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English language learners' strategies for reading online texts: Influential factors and patterns of use at home and in school

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ABSTRACT

We investigate five fourth and fifth-grade English language learners' (ELLs) strategy use when they read online texts at home and in school. We also identify factors that play a role when these learners read online texts, as well as similar and different patterns in reading strategies at home and in school. The findings show that three factors influence the ELLs' selection of online texts and use of reading strategies. In addition, the ELLs used nine reading strategies to enhance their reading online texts. Based on these findings, we discuss (a) the ELLs' online reading strategies in different contexts, (b) the multidimensional zone of proximal development, and (c) collaboration between parents and teachers.

1. Introduction

English language learners (ELLs) need to master necessary language skills to become successful in global learning environments, and reading is one critical skill (Chapelle & Jamieson, 2008). Since written input is a significant resource for the ELLs' language learning process, reading plays important roles in their academic success (Cummins, 1991; Eskey, 2005). Reading contexts and patterns, however, change as technology permeates our lives. Understanding and using technology becomes necessary for the ELLs to interact with the world and to transform it (Kellner, 2001). In contemporary technology-enhanced reading environments, online texts include not only textual resources—traditional texts—but also other semiotic modes—pictures, audio, video, and computer games. Literate people are expected to be aware of changes in technology and multimodality, and to be able to understand and use these diverse texts (Anstey & Bull, 2006; Park, 2012; Chatel, 2002).

Readers adjust their reading patterns and adopt diverse strategies in contemporary reading environments. In both paper-based and online reading contexts, readers use dynamic strategies to make their reading more effective. Skillful readers adopt diverse reading strategies—such as thinking about the topic, setting up their reading purposes, moving back and forth in the text, monitoring their comprehension, and planning when they are reading—more frequently than unskilled readers (Brown, 1980; Carrell, 1989; Carrell, Pharis, & Liberto, 1989; Oxford & Crookall, 1989). In this paper, we identify ELLs' patterns in the use of online reading strategies at home and in school and describe influential factors.

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2. Theoretical framework and literature review

2.1. Sociocultural contexts and dialogism

We adopt Vygotsky's (1986) sociocultural perspective and Bakhtin's (1986) dialogic perspective to gain a holistic understanding of online text reading processes. Vygotsky emphasizes the roles of languages, cultures, and communities in human development. He shows how language, as a meditational tool, plays a vital role in the developmental process (Johnson, 2004; Lantolf & Thorne, 2006; Vygotsky, 1986). From a sociocultural perspective, reading is not simply a process for comprehending the meaning of texts, but also involves active and dialogic processes to make and negotiate meanings while reading texts. During the developmental process, learning creates a zone of proximal development (ZPD), "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Learners begin to internalize what they learn, and their development occurs when they interact and cooperate with people in diverse learning environments (Vygotsky, 1978). Bakhtin (1981, 1986) focuses on utterances, as a unit of speech that includes responsiveness to other voices. Bakhtin emphasizes that an utterance always has a dialogic relationship with preceding and anticipated future utterances.

We use these combined perspectives of Vygotsky and Bakhtin in our approach to ELLs' reading in technology-enhanced learning contexts. We consider ELLs as active participants in online reading, and we study how they use dynamic strategies. Our study offers a comprehensive understanding of second language (L2) learners' similar and different online reading strategies and the influential factors at home and school.

2.2. Electronic literacies and online reading

Electronic literacies involve literacy skills required in computer enhanced learning contexts. Electronic literacies rely on computer literacy, computer-mediated communication (CMC) literacy, multimedia literacy, and information literacy. Computer literacy is the basic skill required to use computer software and hardware, and CMC literacy refers to the capacity of using CMC to interact with others. CMC can be synchronous, as with an instant messenger, or asynchronous, as with email and blogs. Multimedia literacy means having the literacy skills to understand and create complex documents. Since online texts often include textual resources, images, audio, and videos, online literacy requires multimedia literacy. Information literacy is the ability to locate and evaluate online resources (Lemke, 1998; Rosell-Aguilar, 2004; Warschauer, 1999, 2002).

Reading online texts is different from reading on paper. Therefore, readers need to adopt new literacy skills and adjust their reading patterns and purposes in new reading environments (De Ridder, 2000; McNabb, Hassel, & Steiner, 2002; McPherson, 2005; Warschauer, 1999). Technology-enhanced literacy activities make reading more enjoyable and motivate readers to read more actively. Furthermore, they encourage readers to improve their fluency in reading. Readers can access new tools, resources, and communities, as well as learn traditional reading skills, when reading online texts (McNabb et al., 2002; McPherson, 2005). However, they frequently waste time navigating irrelevant websites or lose the thread of the topic they were following (Heller, 1990; McPherson, 2005).

2.3. Online reading strategies

Online texts consist of nonlinear hypertext, multimedia texts, and interactive texts, and these can either support readers' comprehension or provide new challenges in the reading process (Coiro, 2003). When reading online texts, language learners both develop new reading strategies and transfer paper-based text reading strategies to their online text reading (Park, 2012; Park & Kim, 2011, 2016; Chou, 2012; Coiro & Dobler, 2007; Elshair, 2002; Foltz, 1993; Hsieh & Dwyer, 2009; Huang, 2013; Huang, Chern, & Lin, 2009). They modify the features of online texts, navigate and evaluate the texts, personalize their behaviors, and react to problems (Elshair, 2002). In addition, readers use maps and other signals, such as titles and nodes, to facilitate the problem-solving process in hypertext learning environments (Foltz, 1993). However, among existing studies about online reading strategies, there is a heavy focus on cognitive aspects of reading, and few studies have used sociocultural perspectives. In addition, ELLs' reading across diverse learning contexts, such as homes and schools, has not been a focus of research. The current study will fill these gaps.

