Latino/a Children's Digital Literacy Access and Online Reading Skills

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Abstract

This mixed methods study explores digital literacy opportunities and online reading skills of

Latino/a children, grades three to eight, in a South Texas school district along the U.S.-Mexico

border. New Literacy Studies constituted the overarching framework, with cognition and social

justice as supporting theories. Participants were 310 children and five staff members from the

Futuro school district. Data sources included a two-part digital literacy survey, interviews, field

notes, learning logs, and public domain data from *Futuro*. Although most participating children

enjoyed access to working computers and high-speed Internet at home, the majority

demonstrated low computer and online reading skills. Most reported limited school work related

to the development of digital literacies, especially the new literacies of online research and

comprehension. Implications relate to a more complex definition of the digital divide that

includes computer access and use, critical digital literacy, and online reading skill development.

Keywords: digital literacy, new literacies, online reading, digital divide, Latino/a

Introduction

What digital literacy access and skills do Latino/a children of poverty possess in and out

of school? How does access relate to their online reading and comprehension skill development?

This mixed methods study examines these research questions for Latino/a elementary and middle

level children in a South Texas school district, located at the Mexican border. We explore 310

youth participants' digital technology access and skills in and out of school, focusing on basic

computer skills and online research and comprehension.

Our study is significant because Hispanics represent 17% of the U.S. population and the

third fastest growing racial group. With a projected increase of 115% by 2060, Hispanics will

constitute 29% of the U.S. population (U.S. Census Bureau, 2015). One in three Hispanics (33%)

include school age children, compared to one in five (20%) of the white population (Fry &

López, 2012). While the U.S. government uses the term *Hispanic,* we prefer the term *Latino/a*

when discussing our participants, who have more ties to Latin America rather than Spain. About

74% of this city's population is of Mexican origin, according to the city's website. Thus, we

present national data of the Hispanic population, but refer to our participants as Latinos/as.

Besides expanding populations, learning more about nondominant youth is important for

other reasons: poverty and academic achievement. For example, Hispanic and Black children

face the most difficult economic challenges of any U.S. child population (Children's Defense

Fund, 2011). In 2015, the Pew Research Center statistical report indicated 25% of U.S. Hispanics

live in poverty, with an annual average income of $21,900 (Stepler & Brown, 2015). Educational

attainment is also limited among Hispanics. About 20% of American-born and 49% of foreign-

born Hispanics do not possess a high school education or equivalent (Brown & Patten, 2014).

However, 92% of Hispanic registered voters stated education was extremely or very

important, followed by jobs, the economy, and healthcare (López, González-Barrera, &

Krogstad, 2014). This group's academic achievement has been such a travesty that Gándara and

Contreras (2010) called it the Latino education crisis. Therefore, research in schools and districts

serving large numbers of Hispanic children represents a national issue.

When addressing out-of-school technology access to develop digital and critical literacy

skills among non-dominant youth, we found little research. Watkins (2011) underlined the

importance of Latinos/as' and African Americans' digital literacy practices to develop academic,

civic, critical, and social skills. For example, youth contributed to a public memorial of a

homicide victim to critique racial and social class inequalities (Watkins). For many years,

Morrell (2015) engaged public urban youth in digital documentary films and research, which

augmented their critical reading skills. Students joined cyberactivism communities of their

choice and participated virtually and face-to-face in rallies, community forums, and protest

marches. This youth action research took place for six summers (Morrell, 2008); one participant

wrote, "I can no longer read text without questioning it" (p. 155).

Regarding school-based digital experiences and skills, Warschauer and Ware (2008)

described Project *Fresa* [strawberry], which focused on harsh fieldwork conditions in California.

With the scaffolding of two teachers, the elementary students, 80% Latinos/as, generated survey

and interview questions, conducted interviews, and created charts, graphs, and spreadsheets of

their findings. They emailed elected officials and strawberry growers about their concerns. The

pupils findings to California community members and parents, also. Through these experiences,

the children gained valuable cognitive, critical thinking, and communication skills.

Similarly, two Canadian high school instructors involved indigenous students in

generative, critical digital narratives. The adolescents explored issues of oppression, privilege,

race, and identity through a collaborative written report and digital video. According to the

principal investigator, Pirbhai-Illich (2010), "Engaging students required tapping their interest in

using electronic media, accepting their lived experiences, and inviting them to use their funds of

knowledge in multiliteracies" (p. 264).

Developing reading, writing, and collaborative skills is essential for 21st century college

and workplace success (Partnership for 21st Century Learning, 2007). Thus, to give digital

technology increased attention, we position it as a literacy issue; educational policies should

include information and communication technologies (ICTs) to support literacy practices and the

development of new literacies (Leu, O'Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009;

Castek, Coiro, Henry, Leu, & Hartman, 2015). We perceive digital technology as part of new

literacy studies (Gee, 2007) because technology and literacy inform each other (Karchmer,

Mallette, Kara-Soteriou, & Leu, 2005). Indeed, literacy involves "a malleable repertoire of

practices" related to social transformation (Luke, 2005, p. xi).

