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Digital Literacy, Language, and Latinos: L1.4Word¹

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¹. We coin L1.4Word, a web-like term, to indicate the transformative potential of digital spaces in which Latino/a youth can create a relevant, hip, hybrid digital language to move their use of mother tongue literacy into the 21st century.

Abstract

This case study examines language opportunities and practices vis-à-vis digital literacies. Participants were 29 native Spanish speakers from grades one to seven in a South Texas colonia, or unincorporated settlement. Data sources were literacy logs and three sets of interviews. Using grounded theory for data analysis, we found participants did not have school instruction and assignments focused on Spanish or technology. Most had negative views about digital writing in Spanish and lacked confidence in L1 writing. We discuss digital literacy opportunities and practices in and out of school, dialogue and third space possibilities in code-switching, and heteroglossia, or socio-ideological, conflicting digital languages and literacies. Last, we coin the term L1.4Word to signify revaluing and reappropriating one's mother tongue literacy through digital tools to move the language forward.

Introduction

Which languages did Latino/a colonia children, participants in the present study, use when accessing digital literacies in and out of school? This question is important because Latinos are the fastest growing U.S. group (U.S. Census Bureau, 2011); most emergent bilinguals (García, Kleifgen, & Falchi, 2008) in the U.S.A. are native Spanish speakers (Batalova & McHugh, 2010) and U.S. born (Suárez, 2007). Also, researchers have not explored children's digital literacy preferences and practices vis-à-vis language in Texas colonias, which number at least 2,300, mostly along the Mexican border (Texas Secretary of State, 2010), and which constitute at least 500,000 people (Brenner, Coronado, & Solden, 2003). A colonia is an unincorporated settlement in the U.S. Southwest; thus, city services, such as police protection and utilities, are non-existent (U.S. Department of Housing and Urban Development, 2005). About 50% of colonia residents live below the poverty level (Brenner, Coronado, & Solden). Additionally, because emergent bilinguals receive scant literacy support in their first language (L1) in many U.S. schools (Gándara & Contreras, 2009), it is important to discover what language they use for digital literacy purposes away from school. Our question is also significant because of the dearth of research on internet use in languages beside English. In a review of language use and the Internet, Stein (2003) stated, "A large body of research is simply not represented: research that is not in English" (p. 162). This study also theorizes why 29 Texas colonia children of poverty (all L1Spanish speakers) used Spanish and English when accessing digital technology. Each child completed an open-ended log focusing on daily literacy practices and took part in at least one semi-structured interview. All data gathering took place in respondents' homes or at the same community center in their South Texas colonia.

Perspectives

Six theoretical frameworks inform this study: New Literacy Studies; language revitalization; dialogue; heteroglossia; third space; and social justice. Most researchers use one or two constructs to frame their investigations; however, all six frameworks in the present study complement and inform each other and highlight the transformative potentials of multiple perspectives. Next, our theoretical underpinnings inform the relationship between bilingualism, socially situated practices, and policies.

New Literacy Studies

Like New Literacy Studies scholars, we focus on participants' use of communication and information technologies in *and* out of school (Leu, O'Byrne, Zawlinski, McVerry & Everett-Cacopardo, 2009). According to O'Brien and Scharber (2008), digital literacies are "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" (p. 66-67). Digital literacy tools include computers, information and communication technologies (ICTs), video games, and hand-held devices (Skudowitz, 2009). We include television (Bianculli, 1993) because it relates to participants' socially situated practices, or patterns of activity (Gee, 2000; Pahl & Rowsell, 2005).

Language Revitalization

Like Jiménez (2003), we believe a neglect of culturally diverse students' mother tongues and dialects cheats everyone. For the 21st century García and Kleifgen (2010) state: "All children, regardless of language background, need to develop bi/plurilingual abilities ... " An official neglect of the mother tongue, over time, can contribute to home language loss. Thus, a language shift framework enables us to comprehend how native-Spanish speakers can shift to English, the

dominant language, because of their experiences in schools, or high-powered spheres (Fishman, 2001). Similarly, language revitalization theory helps us to fathom how digital literacy use in low-powered spheres (e.g., in homes) can be helpful in not only reversing language shift (Fishman, 1990), but also in moving mother tongue literacy forward. Colonias constitute special sites to study language revitalization due to demographic characteristics (U.S. Census Bureau, 2010), and the constant mobility of border residents between U.S.A. and Mexico (Anderson & Gerber, 2007).

Dialogue

Related to the theoretical framework of language revitalization is dialogue, or multiple perspectives through language (Bakhtin, 1986). Revitalization of the L1 can occur in diasporic communities, or when people of the same ethnicity live as a bounded community away from their ancestral land (Conner, 1986). We posit this L1 revitalization is happening precisely because the English language is becoming problematic in high-powered spheres, such as schools, which serve predominately low-income Latinos who use their L1 in their community, or low-powered spheres. According to Bakhtin (1996) a language, such as English, undergoes “dialogization when it becomes relativized, de-privileged, aware of competing definitions for the same thing” (p. 427). Perhaps because the Spanish language is no longer valued in schools due to federal English-only education policies (U.S. Government Printing Office, 2011), Spanish can actually gain more popularity in low-power spheres and can be perceived as a challenge to hegemonic language education schooling practices. This appears to be what is happening nowadays with some Latino/a children’s resistance to school-related basic skills homework in English, which we call *papelería*. *Papelería* in Spanish can mean masses of papers, and this definition connotes mundane bureaucracy; we apply the term to school settings in which Latino/a

students of poverty have a school menu full of dull, decontextualized, test-preparation worksheets and benchmarks (Bussert-Webb, 2009a; Díaz & Bussert-Webb, 2013). Furthermore, dialogic theory relates to online collaboration because of the polyphonous, or multi-voiced nature of collaborative online learning (Koschmann, 1999).

Heteroglossia

Thus, Latino/a youth may not see *papelería* as relevant to their digital, hybridized worlds and may engage in heteroglossia, or socio-ideological choice in multilingual and dialectical juxtapositioning. Heteroglossia occurs as a hybrid utterance in which voices, dialects, beliefs, and contexts are juxtaposed. Heteroglossia is the language space in which centripetal (unifying) and centrifugal (decentralizing) forces collide, which counters monoglossia. Centripetal discourses are monoglossic because they tend to standardize language and close meanings and centrifugal forces open meanings (Bakhtin, 1996). The hybrid utterance is a passage employing only a single speaker—the author, for example—but one or more kinds of speech. Bakhtin believed the juxtaposition of the two different speeches brings with it contradictions and conflicts in belief systems:

The centripetal forces of the life of language, embodied in a “unitary language,” operate in the midst of heteroglossia. At any given moment of its evolution, language is stratified not only into linguistic dialects in the strict sense of the word ... but also into languages that are socio-ideological: languages of social groups, “professional” and “generic” languages, languages of generations and so forth... alongside verbalideological centralization and unification, the uninterrupted processes of decentralization and disunification go forward (p. 271-272).

Third Space

Similarly, third space theory, or hybridized, multi-voiced practices disrupts first and second space binaries (Gutiérrez, Rymes, & Larson, 1995). Centripetal forces could be conceived as official spaces and centrifugal forces as unofficial spaces. Third space opportunities, appearing between both spaces, provide prospects for hybridized languages and transformative practices. This third space can be digital translanguaging (García, 2009), or sense-making in authentic communicative contexts. Although translanguaging includes code-switching, García noted that emergent bilinguals may view the former as a single, coherent system for meaning-making. Thus, digital translanguaging can create L1.4Word. L1 connotes the first language and 4Word signifies the importance of mother tongue literacy for language revitalization. However, many U.S. born Latinos/as need help and confidence in developing Spanish literacy skills and knowledge to create this third space of transformation.

Social Justice

Although we perceive Latino/a children as intentional actors of their worlds (Merleau-Ponty, 1962) and position-takers (Bakhtin, 1996), we also acknowledge they are acted upon vis-à-vis U.S. language, literacy, and immigration policies, as well as No Child Left Behind (NCLB) legislation (U.S. Department of Education, 2002). Thus, bilingualism and biliteracy relate to social justice because we embrace children's home languages and discourses, or socially situated identities (Gee, 2008), to write back to totalizing discourses. People who use standard English in certain domains, but choose alternate languages or dialects in other digital forms, may do so to resist a monolingual America (Warshauer, 2000). Next, like García, Kleifgen, and Falchi (2008), we are deliberate in our reference to participants as emergent bilinguals (versus English language

learners): “When officials and educators ignore the bilingualism that these students can and often must develop through schooling in the United States, they perpetuate inequities in the education of these children” (p. 6).