3. Research questions

To have a better understanding of L2 learners' varied patterns of using reading strategies when reading online texts at home and in school, we addressed the following two research questions:

1. What factors influence five elementary level ELLs reading of online texts at home and in school?
2. What are the similar and different patterns of strategy use when these ELLs read online texts at home as opposed to in school?

4. Research methods

In this exploratory qualitative case study (Merriam, 2009; Yin, 2014), we investigated how elementary level ELLs use reading strategies when they read online texts at home and in school. We focused on both similarities and differences between these two settings. We treated ELLs as a case. Treating the case as "the primary instrument for gathering and analyzing opportunities for collecting and producing meaningful information" (Merriam, 1998, p. 20), we collected data from multiple resources (Patton, 2002).

4.1. Research sites and participants

We followed five fourth or fifth-grade ELLs across 10 months. The research sites were the ELLs' homes and schools, where the participants engaged in reading activities. The school sites were in the western area of the U.S. The ELLs were Jae-Hoon, Kyoung-Min, Stacy, Claire, and Brian. They had been in the U.S. for 3.2 years on average, and their English proficiency levels were either Intermediate or Early Advanced according to the standards of the school district. The names of the district, the schools and the participants are all pseudonyms. Table 1 presents an overview of their demographic information.

All the ELLs except Brian had Korean ethnic and linguistic backgrounds. Jae-Hoon was confident using English, and he was very communicative and had a good relationship with his classmates. Kyoung-Min did not speak Korean frequently. According to his mother, Kyoung-Min lost his first language (L1) because of the cultural and linguistic difficulties that he experienced when he entered school in the U.S. Stacy did not actively participate in class activities, but Claire was active in classes. Brian had Chinese and Filipino ethnic backgrounds, but he did not speak Chinese because he had only lived in the Philippines before he came to the U.S. Brian experienced linguistic difficulties when he first came to America, but he had an optimistic attitude in class.

4.2. Data collection

For ten months in 2010, we collected data: observations, interviews, documents, field notes, reflective journals, and verbal reports. For the observations and verbal reports, we visited each ELL's home and school and observed their reading of online texts, and they verbally reported what they were thinking and doing while reading the texts. Verbal reports were collected using the concurrent method, with ELLs consistently talking while engaging in online reading activities. We also interviewed the ELLs, their parents, and teachers to gather more information about the ELLs' computer use and online reading. We wrote field notes and reflective journals throughout our observations. In addition, we reviewed diverse documents, such as ELLs' reading samples, assignments, teachers' handouts, and school or teacher websites. Table 2 shows the specific data sources, times, and duration.

4.3. Data analysis

We imported all data to *Atlas.ti*, a computer software application for qualitative data analysis. For the data analysis, we prepared and organized data, read the data and developed categories based on semantic relationships. We also identified salient categories, such as "accessing a website," "interacting with others," and "sharing videos," assigned them a code, and put others aside. We assigned each instance a code, such as "connecting (text-to-self)," "connecting (text-to-text)," and "connecting (text-to-world)," and subsequently refined the salient categories and interpretations, using refined categories such as "making a connection." After these processes, we conducted further analyses within and across categories. We iteratively reread data, refined salient categories and interpretations, and kept a record of where relationships were found in the data. For example, we had "using references" and "sharing an information source" as two separate categories, but we ended up combining them. We also completed an analysis within categories and searched for themes across categories.

To enhance trustworthiness and transferability, we collected and analyzed multiple data sets and clarified our perceptions and theoretical framework by looking across the different types of data. Furthermore, we compared our results

Table 1
ELLs' Information as of August 2010.

Participant	Grade Level	Original Nationality	Schooling in the U.S. (years)	Level of English Proficiency	Classroom Teacher	School
Jae-Hoon Woo	5	Korean	2.6	Early Advanced	Mrs. Chang; Mr. Hill	Dover E.S.
Kyoung-Min Bae	4	Korean	4.5	Early Advanced	Mrs. Davis	Dover E.S.
Stacy Shim	5	Korean	2.8	Intermediate	Mrs. Chang; Mrs. White	Hilley E.S.
Claire Choi	4	Korean	2.8	Intermediate	Mrs. Davis	Dover E.S.
Brian Te	4	Filipino/ Chinese	3.3	Intermediate	Mrs. Bryant	Haynes E.S.

Table 2
Data Sources.

Data	Home	School
Observations and Verbal Reports	2–4 h for each visit; 4–5 times in total for each ELL	2–4 h for each visit; approximately 30 times in total for each ELL
Interviews	ELLs: multiple informal conversational interviews (5–10 min for each interview; approximately 10 times in total for each ELL); one semi-structured interview (20–25 min) Parents: one semi-structured interview (20–25 min)	ELLs: multiple informal conversational interviews (5–10 min for each interview; approximately 10 times in total for each ELL); one semi-structured interview (20–25 min) Teachers: one semi-structured interview (20–25 min)
Documents	Literacy samples, assignments, and teachers' handouts	Literacy samples, school or teacher websites, and school reports
Field Notes and Reflective Journals	Field notes and reflective journals for observations and interviews	Field notes and reflective journals for observations and interviews

with current worldviews and previous research (Creswell, 2007; Merriam, 1998), further refining categories, and we conducted member checks.