Digital literacies relate to "socially situated practices supported by skills, strategies, and

stances that enable the representation and understanding of ideas using a range of modalities

enabled by digital tools" (O'Brien & Scharber, 2008, pp. 66-67). Digital literacy tools include

ICTs, video games, wireless interfaces, and other hand-held devices (Skudowitz, 2009).

Information and communication lines intersect, as we can locate information on a mobile device,

smartphone, or tablet and can engage in strategic play in a game with someone far away using

Wi-Fi and cellular data. Yet, digital literacy and online reading skill development require more

than simply placing tools in children's hands. This is because digital literacies involve

collaboration, engagement, and meaning (Kalantzis, 2011), in addition to information

consumption, creation, critique, and production (Lankshear & Knobel, 2006). Therefore, digital

literacy skill development requires higher-order thinking (Churches, 2008) as well as application

and practice in complex digital environments supported by ICTs.

Theoretical Perspectives

New Literacy Studies (NLS) traditions guided our inquiry. This overarching theoretical

perspective focuses on evolving notions of context-based literacy practices, including

technology-infused contexts, with a variety of multimodal texts (Gee 2000). Within NLS, we

examined data from cognitive and social justice lenses because we were interested in the digital

access and online research and comprehension skills of low SES Latino/a children.

New Literacy Studies

Our research is part of NLS theory because we interpret digital skills and use as ways to

enhance contextualized literacy practices (Gee, 2007; Stolle, 2008). Leu and colleagues have

spent more than a decade defining and refining a new literacies perspective from a cognitive

approach (Leu, Kinzer, Coiro, & Cammack, 2004; Leu, Kinzer, Coiro, Castek, & Henry, 2013;

Castek et al., 2015). These approaches focus on the development of online reading paired with

higher-order thinking skills, ranging from synthesizing to critically evaluating information.

Cognition

Building upon this body of NLS theory and research, we aligned our definition of digital

literacy skills to focus on the new literacies of online reading. More specifically, we focus on the

new literacies, which include strategies and skills "required to identify an important question

directing the author to locate, critically evaluate, synthesize, and communicate information with

the Internet" (Castek et al., 2015, p. 325). See also Henry (2006). The revised Bloom's taxonomy

includes verbs, not nouns, to demonstrate the role of learners in constructing their own

knowledge. These cognitive skills involve remembering, understanding, applying, analyzing,

evaluating, and creating (Churches, 2008). Thus, a cognitive framework includes schema

building, cognitive strategies, engagement, and analysis and relates to students' 21st century

career and academic success (Kivunja, 2014).

We utilized a taxonomy of cognitive skills, from basic Internet searches, navigation, and

email, to more advanced Internet-based searches. The latter include the process of locating

information on the web, information synthesis, and critical evaluation (Castek et al., 2015). In

the following section, we explain how these skills are not neutral from a NLS perspective.

Social Justice

As social justice scholars under NLS, we explored access to new literacies and

underlying social inequalities reproduced in that access (Freire, 1970). Literacy encompasses

access, design, diversity, and domination (Janks, 2010). We relate access and design to what

children do with technology. We connect diversity and domination to structural inequities that

low socioeconomic status (SES) Latinos/as face. For instance, teachers from high SES districts

are more likely to assign Internet-related homework than low SES districts (Henry, 2010).

Additionally, teachers and students from wealthy districts had significantly higher mean scores

on an assessment of online reading comprehension. See also Henry (2007).

NLS relates to these social justice issues. Luke (2005) considered the NLS commitment

to "education as a force for a more equitable redistribution of social goods, power, and capital"

(p. xiii). Next, we perceive literacy as contextualized and ideological, not neutral (Barton &

Hamilton, 1998; Gee, 2000; Street, 1993, 2003). For example, children may possess many digital

skills, but if these skills involve only entertainment, friendship through social media, and

information consumption, these children will not be as academically prepared. Furthermore,

much depends on children's academic digital access and mentoring in school and in out-of-

school contexts. Therefore, we employed a social justice lens because of systemic inequities

(Freire, 1970) and inaccessibility to digital resources, especially for impoverished youth and

Latinos/as. Low SES schools tend to possess less instructional technology than wealthier ones

(National Center for Education Statistics, 2010). Furthermore, teachers in the former hesitate to

assign digital work, believing children lack access (Bussert-Webb, 2014; Warschauer &

Matuchniak, 2010).

Regarding out-of-school access, Latinos/as do go online as much as other groups (López,

González-Barrera, & Patten, 2013). However, many experience interrupted services, logistical

issues in finding public access, and non-functioning devices (Gonzáles, 2016). Bussert-Webb

and Díaz (2012) found most Mexican-heritage youth in a low SES neighborhood did not get

broken hardware replaced and did not know who could service their equipment. Irreparable tools

not only impact youth's digital literacy access; the former also relate to digital skills, as youth

cannot develop digital skills with unusable equipment.

Research Methods

This section focuses on our research site, participants, data sources, procedures, and data

analyses; all methods connected to our theoretical frameworks.

Setting

This study took place in *Futuro* [Future], pseudonym for a South Texas school district

and the largest employer south of San Antonio. Having a school district, versus a business or

university, as the biggest employer demonstrates the city's poverty level and economic standing.