Thus, when we combine New Literacy Studies, language revitalization, dialogue, heteroglossia, third space, and social justice – we realize how non-neutral digital technologies are (Jiménez, 2003), and in this non-neutrality, we see possibilities. Like Luke (2005), we believe digital literacies and translanguaging have the potential to counter hegemonic notions of literacy and language “for a more equitable redistribution of social goods, power, and capital” (p. xiii). This redistribution relates to power and change in societal structures vis-à-vis U.S. language, immigration and education policies. High-powered spheres and official spaces and low-powered spheres and unofficial spaces (Fishman, 2001) can blend into hybridized, transformative third spaces (Gutiérrez, Rymes, & Larson, 1995) to move L1.4Word. Also, like New Literacy Studies scholars (e.g., Barton & Hamilton, 1998; Gee, 2008; Leu, O’Byrne, Zawilinski, McVerry & Everett-Cacopardo, 2009; Street, 2003) and Bakhtin (1996), we perceive language and literacy practices as ideological and as contextualized.

Methods

This section focuses on the research site, participants, data gathering, data sources, and analysis for the three institutionally-approved data gathering phases.

Site

This study took place in an after-school tutorial agency and in the homes of participants, all in Esperanza, pseudonym for a South Texas colonia. With approximately 7,000 residents and over 50 years of existence, Esperanza is the oldest and largest U.S. colonia (U.S. Department of

Housing and Urban Development, 2005). Esperanza residents have an average per capita income of \$6,000 and 45% over age 24 have less than a ninth grade education (U.S. Census Bureau, 2010); an estimated 37% of Esperanza residents are foreign-born; 99% are Latino; 95% are of Mexican origin; and 97% speak Spanish at home. Despite these obstacles, Esperanza residents have community and family unity, which are important determinants of language revitalization (Fishman, 1990). Although some have accrued wealth, they do not leave because of relationships with neighbors (Bussert-Webb, 2011). Another strength is the importance community members place on education. Most Esperanza children attend Texas Education Agency (TEA) recognized or exemplary public school campuses; to have this classification a school must demonstrate above average attendance, retention rates, and results in state-mandated academic tests among all students (Long, 2010).

Participants

The 29 Latino/a children for all phases were 15 males and 14 females, ages six to 14, and in grades first through seven. All acquired Spanish as a first language; 23 attended elementary, or primary school, and six were enrolled in middle school. All participants (except one, in the first phase) attended the after-school tutorial agency. Thus, we collected data for all phases either in respondents' homes or at the tutorial center.

Data Gathering

Three participated in phase one between February 2009 and December 2010; they were part of Díaz's dissertation (2011). Phase two, in May 2010, involved 27 children (one of whom was in the first phase). Phase three, in May 2011, involved 13 children (all of whom were in phase two); unfortunately, many participants no longer attended the center so we could only contact about half of them for the last phase. All interviews lasted between 25 to 30 minutes and

were English and Spanish combinations, depending on respondents' preferences. We audio-taped and transcribed all interviews. Phases one and two consisted of structured interviews and phase three utilized a semi-structured approach. Participants' responses during phases one and two piqued our interest about the languages participants used while accessing digital media, so we dug deeper into this phenomenon by re-interviewing them in the third phase.

In phase two 27 participants completed a 24-hour literacy log. They received and completed a Spanish or English hard copy of the log based on their language of preference; some mixed languages when responding to the log questions. During the same phase, Díaz interviewed 26 children, but two friends or siblings at a time; we made this methodological decision because the children were part of an on-going tutoring and gardening program with a tight university schedule. Bussert-Webb's methods course and reciprocal service learning project (in which teacher candidates tutored and gardened with the children) lasted only three weeks every May. Technology and language responses from the first and second phase piqued our interest, so in the third phase, we combined these two areas and focused on the language the youth accessed while engaging in digital literacy. To avoid the methodological problem of a respondent possibly providing the same information as a peer, we conducted one-on-one interviews in the third phase.

Data Sources

Data sources were three sets of interviews, literacy logs (Bussert-Webb, 2009b), and participant observations. The open-ended 24-hour log, comprised of six questions, focused on children's self-reports of reading while: getting ready for school, during school, to and from school, for homework, and while using digital media. In the left column, participants wrote what

they read and did and in the right they wrote what language used during different parts of their day. The following table demonstrates the focus of each phase and sample interview questions.

Table 1: Phase, Focus, and Questions

Phase	Focus	Sample Interview Questions
One	Language maintenance and loss and biliteracy	<ul style="list-style-type: none">• Tell me about what you read in Spanish and in English.• Do you like to read in Spanish? Why or why not? Do you like to read in English? Why or why not?
Two	Print and digital literacies	<ul style="list-style-type: none">• This summer what do you plan to read?• What do you do on the computer?
Three	Languages used for digital literacies and perceptions	<ul style="list-style-type: none">• What language do you use for each type of technology? Why?• How do you feel about the ways you use technologies and the languages you use to access them?

In the last phase we also sought to determine interviewees' text-processing and purposes by conducting cell phone and internet think alouds (Damico & Baildon, 2007). The protocol was: "Here is a cell phone/computer. Please tell me what you're doing and your purposes." Follow-up questions pertained to where participants navigated and why.

Analysis

Data analysis consisted of looking for patterns in the data and was based on grounded theory (Glaser & Strauss, 1967). During the data analysis process, we read the transcripts repeatedly and took notes. As a result, several themes emerged, which we identified and categorized by making comparisons and looking for similarities across the data (Bogdan &

Biklin, 2007). Next, we selected and labeled some data as more significant than others by cycling back and forth within our theoretical framework (Barton & Hamilton, 1998). This section focused on the colonia where we conducted this grounded theory case study with children participants; the three phases consisted of interviews and a 24-hour literacy log.

Results

Findings are divided into three main sections: in-school contexts, language preferences, and out-of-school contexts.

School-related Digital and L1 Experiences

This section focuses on participants' dearth of school-related digital experiences, a test-preparation curriculum, and rare school opportunities to learn L1 reading and writing.

Paucity of academic digital experiences. Participants lacked digital experiences in school and for homework. We noticed that only one participant brought in a technology-related school project during the May 2010 service learning project. Few participants could recall any digital projects they did during school or for homework, also. A lack of technology integration is particularly marked in low-income urban schools because of the test preparation focus vis-à-vis NCLB (Henry, 2007; U.S. Department of Education, 2002). Furthermore, NCLB legislation has intensified a test-preparation focus, especially in schools serving predominately low-income Latino/a children (Gándara & Contreras, 2009).

Test preparation. Participants experienced mostly a discrete-skills curriculum to prepare them for high-stakes tests. When asked if she used the computers at the tutorial center, Cadamayo, 12, responded, "not anymore because I have a lot of [paper] homework." In reference to homework, some said they would like to have technology-based reading passages with comprehension questions to prepare them for the state-mandated standardized test, or the Texas

Assessment of Academic Knowledge and Skills (TAKS) during data gathering. Because of the paucity of technology-based school instruction and assignments and participants' experience with test-focused instruction (Díaz & Bussert-Webb, 2013), we were not surprised when Artista, seven, said she would like to have the following type of school experience:

Passages, like the stories for the TAKS test. I would like this. So I could use the computer. I like the TAKS passages 'cause I don't have to get any homework. Like when you take the TAKS, you don't get homework.

When asked what kinds of homework she received, Artista said, "Spelling and passages (for the TAKS) and sometimes we have to write sentences with the vocabulary." Artista's brother, PSP, a nine-year-old, said he did "homework, boring homework" at the tutorial center. Thus, participants may have grown tired of *papelería*, or countless worksheets and print-based test-preparation activities. Perhaps, at a primordial level, they have come to associate paper with school-related literacy practices. Unfortunately, it appears test-preparation and testing may shift to digital formats. Starting in 2012, all end-of-course Texas-mandated high school tests will be offered on paper and online (Texas Education Agency, n.d.). This does not mean students will be tested on locating, synthesizing, and evaluating online information (Leu, McVerry, et al., 2009). What it indicates, however, is high-stakes testing is becoming digitalized.