5. Findings

We identified three factors that influenced the ELLs' reading of online texts and their use of reading strategies. These factors were relevant to the ELLs, the caregivers, and the online texts, which meant that all components influenced the ELLs' online texts and that all of these should be considered by educators. The ELLs used nine salient reading strategies when reading online texts at home and in school. The ELLs used the strategies somewhat differently because of situational differences, such as reading L1 online texts for fun at home and reading L2 online texts for a project in school. Table 3 demonstrates how the reading strategies were used in each context and degree of usage.

The numbers in columns two and three demonstrate the rate of frequency of using strategies in each context.

5.1. Influential factors

When the ELLs read online texts, three factors influenced their reading and strategy use. These factors were (a) ELLs' electronic literacy knowledge and experience, (b) parents' and teachers' guidance for online text readings, and (c) the language of online texts.

5.1.1. ELLs' electronic literacy knowledge and experiences

The ELLs' knowledge and experience with electronic literacies influenced their use of reading strategies at home and in school. Computer literacy, such as the ELLs' typing and other basic computer skills, was important when they searched for online texts and dialogued with others. The ELLs' CMC literacy skills influenced their dialogic interactions on the Internet, and they could build virtual communities and try on additional identities (Lam, 2000; Swan, 2002). These skills were significant when they shared their knowledge and resources with others as well. The ELLs' abilities to develop and understand complex documents depended on their multimedia literacy (Lemke, 1998; Warschauer, 2002). Since the ELLs and their teachers frequently used multimedia resources, multimedia literacy was an important skill in education. Based on their information literacy skills, the ELLs searched for and evaluated diverse online texts, so this search process was another core component of electronic literacies and technology-enhanced educational contexts.

The ELLs' knowledge and experiences with electronic literacies enabled them to become more active and proficient learners when reading online texts at home and in school. For example, Jae-Hoon and Stacy used their computers more proficiently than other ELLs, and they were confident in every aspect of electronic literacies. While reading online texts at home and in school, Jae-Hoon and Stacy actively used their computer literacy, CMC literacy, multimedia literacy, and

Table 3
Frequency of Strategy Use at Home and in School.

	Reading Strategies	Frequency at Home (%)	Frequency in School (%)
1	Accessing a Web Page	18.4	16.5
2	Adjusting the Reading Pattern	5.6	4.5
3	Dialoguing	13.6	14.5
4	Inferring from the Text	5.6	9.0
5	Making a Connection	12.1	10.0
6	Monitoring Comprehension	6.4	9.0
7	Previewing and Setting up the Purpose	10.8	14.0
8	Using Computer Skills and Devices	18.2	12.5
9	Using References and Sharing an Information Source	9.3	10.0
	Total	100	100

information literacy to solve problems. On one occasion, when Jae-Hoon's teacher introduced a *YouTube* video, the teacher was unable to open it. Jae-Hoon showed him how to access the video. However, Brian was neither proficient nor confident with electronic literacies, so he could not actively use the skills. When Brian searched for information about Mojave Indian Culture, he did not know how to find it; when he typed an essay about his friends on a laptop computer, he did not know how to change the font size. In each case, he had to ask for help from his teacher or more capable peers. Brian's lack of electronic literacy skills limited his active reading of online texts.

5.1.2. Parents' and teachers' guidance for online text reading

The parents and the teachers influenced the ELLs' online text reading by making decisions on how many hours the ELLs could use a computer per day and what genres of websites they could access (Park, 2012; Park & Kim, 2016; Lee & Chae, 2007; Van den Bulck & Van den Bergh, 2000). Even though the parents mentioned the positive influences of online texts on their children's academic achievement, their negative opinions about the children's computer use at home were salient. Instead of using online texts more productively, most parents simply allowed the ELLs to use a computer as a reward for their hard work in school. In an interview, Claire's mother said,

> I know that some kids use websites for their study very well, and there are of course many good online resources. But it does not seem to work for my daughter. Whenever Claire uses a computer, she plays online games.

The parents neither encouraged their children to read online texts productively nor provided motivation to use texts more effectively as active learners. The ELLs asked for permission to use computers, but they did not request specific guidance on online resources. For example, after receiving permission to use a computer, Jae-Hoon navigated the Internet, played games, and searched for online resources. If he needed any more information or advice, Jae-Hoon either searched for YouTube videos or communicated with his friends. The ELLs' independent online reading patterns led them to read texts more for fun than for information. Brian said,

> My mom allowed me to use a computer only for an hour per day, so I mostly play games during the time. If I need to use the Internet for homework, I request more computer time. I don't wanna lose my play time.

In contrast to parents, all the classroom teachers appreciated the positive value of technology in education. Because of their positive views, teachers used the computer technology in their classes actively and productively. Students assumed that computer sessions in school were intended to complete their school projects and to develop their electronic literacies. When Jae-Hoon searched for information about "Southwestern Native American Customs" for his social studies project, for instance, he asked for help from his teacher and learned how to search for relevant online resources effectively. In addition, since the teachers adopted more technology tools and developed computer-based activities, their involvement in the ELLs' reading online texts was significant.

The ELLs' participation in online text reading and learning activities was strongly influenced by their parents' and teachers' plans, perspectives, and decisions. The ELLs read online texts more productively when they received meaningful input regarding the use of the computer from their parents and teachers in positive learning environments. The active involvement of parents and teachers in the ELLs' online reading process enhanced the ELLs' learning and development in their use of electronic literacies.