Additionally, the city surrounding Futuro sits alongside the Mexico border and is the most

economically strapped U.S. city (U.S. Census Bureau, 2010). *Futuro,* with approximately 50,000

students and over 50 schools, is one of the poorest U.S. districts; 95% of *Futuro*'s students are

economically disadvantaged and qualify for free and reduced price school meals as part of the

National School Lunch Program. According to the district's website, 65% of the student

population is at-risk; 33% are considered limited English proficient.

Despite these challenges, *Futuro* has won several state and national awards for student

achievement on high-stakes tests as part of No Child Left Behind (NCLB) requirements (U.S.

Department of Education, 2002). *Futuro* boasts a student attendance rate of 96%. The Texas

Education Agency (2015) rated 80% of *Futuro* schools as recognized or exemplary, based on

attendance, retention rates, and state-mandated test results.

Participants

We gathered data during an after-school enrichment program for *Futuro* children,

identified as at-risk for school failure in five elementary schools and three middle schools, grades

three to eight. Of approximately 1,400 children in the after-school program, 114 middle level and

196 elementary students turned in signed, matching parent consent and child assent forms

(n=310). About 87% of the children self-identified as Hispanic on Digital Divide Measurement

Scale for Students (DDMS-S); however, we believe this percentage should be much higher.

Futuro's website indicates a 99% Latino/a enrollment. Moreover, during survey completion,

participants asked Bussert-Webb what *ethnicity* and *Hispanic* meant, although the survey

questions contained definitions and examples of each. Some youth with Spanish first and last

names asked Bussert-Webb if they were Hispanic, Asian, or Black. Of the 310 children, 18

participated in interviews with Bussert-Webb and at least 150 (about half) completed learning

logs. Perhaps more participants completed the logs, but the number was difficult to determine

because some did not type their names.

Staff interviewees included four female and one male staff member (five total) who had

expressed interest in digital literacy or who taught technology during the after-school program.

Two staff members were site coordinators and the other three were technology teachers; they had

the same job titles during school and for the program. Site coordinators interacted with teachers

during the school day and had opportunities to observe classroom instruction. All five staff

members self-identified as Latinos/as. The only male staff participant taught at the middle level;

all others were females at the elementary level.

Data Sources

We used a mixed methods approach to cross-reference quantitative and qualitative data

sources. We administered a two-part DDMS-S, which assessed computer access and use as well

as digital literacy and online reading skills (Henry, 2007). We included child and staff

interviews, children's learning logs, and documented field notes, also.

For quantitative data, we administered the DDMS-S to determine children's technology

access and skills across three constructs: 1) Internet access inside and outside school, 2) Internet

use inside and outside school, and 3) Internet reading skill as a measure of online reading

comprehension, derived of two dimensions, reading to locate information and reading to

critically evaluate information. An exploratory factor analysis (Pett, Lackey, & Sullivan, 2003;

Thompson, 2004) resulted in the identification of these three interpretable factors (Henry, 2007,

2010). Next, validation procedures to test the psychometric properties of the DDMS-S included

content validation (Netemeyer, Bearden, & Sharma., 2003) and two internal consistency

estimates of reliability (i.e. split-half coefficient - .9389 and coefficient alpha = .9345), indicating

satisfactory reliability (Green & Salkind, 2003).

For qualitative data, a 25-question semi-structured child interview focused on digital

technology access and use during and away from school. Included were mobile phone and

Internet think alouds (Damico & Baildon, 2007), e.g., "Here is my laptop. Talk aloud as you use

it and wherever you go." Other interview questions were: "How do you feel about the ways you

use technologies outside of school?" and "What have been your experiences with technology-

related school projects?" An eight-question semi-structured staff interview focused on staff

perceptions regarding the children's technology access and use during school hours and at home,

as well as what staff envisioned as important digital skills for the children. A sample question

was: "What is your goal for the children's technology knowledge and skills?"

Qualitative data also included Bussert-Webb's participant observation and children's

learning logs during the after-school program. Field notes taken during the DDMS-S

administration documented children's questions and basic technology skills in the computer labs.

For the electronic logs, youth completed demographic information, summarized what they did

during school and in the after-school enrichment program, and wrote reflections on what they

enjoyed during the enrichment program.

Procedures

Bussert-Webb was present when the children completed the DDMS-S through Survey

Monkey links; the youth completed the DDMS-S, administered in a group setting in their school

computer labs after school. We divided the DDMS-S into two parts for administration: 1)

technology/Internet access and use inside and outside of school, and 2) Internet searching and

critical evaluation of web-based information and a technology self-efficacy scale. We asked

youth to complete part two immediately after part one because of program time constraints and

limited school computers. Sample questions from part one included: "I use the Internet in the

following places (select all that apply)," and "Who owns the computer that you use most often?"

Sample questions from part two were: "How did Oprah Winfrey get started with her talk show?

You want to find the answer to this question. What would be the best way to search the Internet

for an answer?" and "Canadian Man Raises Enormous 80 Lb., 60-inch Cat. Where would you go

to see if this news story is true or false?"