Little L1 instruction. Besides decontextualized discrete-skills homework and paper-forms of test-preparation, these children alongside the Mexican border said they received little curriculum and instruction related to reading or writing in Spanish, e.g., "in the school I learn only English" and "*Los libros de mi escuela están en inglés, las notas de la maestra están en inglés*" (The books at my school are in English; the teacher's notes are in English). It is difficult

to become biliterate if L1 instruction and materials are insufficient (Reyes, 2011). Also, several researchers over the last 40 years have found that teaching children of other languages to read in their mother tongue helps their reading achievement in English (Chuang, Joshi, & Dixon, 2012; Goldenberg, 2008). In summary, these school-related findings related to participants' reading and writing and authentic technology experiences.

Digital Language Preferences

This section builds upon the previous one and focuses on how the dearth of L1 instruction and materials influenced most participants to prefer reading and writing in English. Francisca, 13, said: "*Prefiero inglés que español. Pues no puedo en español porque está muy difícil; nunca me enseñaron a escribir en español*" (I prefer English more than Spanish. I cannot write in Spanish because it's harder and I was never taught to write in Spanish). Many respondents expressed reluctance to text or type in Spanish in informal contexts because of a lack of confidence and skills. Hermanito, 11, said, "Sometimes I text in English; it's better for me to spell. Like the word "because," is it *porque* or *por qué*?" After he typed in his email and password in *Facebook* during this laptop think aloud, Hermanito said, "See who's connected. Email them. Write them in English because it's better for me to spell." Chateo, 14, explained why he texted mostly in English: "I have more sentences. I have more things when I click." Francisca noted, "*Para mí, es más fácil hacerlo en inglés porque las palabras están más cortas*" (For me texting is easier in English because the words are shorter).

According to Wong-Fillmore (2000), many English emergent children in the U.S.A. receive this impression at school: "The home language is nothing; it has no value at all" and they believe "they must disavow the low status language spoken at home" (p. 208). In a seven-year investigation of Mexican-heritage immigrant and U.S.-born parents and their U.S.-born children,

respondents held consistently positive opinions about English because they perceived it more highly than Spanish (Pease-Alvarez, 2002). Lee's (2002) Korean-American college participants did want to develop their L1, but they had received inadequate L1 instruction at the primary and secondary school levels. It follows that if L1 instruction is limited, then children may not feel as confident or positive about reading and writing on paper or online. This section related to the children's digital language preferences.

Out-of-school Practices

This section focuses on participants' out-of-school: digital access and practices; translanguaging; interlocutor contexts; family influences; digital secrets; writing in low-powered spheres; using internet design features to gain L1 literacy and to resist English hegemony; television viewing; and perceptions of digital language use.

Digital access and practices. All participants reported playing games, mostly in English, with computers, *DSs*, *PSPs*, *Xboxs*, and cell phones. Most communicated with friends through *Facebook*, *Myspace*, and texting in both English and Spanish. Texting was also split between both languages, but participants in grades one, two, and three did not report texting. Next, despite living in one of the most economically disadvantaged U.S. communities for its size (U.S. Census Bureau, 2010), most respondents had home computers and Internet for non-academic purposes (Bussert-Webb & Díaz, 2012). Those who did not have the tools used design and redesign (Janks, 2010) by finding alternate access points, e.g., tools and equipment at the tutorial agency or in the homes of neighbors, family, and friends. The most popular websites mentioned were *Facebook*, *Myspace*, and sites with games. None mentioned using the Internet to find out about current events. This may be due to participants' ages, because the most popular website among

U.S. Latinos in May 2011 was *Univisión*, *Televisa*, *impreMedia*, and *Yahoo en español* were in the top 10 (Guskin & Mitchell, 2011).

Translanguaging. Participants reported translanguaging (García, 2009) while reading and writing digital texts. An example in reading comes from the laptop think aloud of Frank, 13: “Check my friends, like this: *Solicitudes de amistad*” (friend requests). He read aloud: “*La Sadgirl*” and smiled widely. The picture was of a pouty-faced, but pretty teen about Frank’s age, with waist-length black hair and puppy dog brown eyes. In Frank’s hybridized world, the juxtaposition of “*La Sadgirl*” was a clever use of Spanish-English translanguaging, a digital collapsing of two words and worlds, and visual and verbal irony because the pretty girl looked more sulky than sad. Also, Frank’s oral descriptions and navigations in *Facebook* and during gaming demonstrated that he made conscious decisions regarding Spanish and English digital practices. Warshauer (2000) also discusses hybrid ethnic and language identities of Latinos/as:

To the extent that a US Hispanic identity has emerged (or that national identities such as Mexican/Mexican-American have been preserved), it is once again largely due to language, with Latin American immigrants united by their use of either Spanish or “Spanglish” (p. 154).

In the following interchange, we can see Hermanito perceived translanguaging as part of his identity. Also, he switched between Spanish and English to facilitate communication:

Díaz: *¿Y qué piensas tú de las personas que mezclan los dos lenguajes? ¿Se te hace curioso, o estás acostumbrado?* (What do you think about mixing both languages? Do you find it unusual, or are you used to it?)

Hermanito: *No sé, pues yo hablo así* (I do not know, because I speak like that).

Díaz: ¿Y te das cuenta cuando lo haces? (Do you realize when you are mixing both languages?).

Hermanito: Sí, y lo hago pues no sé cómo decir la palabra en español (Yes, and I do it when I do not know the word in Spanish).

This translanguaging is necessary for continuity in oral and written communication (Skiba, 1997). In another interview, Hermanito said, “I text with all the friends that know both, like Spanish and English. I text them in Spanish or sometimes in English.” Francisca said, “*También tengo Facebook en inglés y de vez en cuando en español*” (I have also *Facebook* in English and sometimes in Spanish). In the following interchange, Cain, 14, reported not just translanguaging, but enjoying doing so:

Díaz: What do you think about the people who mix both languages? Do you think it is okay?

Cain: Yes, we do it, too. It is cool.

Díaz: Why do you think it is cool? I would like to know how do you feel when you are switching so easily from one language to the other.

Cain: It feels weird. It’s like, “*Hola. ¿Qué onda? What’s up?*”

Díaz: Do you feel okay with that?

Cain: (Laughing) Yeah!

The “weird coolness” described by Cain when he and others translanguage is at the heart of heteroglossia and dialogue. This “weird coolness” is in juxtaposition and it demonstrates a tension between centripetal and centrifugal forces and between worldviews. Centripetal discourses centralize language, while centrifugal discourses are on the periphery; they diversify language and resist closure. Heteroglossia is the conflict between two or more languages within

an individual and her or his interlocutor and context. Thus, their writing, be it printed or digital texts, becomes dialogized with translanguaging: “It is from there that one must take the word, and make it one’s own” (Bakhtin, 1996, p. 294). Making the word one’s own in a socio-ideological context, for Cain and the other Latino/a participants, meant translanguaging, or a sense-making process that includes hybrid language use. Bakhtin stated, “After all, one’s own language is never a single language: in it there are always survivals of the past and a potential for other-languedness ...” (p. 66). Thus, heteroglossia and dialogue focus on context and struggle related to language uses and contexts.

Next, participants’ translanguaging represented a third language, a trilingualism, or a hybridized language for authentic communicative contexts. Although Bakhtin (1996) was referring to parody in literature when discussing bilingualism, the concept of translanguaging appears to apply: “This is an already fully developed, intentionally dialogized bilingual (and sometimes trilingual) hybrid” (p. 78). Bakhtin (1997) believed in “nonself-sufficiency” (p. 287), multiple voices, and dialogue. He opposed closed systems and single consciousnesses and he posited dialogue and context were essential to de-privilege any particular culture, language, or utterance. Biliteracy and bilingualism vis-à-vis digital literacies also relate to third space theory to break any first- and second space binaries. Written translanguaging online resembles face-to-face translanguaging (Hinrichs, 2006). Gutiérrez, Baquedano-López, & Tejada (1999) discussed hybrid language practices as opening up third space in their ethnographic study of the literacy practices of children and their teacher in a dual immersion elementary school classroom. Similarly, Bhatt (2008) discussed how Hindi translanguaging in English newspapers created a third space in which readers, writers, and speakers could reposition themselves.