5.1.3. The language of online texts

The third influential factor was the language of online texts. The ELLs considered this when searching for and accessing texts. The ELLs read online texts in both L1 and L2 at home, but they accessed only L2 texts in school. In home contexts, the ELLs considered that the websites in their L1 s were fun resources but not academic resources. One significant reason for this was that their L1 literacy proficiency was much lower than their L2 literacy proficiency. They accessed L2 texts both for information and for fun. For example, Stacy and Claire accessed portal sites in their L1s, such as *Daum Kids Jjang* (http://kids.daum.net), *Junior Naver* (http://jr.naver.com), and *Naver* (www.naver.com). The ELLs also accessed online texts in their L1s through diverse websites, such as *Google* (www.google.com), *Yahoo* (www.yahoo.com), and *YouTube* (www.youtube.com). For example, Jae-Hoon, Stacy, and Claire accessed *YouTube* and watched Korean music videos. Regarding the language of resources, Claire said:

> I don't read in Korean. When I access Korean [websites], I open them to play games and watch fun Korean TV programs. I watch Korean music programs, soaps, and cartoons. I can still watch what my friends in Korea watch in this way. I can still understand when [my friends] talk about popular boy group members. ... I access English websites to do my homework. I can find much information on the Internet.

The ELLs were allowed to access only L2 texts at school. Their access to L1 texts in school was limited due to their focus on academic purposes and technical issues. In most cases, classroom teachers allowed students to use computers to complete their school projects, and the ELLs could not add new language to the computers and type in their L1. Regarding this technical issue, Brian said, "I can't type Filipino at school. I can only use English and finish my report." This may have been a missed opportunity, if teachers could have designed ways to capitalize on ELL's engagement with L1 websites.

5.2. Similarities and differences in ELLs' use of reading strategies at home and in school

In both home and school contexts, participants used the nine online reading strategies represented in Table 3. We list these strategies in alphabetical order. They used every reading strategy both at home and in school.

5.2.1. Accessing a web page

When reading online texts, the ELLs searched for and accessed web pages. They typed a web address, typed keywords into a search engine, clicked a hyperlink of an open website, or clicked a bookmark. When the ELLs searched for a website uniform resource locator (URL), teachers' guidance was more helpful in providing the students with URLs in school than parents' involvement was at home. The classroom teachers shared relevant URLs on the whiteboard or on their websites, but parents' list of educational websites was comparatively limited. When reading online texts, the ELLs relied more on teachers' instruction and recommendations in school, but their own information literacy skills played significant roles at home.

After accessing a website, all the ELLs clicked hypermedia to open or move to another web page. As shown in Tables 4 and 5, the most frequently accessed online texts at home were textual resources and videos, and the ELLs also spent much time in playing computer games. In school, the ELLs accessed textual resources and images most frequently.

In both home and school contexts, the most frequently accessed texts involved textual resources, and the least frequently used text format was audio. The ELLs could not often access videos and computer games in school because of filtering software, and classroom teachers did not often allow their students to play computer games. The ELLs' strategies to access online texts were thus relatively limited in school.

5.2.2. Adjusting the reading pattern

The ELLs read the texts aloud or silently, quickly or slowly, adjusting their reading to the content and the task. They read certain texts in detail or multiple times. The ELLs adjusted their reading patterns based on their reading purposes and environments. When reading the texts for fun, as in *aesthetic reading* (Rosenblatt, 1978), they read texts more quickly. When the ELLs had occasion to read online texts for information, as in *efferent reading* (Rosenblatt, 1978), more often in school than at home, they read the texts more carefully. Brian said, "I often read texts on a computer carefully to finish my school tasks, but I don't even read any [text] on a computer at home." Different patterns of vocalization were present at home and in school. In home contexts, the ELLs freely read out-loud without paying attention to others, but they usually read online texts silently not to distract other students in school.

5.2.3. Dialoguing

The ELLs engaged in dialogues with others, themselves, texts and authors while reading online texts (Park & Kim, 2011, 2016; Bakhtin, 1986). The ELLs dialogued with their family members, neighbors, teachers, peers, and others, in person or via CMC. They asked their siblings questions about online content and sometimes requested permission from their parents to access particular online texts at home. In school, they dialogued with teachers and peers to find main ideas, to complete class tasks, etc. The ELLs' dialogues in school were more active and meaningful than in home contexts because each interlocutor shared the task goals defined by the teacher. The ELLs' use of CMC to dialogue with others was different in each context. The ELLs frequently dialogued with others through both asynchronous and synchronous CMCs at home, but they did not often use CMCs in school. For example, Jae-Hoon, Stacy, and Claire logged onto *Facebook* to dialogue with others in both synchronously and asynchronously at home. However, the ELLs could not use CMCs in school due to the restrictions on students' access to certain websites and software applications. Moreover, they could not actively use CMCs due to the short computer sessions in school.

In both home and school contexts, all the ELLs also dialogued with themselves while reading online texts. The ELLs asked themselves questions and responded, as a strategy for making sense. For example, when Brian read a web page about a game called *Starcraft*, he said, "Is this too difficult for me? Oh, yes, it is. I will check another one." Claire dialogued with herself by reading her own postings, as prior utterances, on her friend's Facebook page. While reading her previous postings, she said, "Oh, now I remember. . [My friend], last semester, asked me how to dye fingernails with garden balsam. I forgot about this, but I remember how to do it and where I found the information." The dialogues with themselves increased when the ELLs encountered difficult or important texts. This seemed to be "egocentric speech" (Vygotsky, 1986). Working in a second language, the ELLs needed external tools like this to complete some tasks.