Other DDMS-S items asked each respondent to rate their skill levels in keyboarding,

searching the Internet for academic and personal purposes, sending email, and reading

information on the Internet. Participants asked Bussert-Webb, bilingual and biliterate, questions

in Spanish and/or English when they took the DDMS-S. The children's questions related to

unknown words, such as *search engine* and *Skype*, and how to continue the survey after a certain

question set. If a child completed part one of the DDMS-S, s/he immediately went to part two;

both parts combined took about 25 minutes on average.

As a nested design, Bussert-Webb interviewed 18 children, two per site, based on high

and low digital access as determined by the DDMS-S results. Bussert-Webb interviewed the

youth in their language of preference: one elementary child and one middle level child in

Spanish, one middle level child in both languages, and 15 children from both levels in English.

Bussert-Webb interviewed six children individually and 12 in pairs. Each tape-recorded and

transcribed interview took about 30 minutes; the researcher typed interview notes in *Excel* as

participants spoke. At the end of each interview, she asked follow-up questions and clarifications

and also summarized the responses for member-checking.

Bussert-Webb interviewed the five staff members individually. Each interview lasted

approximately 30 minutes. The taped and transcribed interviews took place in site coordinators'

offices or in teachers' classrooms. The researcher typed notes as the person responded to

questions. For staff member checking, Bussert-Webb emailed each respondent individually an

attachment of the interview notes. All staff interviewees reviewed the transcriptions for accuracy,

made corrections, or agreed with what was typed.

The optional daily learning logs took the children anywhere from two to 10 minutes,

depending on how fast the children typed and how much they chose to disclose. Children

completed the logs during the after school enrichment program.

Data Analyses

Qualitative analysis, based on grounded theory, consisted of looking for patterns (Corbin,

& Strauss, 2008). We read all data and typed key words, phrases, concepts, or sentences used by

respondents. We read the data again, continuing to write participants' words and our insights.

We discussed our emerging findings and created themes by looking for similarities and

anomalies vis-à-vis our theoretical frameworks (Bogdan & Biklin, 2007). Because we examined

all data, an initial theme was the relationship between high-stakes testing and participants' digital

practices. However, we decided to focus on findings related to digital access and skills because

these themes connected closely to our social justice and cognitive frameworks and our research

questions.

We analyzed quantitative data from part one of the DDMS-S using descriptive statistics

and frequencies of categorical data, which focused on demographic variables and computer

access and use in and out of school. Next, we studied the mean differences in the elementary and

middle level students' online reading comprehension from part two of the DDMS-S. This part-

two scale consisted of 14 forced-response items, measuring two specific functions of online

reading comprehension: locating information and critically evaluating information. Locating

information variables focused on both locating information on the Internet as well as locating

information on a specific website. Evaluating information variables focused on evaluating

information for accuracy and relevancy.

We scored responses to these 14 forced-choice questions dichotomously (1=correct,

0=incorrect) to calculate a composite score for online reading comprehension ranging from 0 (no

correct responses) to 14 (100% correct responses). Once we created the composite and sub-

scores for the two main variables, we used a multivariate analysis of variance (MANOVA) to

determine if differences existed between elementary level students (n=173) and middle level

students (n=98) across the independent variables. Although 310 children participated, some only

wrote learning logs and did not complete the DDMS-S.

Results

Our data analyses revealed these themes: technology access during school and for school-

related work, technology access away from school, and computer and digital literacy skills.

Technology Access

School-Related Access. According to *Futuro*'s website during data gathering, 23,600

instructional computers were in use, but the district website did not specify if its 50,000 students

touched this technology or if the computers were strictly teacher workstations. Thus, when we

discuss access, we also mention student use. The district possessed Project Share, consisting of a

professional development portal for teachers, a student e-portfolio system in development, and a

portal for teachers to communicate and explore content repositories, e.g.., www.pbs.org and

www.NASA.gov. Although *Futuro* made *Google* and *Yahoo* websites available, it blocked many

websites, apparently to protect youth from accessing inappropriate information. During data

gathering, *Futuro* prohibited hand-held devices and video game magazines.

All *Futuro* students possessed a www.gaggle.net account, a secure email and Learning

Management System (LMS) for K-12 schools. However, based on DDMS-S results, one of the

Internet-based activities in which most students (89%) reported the most infrequent use during

school was email, which was peculiar. Perhaps pupils had little time to access Gaggle. On the

DDMS-S, most elementary and middle level students reported that teachers did not require them

to use the Internet. Based on youth learning logs and interviews, students' minimal technology

access appeared to be for discrete skill building, high-stakes testing preparation, e.g., Study

Island and Accelerated Reader (AR) tests; AR involves reading novels and taking

comprehension tests on the computer for assignment grades, points, and prizes.

Elementary and middle level interviewees reported limited computer use during school

and for homework, also. This statement by Luis, age 13, was a typical response regarding digital

homework: "I don't know. In my whole life? In middle school. Two times. One for a project

about a city for Social Studies. And the other one for an English assignment. I had to write an

essay." Scratch, an 11-year-old sixth grader, said, "Basically inside of school it's just regular for

me … In technology class I'm basically typing the words." Scratch said his school's technology

access was so poor that he decided to get online only at home. Gloria, age 10, who arrived in the

United States a year before data gathering, said, *"No usamos la computadora. Tampoco el año*

pasado. No usamos la computadora durante la escuela" [We don't use the computer, not even

last year. We don't use the computer during school].

