theory, and practice in "new times." *The Journal of Educational Research*, 93(9), 193-205.
- American Association of School Librarians. (2007). *Standards for the 21st century learner*. Chicago, IL: American Library Association.
- Campbell, S. (2006). Perceptions of mobile phone in college classrooms: Ringing, cheating, and classroom policies. *Communication Education*, 55(3), 280-294.
- Clark, L. (2005). The constant contact generation. In S. Mazzarella (Ed.), *Girl Wide Web: Girls, the Internet, and the negotiation of identity* (203-221). New York: Peter Lang.
- Coiro, J. (2007). "Exploring changes to reading comprehension on the Internet: Paradoxes and possibilities for diverse adolescent readers" (January 1, 2007). *ETD Collection for University of Connecticut*. Paper AAI3270969. Retrieved from <http://digitalcommons.uconn.edu/dissertations/AAI3270969>
- Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (2008). Central issues in new literacies and new literacies research. In J. Coiro, M. Knobel, C. Lankshear, & Leu, D. J. (Eds.), *Handbook of research on new literacies* (pp. 1-21). New York: Lawrence Earlbaum Associates.
- Cummins, J., Brown, K., & Sayers, D. (2007). *Literacy, technology and diversity: Teaching for success in changing times*. Boston, MA: Pearson, Inc.
- Denzin, N. & Lincoln, Y. (Eds.). (2000). *Handbook of qualitative research* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- Gee, J. (2007). *Good video games and good learning*. New York, NY: Peter Lang.
- Glaser, B., & Strauss, A. (1967). *Discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine Transaction.
- Gounari, P. (2009). Rethinking critical literacy in the new information age. *Critical Inquiry in Language Studies*, 6(3), 148-175.
- Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Web 2.0 and classroom research: What path should we take now? *Educational Researcher*, 38(4), 246-259.
- Greenleaf, C.L. & Hincham, K. (2009). Reimagining our experienced adolescent readers: from struggling, striving, marginalized, and reluctant to thriving. *Journal of Adolescent & Adult Literacy*, 53(1), 4-13.
- Hague, C., & Payton, S. (2010). *Digital literacy across the curriculum: A Futurelab handbook*. Bristol, UK: Futurelab. Retrieved from <http://www.futurelab.org.uk>
- International Reading Association. (2010). *Standards for Reading Professionals*. Newark, DE: International Reading Association.
- Jenkins, H. (2006). Confronting the challenges of participatory culture: Media education for the 21<sup>st</sup> century. Retrieved from <http://digitalllearning.macfound.org/>

- Jewitt, C. (2008). Multimodality and literacy in school classrooms. *Review of Research in Education*, 32(1), 241-267.
- Knobel, M., & Lankshear, C. (2008). Digital literacy and participation in online social networking spaces. In C. Lankshear & M. Knobel (Eds.), *Digital literacies: Concepts, policies, practices* (pp. 249-278). New York, NY: Peter Lang.
- Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60-70.
- Leu, D., Kinzer, C., Coiro, J., & Cammack, D. (2004). Toward a theory of new literacies emerging from the Internet and other Information and Communication Technologies. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading, fifth edition* (pp. 1568-1611). Newark, DE: International Reading Association.
- Lewis, C., & Fabos, B. (2000). But will it work in the heartland? A response and illustration. *Journal of Adolescent & Adult Literacy*, 43(5), 462-469.
- Myers, J., Hammett, R., & McKillop, A. M. (1998). Opportunities for critical literacy and pedagogy in student-authored hypermedia. In D. Reinking, M. McKenna, L. Labbo, & R. Kieffer (Eds.), *Handbook of Literacy and Technology: Transformations in a Post-Typographic World* (pp. 63 – 78). Mahwah, NJ: Lawrence Earlbaum Associates, Inc.
- National Council of Teachers of English. (2008). *The NCTE definition of 21<sup>st</sup> century literacies*. Retrieved from <http://www.ncte.org/positions/statements/21stcentdefinition>
- Palfrey, J., & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. Cambridge, MA: Harvard University Press.
- Partnership for 21<sup>st</sup> Century Skills. (2009). *Framework for 21<sup>st</sup> century learning*. Retrieved from [http://www.21stcenturyskills.org/index.php?option=com\\_content&task=view&id=254&Itemid=120](http://www.21stcenturyskills.org/index.php?option=com_content&task=view&id=254&Itemid=120)
- Reinking, D., McKenna, M., Labbo, L. & Kieffer, R. (Eds.), *Handbook of Literacy and Technology: Transformations in a Post-Typographic World*. Mahwah, NJ: Lawrence Earlbaum Associates, Inc.
- Synder, T., Dillow, S., & Hoffman, C. (2008). *Digest of education statistics 2008*. Washington, DC: U.S. Department of Education.
- Staples, A., Pugach, M., & Himes, D. (2005). Rethinking the technology integration challenge: Cases from three urban elementary schools. *Journal of Research on Technology in Education*, 37(3), 285-311.
- Stone, J.C. (2007). Popular websites in adolescents' out-of-school lives: Critical lessons on literacy. In C. Lankshear & M. Knobel (Eds.), *A new literacies sampler* (pp. 49–65). New York, NY: Peter Lang.