Table 4
Frequency of Strategies of Accessing Hypermedia at Home.

	Sub-Category	Frequency (%)
1	Accessing a Textual Resource	42.3
2	Accessing a Video	26.4
3	Accessing a Computer Game	19.2
4	Accessing an Image	8.8
5	Accessing an Audio	3.3
	Total	100

Table 5
Frequency of Strategies of Accessing Hypermedia in School.

	Sub-Category	Frequency (%)
1	Accessing a Textual Resource	41.0
2	Accessing an Image	37.8
3	Accessing a Video	13.6
4	Accessing a Computer Game	7.6
5	Accessing an Audio	0.0
	Total	100

The ELLs also dialogued with online texts, as well as the authors or creators of the texts, at home and in school – treating the text or characters as interlocutors and talking to them either out loud or silently. All the ELLs started their dialogues with online texts by referring to suggested keywords and web resources while using online search engines. They also continued to dialogue with other texts; including video texts and computer games; by responding to video creators; narrators; or the messages on the games. For example; when Kyoung-Min was watching a YouTube video about Taekwondo; a Taekwondo instructor was demonstrating how to punch. Kyoung-Min responded; "Yes; I know what you're talking about; but it's not as easy as you say. I'll give it a try." In school contexts; Jae-Hoon; Kyoung-Min; and Brian dialogued with the texts; but these reactions were less frequent and more implicit not to interrupt their peers.

5.2.4. Inferring from the text

Inferring is "the process of creating a personal meaning from text" (Kenne & Zimmermann, 1997, p. 162) and drawing conclusions. When reading online texts, most of the ELLs predicted the content of texts and guessed the meaning. They previewed the texts and used their prior knowledge to predict the content of texts, create dynamic interpretations of text, and draw conclusions from text (Kenne & Zimmermann, 1997). In addition, the ELLs guessed the meanings of texts and words while inferring from texts. To use this strategy effectively, they made inferences from multiple resources, such as textual resources, images, and videos. In Stacy's case, for example, her teacher showed online images of *The Mysteries of Harris Burdick* to her students and asked some questions:

Mrs. White: (pointing at an image) What can you infer from this image, Stacy?
Stacy: The guy in the picture doesn't look good. Maybe he did something wrong.
Mrs. White: . . . OK, that's a good start for the inference, for the evidence. This picture makes it possible to infer. Cause this is a great picture for examining those clues. What's your evidence?
Stacy: Because the boy looks sad.
Mrs. White: Now we look at the facial expression. Does the boy look happy?
Students: No.

After predicting the content of texts and guessing the meanings of online texts, the ELLs confirmed if their predictions and guesses were correct. Jae-Hoon, Stacy, and Claire all consistently confirmed their predictions when reading online texts at home and in school. For example, when Stacy read an electronic storybook, *Hannah is My Name*, at home, she predicted, "I think some inspectors will come to the place and send the family to Taiwan because they don't have the green card." However, after reading this part of the text, she confirmed, "I learn that the man in a uniform helps them. I expected that [Hannah's family] would be caught, but they received the green card." At home, the ELLs confirmed their predictions based on their needs and opinions in this way, and their use of this strategy was implicit. However, in school, their classroom teachers encouraged students to predict what would happen in texts and to guess what the meanings of the texts would be, so the ELLs used the strategy more systematically. They subsequently applied their knowledge about this strategy obtained in school to their reading at home.

5.2.5. Making a connection

All the ELLs activated their prior knowledge schemata and connected online texts to themselves, other texts, and world knowledge (Kim, 2011; Carrell & Eisterhold, 1983; Kenne & Zimmermann, 1997; Rumelhart, 1980). When reading online texts, the ELLs made connections between the texts and themselves by activating schemas from their prior knowledge and experience. For example, when Claire watched *Exhibition Video: Discovering American Indian Art* (http://www.youtube.com/watch?v=GK2rPcXmJ9k), she said:

(excited) I love this kind of videos. I like to learn about American Indian culture. (pointing at masks on her computer screen with a computer mouse) They are so colorful and pretty. There are similar [masks] in Korea, too, but they look a little bit different. Korean masks are smaller than [American masks].

In addition, all the ELLs connected the texts to other texts. This constitutes intertextuality, creating a relationship among texts, including multimedia resources (Hartman, 1995; Loeb, 2002). For example, after seeing several images on the *Dav Pilkey's Extra-Crunchy Website O'Fun* website (http://www.pilkey.com), Kyoung-Min said, "I saw these pictures in my book. . This website is interesting and easy because I'm familiar with these pictures" (Kyoung-Min Think-Aloud 4H). Jae-Hoon, Kyoung-Min, and Claire frequently consulted paper-based texts to enhance their online reading processes. Furthermore, the

ELLs activated their own experiences and world knowledge while reading and making meaning from online texts. The use of this strategy was more active and explicit in school because teachers taught and encouraged the ELLs to use the strategy and asked questions to activate students' schemata.