According to a middle level technology teacher, about half of the teachers at his school

use technology in their classrooms. He described teachers' use of clickers, Smart Boards, and

Mobi devices that provide teacher flexibility to interface with interactive whiteboards from

anywhere in the room. He did not mention student technology use, however. When asked how

students used technology during the school day, an elementary site coordinator said, "We're not

implementing a lot of [technology] programs because the teachers didn't grow up with it. I think

we need more tech teachers at our campus."

Besides limited technology access during school, Spanish-dominant Latino/a students in

poverty face another access issue: lack of digital Spanish resources. Abby mentioned the

language barriers related to technology in her middle school, "*En la escuela no puede ponerlo en*

español" [In school I can't use the computer in Spanish]. When asked how she felt about her

inability to use her mother tongue through technology, Abby said, "*Difícil porque a veces no*

entiendo" [Difficult because sometimes I don't understand]. Not allowing this Spanish-dominant

student to use Spanish as a scaffold during school represents an injustice.

Out-of-School Access. On the DDMS-S, 74% elementary and 78% middle level students

reported having a computer in their home. On average, 24% of student participants had no access

to a computer at home. Of those with a computer at home, 13% had no Internet-connected

computer. A small percentage of students (7%) reported dial-up Internet service, while 39% had

high-speed Internet access. However, 62% of elementary-level students and 48% of middle-level

students selected "I Don't Know" in response to this high-speed Internet question on the DDMS-

S. The smaller percentage of middle-level students indicated they were more aware of the type of

Internet service available in their homes.

Both sets of surveyed students reported accessing the Internet from home. Other popular

places where participants reported using the Internet were: the public library, friends' homes,

relatives' homes, Internet cafés or community centers, after-school tutorial agencies, fast food

restaurants, and the mall. To cross-reference survey results, Bussert-Webb asked interviewees if

they had working computers and Internet at home. Abby, age 14, said, "*Computadora - de vez en*

cuando, en la casa. Mi papa no puso el Internet porque el año pasado no trabajó' todo el año"

[Computer, sometimes at home. My dad didn't install Internet because he worked intermittently

last year]. Abby continued, "*Solamente tengo el iPod y el fon. Lo demás es de mi tía. La*

computadora es de mi tía. Ella vive cerquita de mi casa. Mi tía tiene Internet" [I only have an

iPod and cell phone. The rest are my aunt's. The computer is my aunt's. She lives close to my

house. My aunt has Internet]. Abby's quote demonstrated that she, like other participants

interviewed, would find ways to work around limited digital access.

When asked how they felt about slow or nonexistent digital access in their homes, the

youth mentioned feeling left out and dissimilar to some peers. Abby said, "Sometimes I feel bad.

Like last week *mi papa no tenía trabajo, y no podía pagar por los aparatos electrónicos*" [My

dad didn't have work and we couldn't pay for our electronics] "and oh my God, I feel bad."

Some may argue subaltern youth may not realize they lag behind in digital access, but Abby's

impassioned statement indicated she realized and felt sad about inaccessible technology.

Computer and Digital Literacy Skills

Computer Skills. Participants' limited digital access matched their low-level computer

skills. Based on Bussert-Webb's field notes during DDMS-S administration, some students

struggled with computer usage. Some created spaces when typing the URL to access the survey,

while others did not know how to create lowercase and uppercase letters or how to use a mouse.

Bussert-Webb observed many participants pecking slowly at the keyboard with index fingers.

These low-level computer skills were particularly noticeable in a rural elementary school with no

computer lab time for children during the day. This participant observation allowed us to cross-

reference the children's reported technology skills on the DDMS-S.

Digital Literacy Development. Although computer skills are important first steps in

acquiring higher-level digital skills, mere computer know-how does not represent digital literacy.

The latter includes proficiency in digital searches and inquiry, as well as understanding and

evaluating online information. Thus, this next section focuses on finding information online and

inquiry, or researching concepts based on one's interests.

Finding Information Online and Inquiry. The MANOVA tested significant for the

composite online reading comprehension score, $F(1, 265) = 11.772$, $p < .001$. The composite

score for middle level students (M = 4.51; SD 1.87) was significantly higher than for elementary

level students (M = 3.72; SD = 1.79). The MANOVA also tested significant for the locating

information sub-score, $F(1, 269) = 15.593$, $p < .001$. The latter score for middle level students

(M = 2.56; SD = 1.54) was significantly higher than for elementary level students (M = 1.87; SD

= 1.29). Table 1 displays the mean scores and standard deviations for the composite score for

online reading comprehension and sub-scores for locating and critically evaluating information

by school level.

Table 1.