Indeed, L1.4Word can help L1 speakers revalue and reappropriate their mother tongues through digital literacy. Although many parents of Latino/a children attempt to teach them print literacy skills in their home language (Reyes, 2011; Zhang, 2005), these efforts are lost, for the most part, when the children are told, explicitly or implicitly in schools, that Spanish literacy does not have value. According to Hornberger (2006), language revitalization “is not so much about bringing a language back, as bringing it forward!” (p. 281). Similarly, García and Kleifgen (2010) state that groups who have lost their language, tend to “recover bits and pieces of their existing ancestral language practices as they develop a bilingualism that continuously reaches back in order to move forward” (p. 42-43). Thus, L1.4Word has the potential to open up linguistic diversity for children in diasporic communities. Hurtado’s and Vega’s study (2004) suggests the “hybridity of bilingualism” allows for heritage languages to be retained. They examined the simultaneous phenomena of language shift from Spanish to English and Spanish maintenance, and found what they call “linguistic bands,” when two or more people speak a language together (p.147), which allows for speakers to continue to use Spanish after becoming dominant in English. They also suggest Spanish can have periods of dormancy in the lives of speakers who are in communities where Spanish is spoken and still be available for use in response to appropriate triggers. Bakhtin (1996) argued,

But unintentional, unconscious hybridization is one of the most important modes in the historical life and evolution of all languages. We may even say that language and languages change historically primarily by means of hybridization, by means of various ‘languages’ co-existing within the boundaries of a single dialect, a single national language, a single branch ...” (p. 359).

Next, Bakhtin (1997) theorized the idea of threshold to describe, in part, a person living between two worlds, or two spaces, and engaging in genuine dialogue where hegemonic conventions, e.g., standard English and standard Spanish, are broken. A threshold can be a place where two or more languages collide, as in translanguaging, in which Spanish and English are combined to create a hybrid language for making and sharing meaning. This can apply to Latino/a youth, living in the United States, and digital translanguaging “on the *boundary* between one’s own and someone else’s consciousness, on the *threshold*” (p. 287). In a home a threshold is between two rooms. A threshold, thus, be a space between two worlds, e.g., a digital tool, such as a cell phone, in a Spanish-dominant home, and this threshold can propel Latino/a youth to another realm of reality. Also, a digital threshold can also be conceptualized as a third space – alternative and transformative and not confined to time or place (Gee, 2011).

Interlocutor contexts. Participants’ digital language use often depended on the preferences of the interlocutor; participants texted or emailed in the dominant language of the receiver and the context. This relates to the communication accommodation theory (Giles & Ogay, 2007), in which people change their dialect or language to either emphasize or minimize differences between themselves and the interlocutor. For instance, Cadamayo stated: "When I'm texting I use English because most of my friends know more English than Spanish; I text in Spanish to a friend who lives in another part." Hermanito said he texted in both languages, depending on the language dominance of the receiver, “When I'm texting to friends that don't know Spanish, I text to them in English.” Cain expressed similar practices: “If they text me in Spanish, I text in Spanish; and the same with English.” Indeed, heteroglossia “insures the primacy of context over text” (Bakhtin, 1996, p. 428)

Paolillo (1996) found little mother tongue use in a study of a Usenet Newsgroup of Punjabis in the United Kingdom, Canada, and the United States. Paolillo attributed English dominance to the prevalence of non-fluent second and third language Punjabi speakers. Similarly, Androutsopoulos (2007) found German dominated in web-based discussion forums among Greeks, Persians, and Indians residing in Germany. Paolillo attributed the preponderance of German partly to language shift among second and third-generation immigrants.

Family influences. The digital influence of family members, particularly mothers, appeared to help participants maintain some Spanish; Dulce, seven, said she chatted online with her sister in Spanish, and Francisca said, “Texting *en español, lo hago sólo con mi mamá porque ella no entiende el inglés. Y a todos los demás es en inglés*” (Texting in Spanish, I do it only with my mom because she does not understand English. With the rest it’s in English). Francisca engaged in “... *Texting en inglés, con mis friends. Lo hago en inglés, pues ellos saben sólo inglés. A mi mamá en español, y a mis primos en inglés*” (Texting in English with my friends. I do it in English because they only know English. With my mom, in Spanish, and with my cousins in English). PrimeraComunion, 10, texted her mother in Spanish, but her friends in English: “*Sólo a mi mamá, me confundo en español porque mis amigas casi no hablan español*” (Only my mom. I get confused in Spanish because my friends hardly speak Spanish). The same was true for EsponjaBob, 12: “*I text en los dos. A mis amigos en inglés y a mi familia en español*” (I text in both. To my friends in English and to my family in Spanish). Indeed, family members are influential in shaping children's linguistic and cultural identities (Luo & Wiseman, 2000).

Participants appeared to be influenced by older siblings’ practices related to texting, gaming, and music, as well as their suggestions of websites, music, and games. The sister of

Flor, 13, recommended game websites, such as *videojuegos.com*, and famous Latino/a entertainers, such as Winson y Yandel, a Reggaeton duo from Puerto Rico - all in Spanish. Flor's sister was transmitting language and cultural understandings and was creating Flor's desire to read in Spanish (Fishman, 1990). Although it was encouraging that older, influential siblings reinforced the importance of Spanish, we are concerned their practices related to friendship versus interest-driven digital literacies (Warschauer & Matuchniak, 2010), and consumption versus creation (Attewell & Winston, 2003).

Next, digital technologies appeared to help participants to maintain family ties and identities in Mexico, from where most participants were. Years ago it may have been relevant for Latinos/as to write cards and letters to family members in other countries. Correspondences through traditional postal systems appear a thing of the past for participants, as none mentioned engaging in reading and writing cards and letters. Francisca said, "*Tengo e-mail y mando e-mail a mis friends, cousins, y a mis tías*" (I have email and I send email to my friends, cousins, and my aunts). The power in digital literacies relate to socio-historical and dialogical moments. Bakhtin (1996) stated, "The temporal model of the world changes radically: it becomes a world where there is no first word (no ideal word), and the final word has not yet been spoken" (p. 30).

Results indicate that Latino/a youth are using digital tools to move mother tongue literacy into the future, to create L1.4Word, or a relevant language for them. Also, within a Bakhtinian perspective of unfixed phenomena, our findings of L1.4Word can be relevant to participants' (possible) future children, who may continue to transform their mother tongue by emerging technologies. Nowadays Latino/a youth can instant message (IM) families, can see their loved ones' faces and hear them online inexpensively through *Skype* and *FaceTime*, and if they do send them a message, there is less time lag than through the paper postal system. Digital tools are

immediate, interactive, contextualized, and ever-changing. Latino/a youths' digital reading, writing, and visual images (the latter are also literacies) will constantly evolve in relation to socio-ideological and political contexts (Bakhtin, 1996).

Telephone calls and visits to Mexico, especially during holidays and summers, also helped to maintain mother tongue literacy and language. LuchaLibre, nine, and Abuela, eight, were still planning to spend their summer in Mexico, despite the recent violence there. However, with the increased dangers in Mexico, some families choose not to travel to Mexico as frequently and to forego summer vacations being immersed in the Spanish language and Mexican culture. Cho (2000) found second generation speakers' discomfort with native speakers, particularly during travel the home country, frequently motivated them to improve their L1 knowledge.

Guardado (2002) studied English dominant and bilingual Latino groups, both U.S. born, and found parents' concern for their children's Latino identity related to whether their children became English dominant or maintained Spanish. Zhang's study (2005) confirms parental L1 commitment as a key factor in children's language maintenance. Indeed, positive relationships with parents and affirmations of L1 use in the home influence L1 maintenance through the generations (Arriagada, 2005; Romero, Robinson, Haydel, Mendoza, & Killen, 2004). Also, cultural maintenance predicted adolescent ethnic language proficiency among Mexican, Vietnamese, and Armenian families (Phinney, Romero, Nava, & Huang, 2001). However, even though family dynamics and parents' L1 use are important for language maintenance among children, Hinton (1999) discovered Asian-descent college students still lost L1 fluency.