5.2.6. Monitoring comprehension

All the ELLs consistently monitored whether they understood particular online texts when they read them, determining the importance of key ideas and making decisions about their ability to grasp them (Kim, 2011; Kenne & Zimmermann, 1997). For example, when Brian accessed the *Mojave Indian Culture and History* website (http://www.nativelanguages.org/mojave_culture.htm), he said, "I think this is the right website, but it is too difficult. What does this word mean?... I don't understand what [the author] is talking about" (Brian Think-Aloud 2S). With respect to monitoring, teachers played more active roles in the ELLs' comprehension checks in school than parents did at home. Classroom teachers actively monitored ELLs' reading processes and helped them have a better understanding of online texts.

5.2.7. Previewing and setting up the purpose

All the ELLs previewed an online text to evaluate them and to decide what to read. In addition, they set up their reading purposes. Before deciding to read particular online texts, the ELLs previewed titles, menus, and texts. For example, when accessing the *Daum Kids Jjang* website (http://kids.daum.net) to play computer games, Claire reviewed the menu button, such as "Game Home," "Funny Game," "Fashion Game," "Mini Game," etc., and decided which game section she would access. She said, "[Menu option] is very good. I can find which games I can find on this website without reading all the content. Often, new games are added, and they are listed, listed under the menu, so I can easily find them" (Claire Think-Aloud 2H). The ELLs also evaluated if the texts were (a) informative, (b) appropriate, (c) interesting, (d) familiar, (e) long/short, and (f) relevant. Based on their purposes in reading a text, they considered a variety of these criteria, but across contexts and tasks the ELLs paid attention to each of these. In school, however, they only considered if the texts were (a) informative, (b) appropriate, (c) interesting, and (d) relevant.

All the ELLs searched for online texts for entertainment purposes at home, but they more often looked for informative texts to complete their projects in school. For example, all the ELLs accessed fun videos, played computer games, and read texts about sports players, singers, and computer games, among other subjects, at home. They focused on whether the resources were interesting and appropriate for them. For example, while Brian searched for online games at home, he said "I like this game. A shooting game. This is a boy's game." He made a connection between the genre of the game and gender and decided that the game was appropriate for him.

All the ELLs also attended to the reading purpose, so they paid attention to meanings and ideas and searched for informative and relevant resources when reading online texts for information. When the ELLs read online texts for fun, however, they focused on whether the texts were interesting and appropriate. For example, when Kyoung-Min was previewing a website about black holes at home, he said "This website doesn't look very informative. It only has a couple of photos without much information. That's it." He stopped previewing the website and moved to another website.

When previewing, the ELLs were positioned differently in each context. At home, they decided on the purpose for reading with minimal interference from their parents, so they could actively and flexibly choose and access diverse online texts. In school, the teachers planned online literacy activities before classes, so the ELLs could not adopt their own reading purposes as actively as they could at home.

5.2.8. Using computer skills and devices

In addition to traditional reading strategies, all the ELLs used their computer skills and digital devices when reading online texts. They scrolled up and down to access intratextual resources, and they moved back and forth between texts to access intertextual resources. For example, when Claire read *Skullduggery Island* at http://www.funbrain.com, she scrolled up and down to read other items on the same web page. When Brian searched for information on how to download *World of Warcraft*, a computer game, he accessed multiple websites by typing keywords into a search engine. Moreover, the ELLs downloaded texts, files, or software applications when they read texts at home. However, they could not often download those texts in school because of limited time to use computers and security issues.

The ELLs also used pointing devices, such as a computer mouse and laptop touchpad. For example, while navigating the *Hubblesite* website (http://hubblesite.org), Kyoung-Min moved a mouse pointer to the text that he was reading. Claire also used her mouse to easily find where she was reading:

> Um, I can't mark on the computer, but I can leave this [mouse pointer] on the word that I'm reading like this. (moving her mouse and mouse pointer) I can see where [the mouse pointer] is, and I can read the part again easily. I don't need to remember where I was reading, and this is very convenient.

The ELLs utilized this approach to mark what they were doing and which segment they were reading, which helped them monitor and guide their own activity.

5.2.9. Using references and sharing an information source

ELLs used and shared references and information sources while engaging in online reading. In both home and school contexts, the ELLs used paper- and computer-based references, such as paper-based books, paper-based handouts, and web

resources such as glossaries, online dictionaries, and hyperlinks, while reading online texts. For example, Brian looked up information about the life cycle of a star in a paper-based encyclopedia, and Claire looked up words in an online dictionary at http://www.dictionary.com. In school contexts, all the ELLs referred to additional resources, such as notes on a whiteboard and on a projector screen. All the teachers actively used the whiteboards to deliver information to students.

The ELLs also spontaneously shared information from online texts with others. At home, all the ELLs shared information with their siblings, relatives, and neighbors. For example, Brian found information about how to complete a mission while playing *World of Warcraft* at home, and he shared it with his neighbor who played the game. In school, they shared materials with other students, by forwarding web resources and through other means. All the teachers also searched for good online texts and shared them with students. However, only the parents of Stacy and Kyoung-Min searched for and shared resources with their children.

6. Discussion and implications

While reading online texts at home and in school, the ELLs actively used multiple strategies to make their reading more effective (Chou, 2012; Coiro & Dobler, 2007; Coiro, 2003; Elshair, 2002; Foltz, 1993; Hsieh & Dwyer, 2009; Huang, 2013; Huang, Chern, & Lin, 2009). In addition, the ELLs transferred what they learned between home and school contexts, as they did with the "inferring from the text" and "making a connection" strategies. They also made decisions to adopt particular strategies and to adjust them depending on the reading environments and purposes. In this section, we discuss (a) the ELLs' online reading strategies in different contexts, (b) multidimensional ZPD, and (c) collaboration between parents and teachers.