Means and Standard Deviations for Online Reading Comprehension Scores

Measure	Mean	SD
Middle Level Students		
Composite Online Reading Comprehension	4.51	1.87
Locating Information	2.56	1.54
Critically Evaluating Information	1.95	1.10

Elementary Level Students		
Composite Online Reading Comprehension	3.72	1.79
Locating Information	1.87	1.29
Critically Evaluating Information	1.95	1.10

Critical Evaluation of Information. As indicated in Table 1, we found no significant difference on the critically evaluating information variable between the elementary and middle level groups. Importantly, the mean score for items related to critically evaluating information was the same for both groups. This suggests both elementary and middle level students lacked the higher-order thinking skills related to evaluating information for accuracy and bias when critically reading on the Internet.

We triangulated this critical evaluation score with participants' DDMS-S self-reports; 48% of elementary and 29% of middle level students indicated they never check information accuracy. Only 13% of elementary and 11% of middle level respondents stated they always check information for accuracy. Most elementary level students (65%) and about half (53%) of middle level students indicated they never check the authorship of information they read. A few elementary level students (11%) and middle level students (6%) reported always checking authorship of information they read on the Internet at school.

The DDMS-S mean scores and self-reports differ from what an after-school technology teacher at the elementary level reported. She wanted them to research deeply and to discover different points of view. She said she teaches them to read critically online:

> If they go on the Internet, when they're working on bios, they find the person grew up in
>
> a small town and they go to another website and they find the [same] person grew up
>
> in a big town. They learn that they need to continue delving into the information until
>
> they find out what are the actual facts.

However, this was just one staff participant at one school. Data from the DDMS-S related to the
new literacies of online reading comprehension indicated our youth participants were not
developing critical digital literacy skills.

Discussion

We interweave our findings regarding technology access and skill levels with relevant
literature and our cognitive constructivism and social justice frameworks, under the overarching
theory of New Literacy Studies.

Technology Access

School-related Access. Participants' digital access in school was minimal, which reflects
national trends. Schools serving predominantly low SES students possess less instructional
technology (National Center for Education Statistics, 2010). Our participants' limited access
relates to our cognitive framework as well because students may experience difficulty
developing schemata and employing higher-level analytical strategies if they have poor
technology experiences in school (Kivunja, 2014). Bussert-Webb noticed students at one rural
school struggled with basic computer skills during the DDMS-S administration.

Additionally, the children's limited digital access and skills appeared to mirror some
teachers' need for ongoing digital literacy training. A coordinator at the rural school, discussed in
the previous paragraph, noted that technology liaisons could build other educators' knowledge
and skills and that teachers needed more professional development in technology. This finding is

also supported in the literature. Low-SES teachers and pupils had significantly lower mean

scores on an assessment of online reading comprehension (Henry, 2007, 2010), which relates to

our social justice framework.

As Henry (2007, 2010) found, children with pauper-like technology and little mentoring

tend to have unequal higher-level technology skills, compared to their wealthier peers. Thus,

limited school technology access relates to social justice (Warschauer & Ware, 2008). The

opportunity gap connected to SES is a systemic inequality (Gorski, 2013). We are not criticizing

Futuro, which faces much NCLB pressure to help low SES, emergent bilingual children. Student

use of digital literacies for authentic purposes is rare in test-preparation environments permeating

many low SES schools (Bussert-Webb, 2009; Bussert-Webb & Díaz, 2012; Henry, 2007; Leu,

McVerry, et al., 2009).

Furthermore, limited Spanish language access to digital tools in school is a social

injustice because Spanish-dominant children cannot build on their learning without language

scaffolding. As native-English speakers, we could not imagine being recent immigrants in Japan,

for instance, and accessing only Japanese resources at school. Conversely, teaching emergent

bilinguals to read in their home language and providing home language resources help their

reading achievement in the target language (Chuang, Joshi, & Dixon, 2012; Goldenberg, 2008).

Access, design, diversity, and domination are important facets of social justice (Janks,

2010). However, our interviewees experienced little of Janks' four areas during school or for

homework. Autocratic test-preparation curricula controlled and dominated the children, and this

teach-to-the-test approach did little to develop their cognitive skills online. They had little in-

school technology access, few opportunities to express their diversity, and few design

opportunities through inquiry projects. Thus, youth participants' limited access and mentoring appeared related to the ways they used technology.

Out-of-school Access. Most elementary and middle level students reported having computers in their homes; about one fourth had no home computer. Of participants with at least one home computer, about 13% did not have computers connected to the Internet. Most students indicated using the Internet at home the most, perhaps because of restricted school access. Based on the scant amount of digitally-related homework participants mentioned receiving, it appeared teachers perceived the children to have *no* computer and Internet access. However, to prepare students for cognitive development and employment demands (Kivunja, 2014) and digital equity (Gee, 2011), youth must have challenging, authentic, collaborative digital homework.

Our child participants experienced limited school-based access and use, but higher out-of-school social media use, which relates to national findings. Henry (2010) discovered students in low SES districts used the Internet more outside of school than in school. In Rideout, Foehr, and Roberts (2010), Latino/a and African American youth played video games approximately a 30 minutes more daily than did white youth, and Hispanics had higher computer usage rates than Whites in social networking, instant messaging, video websites, emailing, reading magazines or newspapers, and using graphics and photos. If one of the four social justice areas is absent (access, design, diversity, and domination), children circumvent the system (Janks, 2010). Of four income groups in 2010, the lowest-SES teen mobile phone owners were most likely to use their phones to go online and were least likely to have a computer in their home (Lenhart, Ling, Campbell, & Purcell, 2010). Thus, people can reconstruct and redesign to rhizome around inequalities (Janks).