Digital secrets. Although participants' adult family members appeared important in shaping children's beliefs and practices, peers were also influential, especially for participating pre-adolescents and adolescents (Robertson & Simons, 2003). In their study of first, second, and

third generation Mexican Americans using surveys and interviews, Hurtado and Vega (2004) found language preference is influenced by peer groups and contact with L1 speakers. In the present study, participants preferred to text peers more than family members. PrimeraComunion said she texted Latino/a friends in English so her Spanish-dominant mother would not decipher messages deemed private: "(I text friends in) *inglés porque mi mamá no sabe leer el inglés*" (English because my mother does not know how to read in English). When asked if cell phone owners minded if participants texted in English and the cell phone owners did not read English, participants said the owners (mostly parents and older siblings) did not mind. In a study of second generation Chinese American adolescents, peers were the most important influential on language preference and L1 maintenance (Luo & Wiseman, 2000). Both Chinese-speaking and non-Chinese speaking peers were influential in U.S.-born children's use and retention of Chinese.

Digital use in high-powered and low-powered spheres. During a joint interview with Mayor, 13, and Hermanito, the brothers mentioned the language fluency of the interlocutor was not as important as the location from where Mayor and Hermanito texted or typed digital messages. Although they felt more comfortable writing electronically in Spanish from home, they said it did not bother them to read texts or emails in Spanish or English at home:

Díaz: *¿Y por qué lo haces en español? ¿Es porque tus amigos hablan sólo español?* (And why do you text in Spanish with your friends? Is it because your friends speak only Spanish?)

Hermanito: *Es que hago 'texting' desde mi casa, y como en casa hablo más español, entonces me siento más cómodo con el español.* (This is because I text from home. Since at home I speak more Spanish, I feel more comfortable to text in this language).

Other participants demarcated language use in high-powered spheres (e.g., English for school-related work) and in low-powered spheres (*Facebook* in Spanish to communicate with friends). Frank said: “The projects for school are in English and *Facebook* and stuff like that is in Spanish.” Also, during the first round of interviews, participants said they wrote peers in Spanish when the topics were about personal matters; however, they wrote peers in English when the topics related to school.

Digital features to improve L1 reading and writing skills. Although most respondents preferred to engage in digital literacy practices in English because they were not taught to read or write in Spanish, some, like Flor, were able to use graphics, inextricably linked to the Internet, to assist them in Spanish reading comprehension. For instance, during her think aloud, Flor showed Bussert-Webb a website in Spanish and said she looked at the pictures to assist her comprehension. The Internet was teaching Flor how to read in her mother tongue. Another example of the Internet teaching participants L1 literacy comes from Cadamayo. During her laptop think aloud, she began looking for the house where she had lived in Nuevo Leon, Mexico: “Ca-der-ey-ta, Nuevo Leon. That's where I lived. I can't spell it.” (She then attempts a spelling and the Internet performs an autocorrect.) “Ah, here it is!” Indeed, digital tools have the potential to teach people their first language through visual context clues and auto-correct features.

Smith (2006) explained that people learn to read by reading and that digital tools help us to learn to read and write through authentic contexts: “Computers help everyone write. And what helps writing helps and promotes reading” (p. 125). When an internet site has graphics that match the texts and when a search engine corrects the spelling of a city one is looking for, it is possible the Internet can help to contextualize literacy learning. However, people must have

exposure to these electronic and print sources in their mother tongue for L1.4Word. Thus, although the Internet first spread global English, it can also provide opportunities to challenge English language hegemony (Warshauer, 2000).

Some participants mentioned switching the language of games, social media, and cell phones so they could communicate in Spanish. Frank said, “*XBOX 360*, English. *PS3*, Spanish. *Call of Duty Black Ops*, in Spanish and English. I play it in English and I put it for my brother in Spanish.” Frank’s quote demonstrates he knew how to change the game language. During his laptop think aloud, Frank stated: “I go to the start button and I go to the Internet and I put *Facebook*.” After typing his Hotmail username and password, he went to “*notificaciones*” (notifications). When Bussert-Webb remarked about Frank traversing in a Spanish-only site, Frank showed her the bottom button where he said he could change *Facebook* to any language.

Also, EsponjaBob showed Bussert-Webb how to change her cell phone settings to Spanish during the think aloud part of the interview. With her own cell phone, EsponjaBob said, “*Toco aquí. Busco mis contactos. Le pongo así. Y luego empiezo a escribir en español*” (I touch here. I look for my contacts. I put it like this. And then I begin to write in Spanish). We interpret Frank’s and EsponjaBob’s maneuvering away from English as their way of talking back to official language practices, perhaps the ones in schools, where they had spent at least seven academic years. The claim that digital technologies mask differences related to race, gender, class, and ethnicity is unfounded (Jiménez, 2003). However, some digital technologies have the potential to challenge power relationships. Switching a social network site and cell phone settings to one’s mother tongue is one example. Jiménez stated that this is nothing extraordinary in many parts of the world, but it is in a country (such as the United States) where many in power view the bilingualism of low-income culturally diverse populations “with suspicion” (p. 127).

Power relationships and hegemonic language practices are hard to change, however. In a newsgroup study, Paolillo (1996) found people of Punjabi descent only used Punjabi for jokes and greetings; he posited that little Internet use in Punjabi related to users having to type their mother tongue in Roman characters. In fact, early planners conceptualized the Internet from a monolingual, American worldview. Danet and Herring (2007) explained that the American Standard Code for Information Interchange (ASCII) created in the 1960s, had graphical characters based on the Roman alphabet and English language sounds: “ASCII character set has privileged English online” (p. 9). Before 2004, when Unicode 4.1.0 with 50 scripts was introduced to accommodate more languages, internet users in non-Roman languages resorted to Romanization and numbers to provide tone. U.S. internet users have been decreasing in proportion to other world-wide users. In 1985, these users represented 90% of the world population, in 2010 they comprised 12.5%, and in 2015 they are expected to represent 10%. China and India are among the biggest populations of internet users (Computer Industry Almanac, n.d.).

Although Frank and other participants could, and did, switch internet social network sites, games, and cell phone settings to Spanish, others may not know about this option and may be reluctant to type in Spanish. They may not know what keys to push to create Spanish accent marks and other diacritic marks, such as: *ç*, *í*, and *ñ*, and may be corrected constantly by the English auto-correct. For instance, when we text in Spanish, or type in the Internet in Spanish, it can be frustrating and time-consuming if either tool’s setting is in English.

TV viewing. Television viewing was in both languages, depending on the program. Ten (37%) watched TV in English, seven (26%) in Spanish, and two (7%) in both languages.

Although their TV viewing was about split in both languages, we wonder if this was because of

parents and other adult members living in their homes preferred Spanish-language programs. Also, in terms of the content of what they watched, *telenovelas*, or soap operas, and the news were in Spanish. This may be because of adult family members wishing to apprise themselves of Mexican current events and because of the custom of watching Mexican soap operas. In this particular colonia, several families may live in one home to share costs. In English participants watched cartoons (e.g., *Dora the Explorer*, *Pokémon*, and *Sponge Bob*) and other programs such as the *Good Morning America*, a news and entertainment program, and the *George López* comedy show about a Latino family in Los Angeles, California. In Spanish they watched news programs, some cartoons, and soap operas. English-speaking Latinos still watch Spanish-language TV; about 25% of Latinos who speak mostly English at home, and 40% who speak mostly Spanish, watch between one and three hours of Spanish-language TV daily (Guskin & Mitchell, 2011).

Participants, such as Flor, tended to watch TV in Spanish with their mothers. Although Flor said she loved going to the tutorial center, she prioritized time spent with her mother watching a Spanish-language soap opera. Flor said she savored watching this Mexican TV show with her Spanish-dominant mother. In fact, she did not come to the tutorial center until their program was over; this indicated that Flor connected this Spanish-language program to her mother and to her Mexican heritage (Gándara & Contreras, 2009). The cultural and family connections were apparent when Flor described the program, which appeared on “canal 19, *El canal de las estrellas*” (channel 19, The Channel of the Stars): “*In la rosa de Guadalupe* (the Rose of Guadalupe) the kids talk about problems and someone asks Guadalupe to help them and she helps them. Mom watches it with me.” The Virgin of Guadalupe is the Roman Catholic icon in Mexico for the Virgin Mary, Mother of Jesus. The use of *Rose* in the series title is a reference

to roses that spilled out of Juan Diego's blanket, so he, a poor peasant man, could prove to an incredulous bishop that the Virgin Mary appeared to him (Juan Diego) in the mountains. *La Virgen de Guadalupe* is also a national symbol of Mexico (Arizona Adult Literacy and Technology Resource Center, n.d.). In a randomized national survey of 1,200 Latinos conducted by the Pew Research Center, 66% of Latino Catholics said religion was very important in their lives (Taylor, López, Martínez, & Velasco, 2012); hence, religion is also linked to identity.