Appendix A  
Teacher Interview Questions

Purpose of the Study:

- What is your view of why we are here? How did you come to participate in this study? *Give a copy of proposal.*

Personal/Professional Background

- Tell me a little about yourself.
- How long have you been here?
- How do you feel about being at Baybrook?
- Are you certified? Where? How long have you been teaching?
- Tell me about your students. (Parents and Family; Community)
- Tell me about your classroom.
- What kind of support are you getting?
- What else would you like us to know?

Literacy Instruction

- What are your goals for your students as readers and writers during this school year?
- What are your goals for your students as future readers and writers?
- What purposes and functions of literacy do you think will be important for your students to fulfill as adults?
- What literacy attitudes and perceptions would you like your students to develop about themselves personally and as fully functioning members of society?
- What aspects of your current curriculum support achievement of these literacy goals?
- What do you feel is needed in terms of literacy programs and materials, as well as school and system support to achieve these goals?

Appendix B  
Student Interview Questions

- What do you think makes a good reader?
- What do you think makes a good writer?
- What are your goals for yourself/what do you want to learn or do as a reader and writer during this school year?
- What do you do in your classroom that you think helps you learn to read and write better at school?
- What types of reading and writing do you do at home (including on the computer or cell phone if you have one)?
- What do you do in your classroom that you think helps you to be a better reader and writer at home?
- What else do you think you should be doing at school that might help you be a better reader and writer at home?
- What are your goals for yourself as a reader and writer when you are an adult?
- How do you think reading and writing will be important to you as an adult?
- (For older students) What types of problems for the country or the world do you think grown-ups/leaders will have to solve in the future and how do you think reading and writing will help them do that?

Appendix C  
Community Interview Questions

- What types of reading and writing are currently required in order to be active and productive citizens in your community?
- What types of reading and writing do your family members and friends engage in for their own personal pleasure and fulfillment?
- What types of reading and writing competencies do your co-workers/employees/employers need in order to be successful at their workplace?
- What types of reading and writing competencies do you think will be important for future citizens to acquire in order to solve societal issues in the future?
- What types of reading and writing competencies do you think will be important for future citizens to acquire in order to solve environmental problems?
- What types of reading and writing competencies do you think will be important for future citizens to master in order to succeed in the workplace?
- In what ways do you believe schools are already addressing these future literacy needs?
- What do you feel is needed in terms of school literacy programs, as well as school and system support, to achieve these goals?

Appendix D  
Parent Survey

In the past week, did your child... (His/her grade level is \_\_\_\_\_.)

<i>Send or receive a text message on a cell phone?</i>	Yes	No	Don't know
<i>Send or receive an email message?</i>	Yes	No	Not an email or internet user
<i>Send or receive an instant message?</i>	Yes	No	Not an email or internet user
<i>Post a message to someone's personal online profile?</i>	Yes	No	Not an email or internet user
<i>Listen to a podcast?</i>	Yes	No	Not an email or internet user
<i>Download music, games, or ringtones from the internet?</i>	Yes	No	Not an email or internet user
<i>Use the internet to get news or information?</i>	Yes	No	Not an email or internet User
<i>Use the internet for homework or projects?</i>	Yes	No	Not an email or internet user
<i>Write or receive a personal letter?</i>	Yes	No	Don't remember
<i>Read a book?</i>	Yes	No	Don't remember
Thinking about technology such as the internet, instant messaging, cell phones, text messaging, and iPods, does new technology ...			
<i>Make learning more interesting?</i>	Yes	No	No opinion
<i>Make you closer to friends/family?</i>	Yes	No	No opinion
<i>Make you more efficient?</i>	Yes	No	No opinion



Thinking about your child's future, what kinds of skills and abilities will he/she need to be successful?		
What skills should your child be learning in school to be prepared for the future?		
Do you have a computer at home?	Yes	No
Please check all the places that you use computers. If other, please describe:	School_ _____ Other__ _____	Work__ _____ Library____
Do you have internet access at home?	Yes	No
Please check all the places that you use the internet.	School_ _____ Other _____	Work__ _____ Library____
If other, please describe:		
Would you be willing to participate in a brief follow-up interview?	Yes	No
Your Name:		
Child/children in your household (his/her/their ages):		
Phone and/or email contact information:		
Year you were born:		