As social justice scholars, we are also interested in challenging issues of digital inequality

and privilege vis-à-vis ethnicity and other factors. In his later years, Freire embraced complex,

multifactor analyses in his struggle for a socially just world (Macedo, 2000). Thus, we conducted

data analyses related to children's ethnicity and out-of-school digital access to electronic devices

and the Internet, as reported on the DDMS-S. We found no significant differences between these

variables. However, we report this finding with caution, since there was not enough ethnic

diversity; 87% reported they were Hispanic. The cultural variable may be a factor in future

studies with larger percentages of various ethnic groups.

Digital Literacy Skills

Many children participants struggled with basic computer skills. When Bussert-Webb

assisted them with the DDMS-S in computer labs, she was shocked some fifth grade students did

not know how to type a capital letter. Many youth did not know how to type a URL; for

example, some used spaces when they typed the DDMS-S link Bussert-Webb wrote on the

whiteboard. Although keyboarding and URL knowledge do not equate to digital literacy, basic

computer skills are a precursor to digital literacy skills (Castek, et al., 2015). The first author did

not notice differences in basic computer skills and children's ethnicity, gender, or language

during the survey administration.

Next, no significant difference existed between the elementary and middle level children

on the critically evaluating information variable of the DDMS-S. The mean score for items

related to this measure was the same for both groups (e.g., 1.95 out of a possible score of 5.0).

This suggests both groups lacked higher-order thinking skills related to evaluating online

information for accuracy and bias. The dismal DDMS-S results, especially for middle level

participants, indicate the youth need to learn how to create products, develop critical reading

skills online, and write for authentic purposes (e.g., blogs and newsletters). Merely taking AR

quizzes and playing electronic games do not help youth to evaluate online information.

Although continuous immersion in stories helps youth to become proficient, engaged

readers (Wilhelm, 2008), youth can gain complex cognitive skills when they use digital tools for

non-academic purposes (Moje, Overby, Tysvaer, & Morris, 2008), especially when engaging in

interest-driven digital literacy experiences (Warschauer & Matuchniak, 2010) and creation

versus consumption of information (Attewell & Winston, 2003). In the revised Bloom's

taxonomy, creating is at a higher level than evaluating; it requires less of a cognitive load to

critique another person's work than to create it (Churches, 2008). Examples of creating in digital

environments include programming and creating games and Apps, filming and editing to design

new products, producing and directing products, and publishing products (Churches).

Yet, what happens when low SES Latino children receive little challenge to engage in

higher cognitive levels? How will this affect their academic and career success? Online reading

comprehension relates to identifying questions, and locating, analyzing, synthesizing, and

communicating information (Coiro, 2011). Online reading skills predicted seventh grade

children's offline (hard copy) reading comprehension, also (Coiro). Furthermore, reading

comprehension affects students' achievement in school and college across the curriculum. Thus,

poor children's low online reading skills relate to cognitive and social justice outcomes.

As social justice proponents, we pondered whether ethnicity, an independent variable,

related to the children's online reading comprehension scores, a dependent variable. Thus, we

ran DDMS-S analyses on these variables, but found no significant differences. As previously

stated, not enough diversity existed in children's ethnic groups; 87% reported on the DDMS-S

that they were Hispanic. Future research should focus on further fleshing out this variable to

determine if a student's cultural background is indeed a factor.

Limitations

Several limitations came to light related to validity, reliability, and repeatability, as well

as time constraints and resource limitations. As with any survey instrumentation, self-report data

has inherent limitations because researchers find it difficult to verify the results (Podsakoff,

MacKenzie, Lee, & Podsakoff, 2003). We should also consider descriptive and interpretive

validity in qualitative research in relation to our observational data and field notes (Maxwell

1992; Maxwell & Loomis, 2003). Descriptive validity relates to the factual accuracy of the data

that a researcher documents, while interpretive validity focuses on how well a researcher's

interpretation relates to participants' perspectives, words, and actions (Maxwell & Loomis).

Thus, without full access to the instructional environments for data collection purposes, we relied

on students' and teachers' self-report data and our own descriptions and interpretations of the

accounts documented in the data.

Additionally, construct validity and reliability limitations existed with the survey

implementation. Bussert-Webb noticed some children (less than 10%) took only 10 minutes to

finish parts one and two of the DDMS-S; rushing was more common among middle level

participants. Taking a survey carelessly by clicking any answer relates to construct validity

because it would be difficult to complete both sections in 10 minutes, with an accurate measure

of one's dispositions, knowledge, and skills. This relates to reliability also, as participants may

have scored better on the knowledge and skills questions if they took the survey at a more

leisurely pace. We believe some students rushed because they perceived the DDMS-S to be yet

another test, and they may have been tired from *Futuro*'s test-preparation focus vis-à-vis NCLB.