6.1. ELLs' online reading strategies in different contexts

The ELLs' overall use of the nine online reading strategies was similar at home and in school (See Table 3). ELLs used various reading strategies while engaging in online reading tasks (Park, 2012; Park & Kim, 2011; Chou, 2012; Coiro & Dobler, 2007; Elshair, 2002; Foltz, 1993; Hsieh & Dwyer, 2009; Huang et al., 2009; Huang, 2013), but their specific uses of the strategies were different in each context. As Table 3 shows, they used "accessing a web page," "adjusting the reading pattern," "dialoguing," "making a connection," and "using references and sharing an information source" strategies in similar ways at home and in school. They more often used the "using computer skills and devices" strategy at home and "inferring from the text," "monitoring comprehension," and "previewing and setting up the purpose" strategies in school. The ELLs not only thought about what strategies would facilitate their reading, but also considered how they could use each strategy effectively in different situations. These differences were related to availability and their goals in reading.

In both home and school contexts, the ELLs tailored to the settings and goals. They checked what technology resources and tools they could use and who could help them in a given context. For example, as Tables 4 and 5 show, the ELLs frequently accessed textual resources, videos, and computer games at home. They also accessed textual resources and images in school, but they did not refer to videos and computer games as often as they did at home. In this study, the ELLs did not have substantial restrictions on accessing videos and computer games at home, and their parents did not install filtering software on their computers. Therefore, the ELLs could access most online texts if they were appropriate for their age. In addition, the ELLs had limited access to synchronous and asynchronous CMC in school, which was different from home contexts. Since "dialoguing" was one of the central strategies, the ELLs were still willing to use it in school, but they relied more on having dialogues in person because of the limited chance to access technology tools for communication at school. The ELLs found individuals who would be able to help them read online texts and complete tasks at home and in school. Since the ELLs' electronic literacies in L1s and L2 were different, they sought help from more capable adults, siblings, peers, and online texts (Bakhtin, 1986; Vygotsky, 1978). Among others, parents and teachers significantly helped the ELLs select and adjust their online text reading strategies.

Even though all the ELLs used each of the nine reading strategies, the sources of the strategies were different. Seven of the reading strategies were borrowed from strategies used to read printed texts (Kenne & Zimmermann, 1997). These are "adjusting the reading pattern," "dialoguing," "inferring from the text," "making a connection," "monitoring comprehension," "previewing and setting up the purpose," and "using references and sharing an information source" (Kenne & Zimmermann, 1997). Two reading strategies were new to online reading texts. These are "accessing a web page" and "using computer skills and devices." ELLs modified these *hybrid reading strategies* (Park & Kim, 2011), expanding paper-based reading strategies to suit the online setting. Their creation of these hybrid reading strategies shows ELLs' active adaptation and participation (Perez, 1998).

The ELL's dialogues with online texts, including Internet search engines, websites, and videos, were significant in each context, and the diverse technological tools provided more opportunities for the readers to dialogue with others in both synchronous and asynchronous forms. These dialogues enabled the ELLs to read online texts more effectively than when they read alone. By dialoguing with the online texts about Mojave Indian culture, Brian could access resources that his textbooks did not explain. In addition, diverse multimedia resources on the websites enabled him to have a better understanding about the culture. When they had appropriate skills, the ELLs also positioned themselves as more capable individuals and helped others read online texts. As Jae-Hoon's and Stacy's cases showed, they could play more active roles in completing class

activities and helped other students from time to time. The ELLs' occasional positions as more capable individuals empowered them at home and in school.

Both at home and in school, the ELLs actively considered the features of each context and flexibly adopted appropriate strategies to meet their needs in that context. They paid close attention to what resources and people would be available in each context and tried to use them as much as they could. In addition, the ELLs actively dialogued with others, themselves, and texts while reading online texts, and these empowered the ELLs in the online reading environments. All these attempts showed ELLs' active roles in online text reading processes at home and in school.

6.2. Multidimensional ZPDs

The ELLs made developmental progress as they dialogued with others, self, and texts while reading online. As Kozulin, Gindis, Ageyev, and Miller (2003) argue, Vygotsky used the concept of "zone of proximal development" to explain the role of more competent others in scaffolding the emerging psychological capacities of children. We have described various ways in which ELLs learn through dialogue with more capable individuals like parents, siblings, teachers, peers, themselves, and authors of diverse texts. These dialogues are not one-way conversations, and scaffolding does not occur unidirectionally when ELLs read online texts. The ELLs receive supportive assistance from more capable individuals on any given task. However, the learner in one task might also help others in a different task or in the same task at different times. Any individual ELLs can be both more and less capable, depending on the topic, time, and context.

Others have argued for "bidirectional" ZPDs (Forman, 1989; Goos, Galbraith, & Renshaw, 2002; LeBlanc & Bearison, 2004; Pata, Lehtinen, & Sarapuu, 2006). In a bidirectional ZPD, learners can serve as both teachers and students for each other by sharing expertise in different aspects of a task (Forman, 1989; Goos et al., 2002). We argue that, at least for the kinds of online contexts we studied, reading online texts contain complex and dialogic interactions that require more than two directions at different times. Thus we use the term "multidimensional ZPD" (Park, 2012, p. 336), the idea that individuals of varying abilities can *in some contexts and times* serve as more capable peers for others and even for themselves. It is not that a particular individual is in all respects more highly developed than another. Instead, different individuals can be more capable for different tasks at different times and can thus help other learners and themselves. Claire's case shows how the ELL learned from her own prior utterances, as online postings. In Claire's case, the directionality did not fully explain her learning, so it is necessary to consider the "time" to identify the influences between the learners' "current" utterances and "prior" utterances. Even though the learners are not able to complete a task, they can learn from their own prior utterances as well. In addition, individuals can learn by reading and dialoguing with online texts while completing different tasks.