Flor was so committed to watching the regularly scheduled *telenovela* with her mother that she did not come to the center, which demonstrated a close bond, a shared tradition, and the importance of the Mexican culture and Spanish language in Flor's out-of-school life. As mentioned, mothers play critical roles in L1 maintenance because when they use the L1 to interact with their children, they help their children to develop their Spanish-speaking and Latino/a identities (Kondo, 1997). Mother-child relationships are significant factors in children's L1 use, proclivities, and proficiencies (Luo & Wiseman, 2000). Similarly, in a 1988 National Education Longitudinal Study (NELS) study of 2,736 first, second, and third generation Latino adolescents, Arriagada (2005) found family context and Spanish language use facilitated Spanish proficiency among youth; these contexts were Spanish spoken at home, close parental relationships, and intact families.

Flor also described acting as language broker (Morales & Hanson, 2005) for her Spanish-dominant mother when they watched English programs together: "I read *letras en la tele y se las explico a mi mamá*" (I read subtitles on the TV and I explain them to my mom). Other participants mentioned translating for their parents if the television content was in English. Factors related to L1 literacy and "defying" the three-generation model, include language brokering, or mediating between two languages (Tse, 2001).

Participants' views of digital language use. When asked how they felt about not using Spanish more with digital literacies, all said they were fine with the situation, which saddened us; some even demonstrated a disdain for their mother tongues. Artista said she even felt good about her language choices while accessing the Internet because she did not understand Spanish. Deportes, 10, said, "*También prefiero leer en inglés*" (Also, I prefer to read in English). Because language is so closely tied to identity (Fishman, 1990), participants who reject Spanish reject part of who they are. In a study of Mexican, Vietnamese, and Armenian adolescents and families, Phinney, Romero, Nava, and Huang (2001) found ethnic language proficiency and in-group peer interaction predicted ethnic identity across all groups, and parental cultural maintenance predicted adolescent ethnic language proficiency. This does not mean a dualism, e.g., either a Latino or European ethnic identity, or a Spanish or English language identity. In her study of Korean-American college students in a Korean language class, Jo (2001) found use of English and Korean, and knowledge of both cultures, constituted a third space for the diasporic participants. In summary, this section related to the children's out-of-school digital access and practices.

Conclusion

The first major conclusion relates to structural inequalities in the children's inauthentic digital and Spanish literacy experiences related to school. The second conclusion focuses on participants' language preferences, and the third concentrates on the context in which participants used Spanish.

Systemic Inequalities

Participants' language use while accessing digital literacies in school mirrored systemic inequalities relating to schooling and language policies. Indeed, a lack of digital integration

(Henry, 2007) and a testing-focused curriculum (Gándara & Contreras, 2009), are more marked in schools serving predominately culturally diverse children of poverty. Although Esperanza children live just 15 minutes from Mexico, native language resources and opportunities are limited. Most participants did not receive much L1 instruction in school or for homework. Thus, participants' lack of technology use in Spanish could be related to a void in school-related technology use. Indeed, when we asked participants how they used technology during school and for school-related homework, none said they used technology on a regular basis related to school; the only occasions related to *Accelerated Reader* (AR) tests, a program in which children read books and take tests on them for points and prizes. This lack of technology integration is connected to NCLB and the requirements teachers have to prepare students for high-stakes tests not related to critical digital reading (Leu, McVerry, et al., 2009; Leu, O'Bryne, Zawlinski, McVerry & Everett-Cacopardo, 2009; U.S. Department of Education, 2002).

Language Preferences

Although all participants were Latino/a and native Spanish speakers, few expressed confidence in engaging in technology in Spanish and most said they were more comfortable writing electronically. Also, some said they preferred English over Spanish for engaging in digital technology, which is difficult to understand in a community where mostly everybody speaks Spanish as a first language. Yet, perhaps because of their school-related language experiences, few respondents demonstrated a close connection between literacy practices and Spanish-language identity or between Spanish language use and deep emotions (González, 2001; Hull & Schultz, 2001).

Our findings concerning participants' L2 preferences do not appear to correspond with other studies about L1 beliefs, however. In a Pew Research Center study of 1,220 randomly

selected Latinos in 50 states, participants expressed a strong, shared connection to the Spanish language (Taylor, López, Martínez, & Velasco, 2012). Over 80% of adult participants in the National Survey of Latinos (NSL) said they spoke Spanish, and almost all (95%) said it is very important for future generations to continue to do so. Other studies demonstrate that second and third generation Latinos wish to maintain Spanish (Rivera-Mills, 2001), U.S.-born Korean Americans and Chinese Americans want to sustain their culture and language (Lee, 2002), and Armenian-born and U.S. born Armenian children had closer relationships with the Armenian community than Armenian-born children (Imbens-Bailey, 1996). Other researchers have found that American-born speakers of other languages may have a stronger desire to keep the heritage language and culture than those born abroad (Lee, 2002; Pease-Alvarez, 2002). Indeed, these studies focus on language beliefs of L1 speakers, and youths' L1 beliefs are the most important factors in language maintenance or loss (Portes & Schauffler, 1994).

However, desire is half of the language revitalization battle; transmissibility is equally important (Fishman, 1990). If one cannot speak, read, write, or understand spoken language, s/he cannot pass it on. Because many participants lacked confidence and skills in digital reading and writing, schools could help them to enhance their biliteracy skills and could foster the positive school-home interactions necessary for biliteracy development (Reyes, 2006). Also, practices are just as important as beliefs, and the combination of both creates praxis, or being in sync with one's beliefs and practices in order to transform the world (Freire, 1986). Citing eight different studies, Suárez (2007) noted, "most studies of long-term heritage language maintenance conclude that the shift to English, and the accompanying loss of the heritage language, remain the norm" (p. 28). Given what *really* takes place in terms of long-term language maintenance,

some of the contradictory studies begin to make sense; for instance, of U.S.-born Latinos, 51% were English dominant (Taylor, López, Martínez, & Velasco, 2012).

That nearly half of the U.S.-born Latinos were more comfortable with English than their mother tongue shows a language shift. Next, about 90% felt that Latino immigrants needed to learn English to succeed in the U.S.A. Results in the present study indicate that English may be seen as the language of power in Esperanza, and that poverty is a crucial factor in language shift, as speakers of any language tend to identify themselves with the most socioeconomically prestigious language (Batibo, 2009). Unfortunately, Spanish is often characterized as the language of recent immigrants, and a language of poverty (García & Mason, 2009). Warshauer (2000) noted, “A Spanish-language-based identity remains important for a certain section of Latin American immigrants, while a faith in English immersion as a vehicle to American middle-class life overrides that identity for others” (p. 154).

Context of L1 Use

Participants did use Spanish outside of school in these instances: Language preference of the receivers, the association between comfortable home settings and Spanish, influence of Spanish-dominant mothers, and language brokering for parents during TV viewing. Even the parents of adolescent participants still had roles in language maintenance. It is possible Erickson, a European-American, may have created an adolescent peer pressure theory (Erickson, 1968) that does not apply to all cultures. Although we found that peers influenced participants’ use of Spanish, we also discovered that respondents savored watching television with their mothers in Spanish. In Díaz’s study in the same Latino community (2011), she found that participating children watched TV in English more with siblings, but in Spanish more with their mothers. Also, the youths in our study were more likely to text in Spanish more often in their homes,

regardless of language of preference of interlocutors. They said this was because they felt more comfortable texting in the language embracing them at home. Indeed, familism, or structural settings in which people with different activities and interests are bound together, were important contexts for our participants (Zinn, 1982). Given our Bakhtinian perspectives, it would be impossible to separate these contexts from our findings. In summary, we found that participants faced several school-related inequalities in technology and Spanish use, that they preferred communicating in English, and that they tended to use Spanish more at home.