Next, we found content validity issues related to DDMS-S inappropriateness for younger

and Spanish-dominant participants. Developers normed the DDMS-S with adolescents, with fifth

grade being the lowest grade level. However, the youngest population in the present study was

third grade. We did notice younger students struggled with some vocabulary, e.g., Skype,

Hispanic, and search engine. Thus, the DDMS-S may not have been appropriate for third and

fourth graders. Next, the DDMS-S was in English; although survey questions were developed

with struggling readers in mind, the Spanish dominant children asked Bussert-Webb questions

related to vocabulary. Thus, she sat with Spanish-dominant children to translate. We considered

having a Spanish DDMS-S before gathering data, but decided against this because many words

were untranslatable, e.g., Skype, google, chat, and Internet. Additionally, in a time of rapidly

evolving technologies, our data may be outdated by publication time.

Finally, we experienced time constraints and resource limitations during our research. We

had limited access to instructional environments during the school day. District and school

administrators would not allow any interruption of the children's instructional time because of

test preparation; it was difficult to enter a *Futuro* school to observe technology use firsthand

because of this reason. Therefore, we could not validate what staff members and children said

and wrote with our own observations during the school day. Since we could only gather data and

observe when the after-school program started, we acknowledge these constraints and the

limitations related to construct validity and data triangulation, in particular.

Implications

Our participants received little support in complex digital literacies. Some teachers,

assuming low-SES, culturally diverse children lack digital access, limit technology-related

assignments (Bussert-Webb, 2014). However, educators can ask youth first. If youth lack access,

campuses could provide time and devices for generative, inquiry-based digital assignments. We

hope our article begins to change misperceptions about nondominant children's digital literacy

access.

Indeed, we can teach youth with diverse abilities to use digital tools in sophisticated

ways. Teaching youth to create, evaluate, locate, and summarize online information critically

should be a curricular facet at all schools to improve their critical thinking and reading skills

(Leu, O'Byrne, et al., 2009). For example, after Aboriginal Canadian high school students

engaged in digital storytelling, their print literacy skills improved from two to five grade levels

and their writing moved from a word and sentential level to paragraphs and long essays (Pirbhai-

Illich, 2010). Similarly, elementary students, mostly Latino/as, engaged in critical digital literacy

inquiry to explore domination regarding grueling work in strawberry field; technology facilitated

their cognitive processes and collaboration (Warschauer & Ware, 2008).

Teachers and district personnel could determine the tools children enjoy using, and

should ask *how* and *whether* youth's "online literacies should be embraced in the regular

curriculum" (Alvermann, 2008, p. 18). By listening to youth, in and out-of-school digital

practices could complement each other (Leu, O'Byrne, et al., 2009). We wish to merge home and

school digital access, skills, and practices to help diverse youth develop new literacies (O'Brien

& Scharber, 2008).

As more schools move to technology-infused and mobile learning environments, e.g., one

device per student (1-to-1) and bring-your-own-device (BYOD) models, educators need the

requisite skills to teach digital literacy and new literacies to diverse learners. Burns-Sardone

(2008) made a compelling case for BYOD. Teacher preparation programs can prepare new

teachers to leverage their personal devices for learning purposes. In schools with limited

computers and tablets, students and teachers can access other devices, e.g., cell phones and

iPads, to engage in collaborative academic activities. However, educators require more training

to help learners with less digital literacy experiences to be successful within these technology-

infused learning environments. This is especially important for closing the digital divide along

SES and other lines. If we move beyond a focus on digital access (a primary digital divide) and

use (a secondary digital divide), we may reduce a tertiary-level digital divide, which relates to

digital skills and online reading comprehension. To avoid this tertiary divide, we can include

differences in technology use and online reading and research, while developing digital literacy

practices and skills for all learners (Henry, 2010).

The new literacies of online reading and comprehension are essential to learner

expression and development – cognitively and critically. Yet federal funding and legislation

must change so teachers possess the training and time to incorporate generative, challenging

digital projects with youth. We know of no state-level assessment that tests online reading and

writing in the USA. Moreover, the National Assessment of Educational Progress (NAEP)

framework excludes online reading (Leu, McVerry, et al., 2009). Literacy funding, legislation,

assessments, and frameworks affect teacher preparation, professional development, and

classroom teaching, and can move education into the 21st Century (O'Brien & Scharber, 2008).

Limited technology integration appears the norm in urban schools serving mostly

nondominant, low-SES students. Much of this void relates to test preparation and NCLB (Henry,

2007; U.S. Department of Education, 2002). It is easier to implement new literacies without

testing pressures and with middle-SES pupils who dominate the language of instruction. For

example, Rish and Caton (2009) engaged students in collaborative, generative digital projects.

However, Swords and Spaceships, the fantasy and science fiction English course Caton taught,

had no graduation requirements or state-mandated assessment pressure. Furthermore, Rish's and

Caton's rural schools served mostly white middle-class native-English students.

Last, the digital divide relates to tools, access, dispositions, ever-changing skills, and new

literacies practices (Leu et al., 2007). This divide expands inequalities related to ethnicity,

language, race, and SES (Henry, 2010). We can and should do more to help nondominant

children's technology access and critical digital literacy and online reading comprehension skills.

Our findings propel us to action.

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