The ELLs we observed engaged in virtual and real dialogues with adults, peers, themselves, and texts. They did not focus merely on one task and have one dialogue at a time. Jae-Hoon, for example, watched *YouTube* videos and dialogued with the video creators and himself while learning. Instead of a learner being scaffolded by a more capable other, and instead of two learners scaffolding each other bidirectionally, we observed learners simultaneously engaging in dialogues with several others and themselves, both scaffolding and being scaffolded as they drew on multiple tools and strategies to read online texts more effectively.

Adding to the complexity, reading online allows nonlinear links between texts and multiple simultaneous dialogues in virtual and real space. When reading online texts at home and in school, the ELLs receive assistance from diverse sources—parents, siblings, teachers, peers, online texts, etc. We call this scaffolding "multidimensional" because it draws on multiple dialogues and the scaffolding runs in more than one direction at different times. For instance, while teaching students, classroom teachers frequently adopted diverse online texts to support the content of their lectures. The ELLs dialogued with their teachers, classmates, themselves, and the narrators of these texts simultaneously, solving problems based on the teachers' guidance, the discussions with teachers and peers, and dialogues with the online texts. The direction of the guidance changed depending on the topic and time (see Jae-Hoon's case). The role of more capable peer can change quickly. Thus we need a multidimensional account of dialogue and scaffolding in ELLs' literacy learning. Jae-Hoon's teacher, who was a capable adult, taught subject matter, but Jae-Hoon helped him when a technical issue arose. Learning occurred for all participants who were engaging in multidimensional ZPDs. A single ZPD is not realistic for understanding learning in this complex context. Many other factors, such as instructional technologies, are used in learning contexts, such that the position of learner can be dynamically changed. For this reason, "multidimensional ZPDs" is a better concept for understanding active and dynamic learning in the 21st-century learning context.

6.3. Collaborations between parents and teachers

The ELLs' dialogic interactions with their parents and teachers were very important, and parents and teachers had authority and capacity to influence the ELLs' reading and learning of electronic literacies. However, the collaborations between the parents and the teachers were not active and consistent, especially for the ELLs' learning electronic literacies. Even though many teachers shared lists of educational websites on their school blogs, it was simply information for their students. There was not much information about online reading shared with the parents. In addition, the shared sources were mostly relevant to information literacy, and other components of electronic literacies, such as computer literacy, CMC literacy, and multimedia literacy, were not often shared.

To facilitate ELLs' and mainstream students' reading of online texts at home and in school, parents and teachers need to communicate and collaborate with each other more effectively. Parents and teachers should consider students' needs in diverse learning contexts and optimal ways to help them. Parents should think about how they can help their children to learn effectively through reading online texts and how to make the learning process more meaningful. For example, instead of simply allowing their children to use a computer for a certain time, it would be better for parents to get involved the process of selecting online texts and recommending good texts. If possible, having a conversation with their children about online reading and texts could help the parents understand how their children learn through online reading and what they need. Teachers should consider how to develop technology-enhanced tasks more effectively for students' learning and how to make them more student-centered. For example, depending on the students' computer literacy levels, teachers could develop technology-based projects, such as developing a blog, a wiki page, and digital storytelling, which would give students more opportunities to get involved in technology-enhanced learning environments. As a small group project, a blog or a wiki page could be an excellent collaborative platform for students to work on a topic together. In addition, as an individual project, digital storytelling would enable the students to talk about their own experiences and stories. More systematic and comprehensive opportunities for professional development should be developed and provided to both parents and teachers. These educational opportunities should address relevant topics about electronic literacies in education, and they need to be accessible to both parents and teachers. Educational technology workshops will help parents and teachers be aware of the importance of and be knowledgeable about electronic literacies and online reading. If recordings of the workshops and web resources are posted to the school websites, they will be more accessible to parents and teachers.

7. Conclusions

The findings of this research indicate that ELLs used nine strategies when reading online texts at home and in school. Overall patterns in the ELLs' use of online reading strategies were similar in each context, but there were variations because of the different contextual features. These variations indicate the ELLs' active and flexible uses of online reading strategies instead of passive attitudes toward online reading. In addition, three factors influenced the ELLs' selection of online texts and their use of strategies. These factors include the ELLs' electronic literacy knowledge, their parents' and teachers' guidance for online reading, and the language of online texts.

These findings show that ELLs actively use strategies when they read online texts in both home and school contexts. The ELLs adopt appropriate strategies based on their needs and adjust them if necessary. In addition, they transfer strategies between different reading contexts. The ELLs consider not only what strategies should be used but also how the strategies could be used effectively in different situations. Even though the ELLs read online texts and learn in varied contexts, they do not at this moment receive enough support to use digital tools effectively. Parents and teachers need to play more significant and collaborative roles in guiding online reading and strategy use because technology, especially online texts, are important for the ELLs' learning in contemporary contexts. These contributions will be one of the significant assignments to help the ELLs become more active and autonomous learners.

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