Implications

Many Latino/a youth will one day be parents and grandparents. Some will communicate with their offspring exclusively in English, and the loss of Spanish spoken at home, over the generations, may lead to a language shift (Fishman 2001). Thus, parents should be empowered to create a culture that reflects the importance of being bilingual and biliterate. Culturally diverse children and families and teachers of emergent bilinguals need to understand that learning to read in the first language helps English reading achievement (Chuang, Joshi, & Dixon, 2012; Goldenberg, 2008). Fishman (1990) stated that complete language revitalization is easier if schools teach the language formally, but that “intergenerational transmission linkages” (p. 100) are the most important. These intergenerational linkages could be strengthened if families knew that L1 reading assists L2 reading.

Indeed, biliteracy is closely tied to home language maintenance in future generations. However, Díaz (2011) found many Esperanza residents lack biliteracy. If people do not read and write well in their L1, the next generation will be less biliterate (Pucci, 2000). Languages with literacy traditions have a better chance of long-term survival than languages with only oral traditions (Anonby, 1999; García, Morín & Rivera, 2001). As scholars interested in social

justice, we ponder possibilities. Native language resources and opportunities could be made available for Esperanza children and participants could learn about challenging video games in Spanish, could be taught to change browsers or URLs to Spanish, and could be shown Spanish websites, such as <http://www.google.com.mx/>. They could also receive challenging technology-based class work and homework in Spanish to develop their academic Spanish language. The tutorial center, with the help of Spanish-proficient preservice teachers at the local university, could help in Spanish digital literacy practices, also. Indeed, L1 literacy is a community effort (Van Broekhuizen, n.d.). Yet, it is also important for classroom teachers to affirm and build upon the translanguaging practices and skills of emergent bilingual youth and to help them with sense-making, e.g., finding web-based resources in the L1, reading in the L1 and synthesizing in the L2, and discussing L1 and L2 cognates (García & Kleifgen, 2010). By engaging in these transformative practices, the third space of languaging in out-of-school contexts undergoes another iteration to become the third space of languaging in schools.

In terms of digital practices and language, “Wherever multilingualism exists, language choice becomes an issue. Language choice online depends on the technological, sociocultural, and political context” (Danet & Herring, 2007, p. 21). This context, and even language revitalization, can be shaped by the media. Relocalization occurs when large media companies must shape their products for local contexts, e.g., CNN in Hindi and Spanish to compete with regional media giants (Warshauer, 2000). *Univisión*, the largest Spanish-language network by far, is still growing, reaching audience sizes that compete with the three major English-language broadcast networks (*CBS*, *ABC*, and *NBC*). *Univisión* announced the launch of a 24-hour Spanish-language news station (Guskin & Mitchell, 2011). This is part of L1.4Word. According

to Warshauer, “People will fight to maintain their language when they see it as not only an important part of their grandparents' past, but also of their own future” (p. 167).

Language revitalization cannot happen through outsiders. Instead, L1 survival depends on will, or attitudes and values of heritage language speakers, as well as transmission, or families' values, practices, and skills in passing on the mother tongue (Fishman, 1990). Transmission has occurred through closely-knit communities, such as Esperanza, and this colonia's unity cannot be overlooked for future language maintenance.

In Hawaii, communities are experimenting with new media, e.g., electronic bulletin boards, to assist in L1 transmission (Warshauer, 2001). Even though Latinos do not use the Internet as much as other Americans, there is growth. Also, bilingual and English-dominant Latinos/as are online more than those who are Spanish-dominant (Guskin & Mitchell, 2011). Latinos and European-Americans with shared socioeconomic backgrounds have similar usage patterns. Furthermore, U.S.-born Latinos and bilingual and English-dominant Latinos are more likely to be digitally-attuned than Spanish-dominant Latinos. English-dominant and bilingual Latinos are significantly more likely than Spanish-dominant Latinos to have a cell phone, have a home internet connection, have home broadband access, or use the Internet. However, Spanish-dominant internet use has increased from 36% in 2009 to 47% in 2010 (Guskin & Mitchell). Warshauer (2000) stated, “... Internet contact with Latin America is creating opportunities for language-based identity formation among US Hispanics” (p. 168). Success in the 21st century will be measured by all people's abilities to use multiple literacies, languages, and technologies (García & Kleifgen, 2010). García & Menken (2006) concluded, “We must look for ways of being in the borderlands with language minority students, and so increase more authentic

interaction and heteroglossia ... so all voices are heard, thus creating a 'third space' for Latino students in U.S. schools" (p. 177).

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**Exploring Teachers' Perceptions of Literacy and Use of Technology in
Classroom Practice: Analysis of Self-Reported Practice in One School District**

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Abstract

This article uses literature on twenty-first century skills and survey data from 77, K-12 teachers to explore teachers' perceptions of literacy and use of technology in their classroom. The study revealed teachers have varying definitions of literacy that do not completely align with twenty-first century practices. The evidence also suggests disconnect between teachers' perceptions of literacy and their use of technology in secondary contexts. The findings from this study suggests teachers need to integrate technology as part of everyday practice in academic contexts so that new literacies are part of their repertoire and they can report how they are using technology to foster students' twenty-first century skills.

Keywords: technology integration, literacy, twenty-first century skills

Introduction

Although technology has proliferated our everyday experiences as twenty-first century citizens, in some instances, schools remain stagnant and disconnected from these practices. Friedman (2005) argued that content in classrooms is not keeping pace with increasing globalization and this is problematic because twenty-first century employees need to demonstrate mastery of new literacy skills—critical thinking, problem-solving, collaborating with peers, and using technology. Literacy researchers have propelled the discussion by highlighting the importance of literacy and technology in academic contexts (International Reading Association, 2009).

The study described in this article is framed by research on new literacies and twenty-first century skills (Leu, Kinzer, Coiro, & Cammack, 2004; Partnership for 21st Century Skills, 2004). As educators in the digital age, teachers are expected to support students' literacy development in these areas through their (teachers') own proficiencies with technology and their capacity to facilitate authentic, opportunities for students to collaborate (International Society of Technology and Education, 2007, 2008). The capacity to enact these practices suggests that teachers need a clear understanding of twenty-first century literacy, are able to articulate practices that foster these skills, and ground their pedagogy in ways that support students' literacy development while preparing students for twenty-first century careers. In this study, we explored if and how teachers were using technology. We were guided by one central question, how are teachers using technology in K-12 classrooms? We used this lens to provide us with further insights on the following sub-questions: how do teachers define literacy?, and what is the connection, if any, between the teachers' perceptions of literacy and how they use technology in the classroom?

New Literacies, Instructional Practices, and Technology Integration

Today, the notion of literacy and what it means to be literate is far more complex than ever before. Consequently, there has been a surge in research on twenty-first century skills and pedagogy needed to foster students' literacy development in the current context. The "new literacies" perspective

calls for us to position technology and the Internet in the classroom as a learning tool alongside traditional books so that students are better prepared for the skills, strategies, and dispositions needed to effectively use technology, web-based tools, and ICTs (Alvermann, Marshall, McLean, Huddleston, Joaquin, & Bishop, 2012; Leu, Kinzer, Coiro, & Cammack, 2004; Sweeny, 2007). From this stance, readiness for twenty-first century workplace is demonstrated through students' ability to master new literacy skills—critical thinking, problem-solving using various sources, collaborating with peers, and using technology (Leu, Kinzer, Coiro, & Cammack, 2004; Partnership for 21st Century Skills, 2004).

Over the past decade, some researchers have attempted to conceptualize, characterize, and redefine literacy through examination of students' inside- and outside-of-school practices and the implications of those practices on students' academic literacy development (Alvermann, 2004; Alvermann, Marshall, McLean, Huddleston, Joaquin, & Bishop, 2012; Gee, 2008; Hinchman, Alvermann, Boyd, Brozo, & Vacca, 2003/2004; Serifini, 2011, Steinkuehler, 2010; Leu, Kinzer, Coiro, & Cammack, 2004), some research has highlighted a wide range of skills characterized as twenty-first century literacy practices that are essential for building digital capital and readiness for twenty-first century workforce (Dickson, Astani, Eriksson, Lee-Partridge, & Adalakun, 2000; Gee, 2008; Huijser, 2006; Morgan, 2010; Voss, Blatt, Bos, Goy, Kraska, & Pfeifer, 2009). Others have examined strategies for engaging students in academic tasks while using technology-based or web-based experiences to foster literacy practices (Barone & Wright, 2008; Walsh, 2009, 2010). Research shows that effective technology integration in today's classroom is realized through "technology-enriched learning environments" where teachers and students learn together, use a wide range of digital tools and resources in face-to-face and virtual environments (International Society of Technology and Education, 2007, 2008). Despite the increasing demands for teachers to demonstrate their own efficacy as users of digital tools by adapting and using technology resources for teaching and learning (International Society of

Technology and Education, 2007, 2008; Morgan, 2010; O'Brien, & Scharber, 2008; Tan & Guo, 2009/2010), technology integration remains elusive in some contexts.

Method

This study draws on data from a survey completed by seventy-seven, K-12 teachers in 2008. All teachers in the study worked in a suburban school district in northeastern United States. The survey was part of a district-wide evaluation of the district's literacy program in 6 schools (4 elementary, 1 middle, 1 high school). The purpose of the survey was to capture demographic information about the respondents (e.g. subjects and grade level taught), determine their perceptions of literacy, and collect information about school-based and classroom practice, particularly the types of research-based literacy practices used in their classrooms (e.g. assessment, reading and writing, literature, technology). The survey, administered online using Survey Monkey, included open-ended questions where respondents had to respond to a prompt, and two types of multiple-choice: single answer and multiple options where respondents were prompted to "choose all that apply" or select "Other" and provide an answer. For the current inquiry only grade level and subject area information about teachers was extracted from the survey along with responses that reflected their reports on technology use in the classroom. This information was obtained from Questions #1, #2, #3, #4, #26 on the survey (see Appendix A).

We organized and analyzed the data using SPSS and Microsoft Excel. We initially labeled respondents using a nine-digit identifier automatically generated by Survey Monkey. These labels were simplified to numerical tags assigned according to input order. For example the first respondent entered was referred to as respondent "1," the second respondent entered was referred to as respondent "2," etc. This was the case for both open-ended questions and multiple-choice questions. To ensure readability and lessen the chances of mixing up questions in analysis, multiple-choice questions were entered one question per file and analyzed using SPSS. Then we used the data to generate frequency tables to further examine the data and determine relationships between the participants.

We organized the Excel spreadsheet into a format that enabled us to compare open-ended responses. First, open-ended questions were placed in a new Excel spreadsheet where it would be easier to see the responses side-by-side and make qualitative comparisons. Then content analysis was used to examine responses for Question #3 and #4 on the survey. The emerging themes from this analysis were coded to determine connections to practices identified in the literature as twenty-first century literacy skills: information literacy, multimodal texts, technology literacy, online research, creating digital texts such as PowerPoint, reading online (Dow, 2007; Honan, 2010; Partnership for Twenty-First Century Skills, 2004; Voss, Blatt, Bos, Goy, Kraska, & Pfeifer, 2009). These skills were placed into a spreadsheet under the category twenty-first century skills and other themes that emerged from analysis of the open-ended responses were used to identify additional categories. When revisiting the data we extracted examples from the survey responses that fit into each category. During the final phase of analysis, we created mini case studies (profiles) so we can track how specific respondents answered questions throughout the survey. These “cases” were given pseudonyms and used to provide a more detailed view of the self-reported practice in their classrooms.

Results and Discussion

Who are the teachers?

Questions #1 and #2 on the survey asked respondents to identify their grade level and subjects taught respectively. As shown on Table 1, the majority of the respondents to the online survey taught middle school (34.2%) and high school (38%). Most teachers identified themselves as Mathematics or Science teachers (84.8%). We acknowledge there was likely overlap with teachers’ selection of the subject areas they teach. However, it is difficult to determine where the overlap occurred in these categories because as noted above teachers were able to select multiple options on the survey to provide demographic data.

Table 1: Demographics of Survey Respondents

Respondent	Percentage of Responders
K-2	12.7
3-5	17.7
Middle school	34.2
High school	38.0
Special education	6.3
Basic skills	1.3
English as a Second Language (ESL)	3.8
Mathematics	43.0
Science	41.8
Social Studies/History	38.0
English Language Arts	39.2
Reading	29.1
Art	2.5

Physical Education	1.3
World Language	1.3
Music	6.3
Technology	13.9
Other	16.5

A few of the teachers indicated they worked with diverse learners; specifically Special Education students (6.3%), English as a Second Language learners (3.8%), or in Basic Skills (1.3%) contexts. It is important to note that 13.9% of the respondents identified themselves as technology teachers and 16.5% described themselves as “Other.” The fewest responses included the Basic Skills (1.3%), Physical Education (1.3%), and World Language (1.3%).

How do the teachers define literacy?

Question #3 on the survey used an open-ended format and prompted respondents to provide a definition of literacy. Most teachers (56%), defined literacy in traditional ways: reading, writing, listening, and/or speaking. There was some overlap between those who included “communication” along with other literacy practices in their definition. For instance, some respondents who defined literacy as “writing to communicate” or “speaking and discussing” were placed in more than one category. Only 7% of the survey respondents defined literacy in accordance with the literature; in terms of media, technology, digital tools, multimodal texts, technology, or information literacy (Figure 1). Some of the responses were vague because teachers gave no specific explanation of their perceptions of literacy. For example, one respondent defined literacy as “the process of becoming well-educated...knowing some about many topics; much about a few topics.” In contrast, an example of one respondent’s definition of

literacy that aligns with twenty-first century literacy skills is “the ability to identify, understand, interpret, create, communicate, compute, and use printed and written materials associated with varying contexts.”

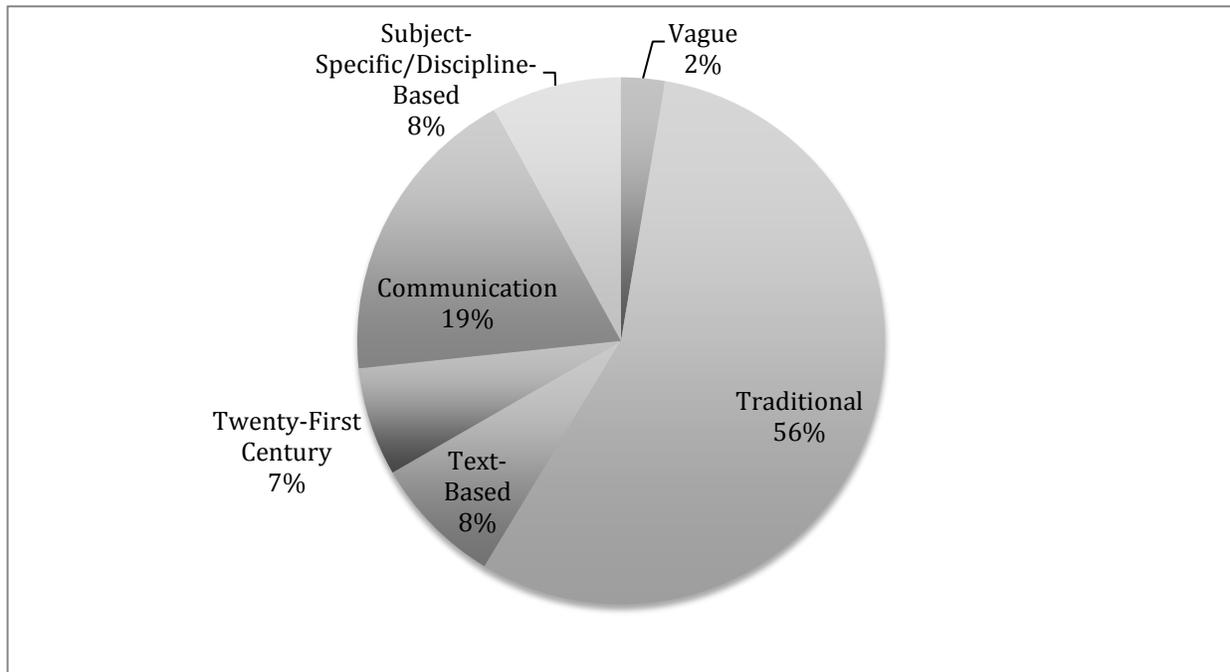


Figure 1: Categories for Teachers' Definition of Literacy

We noticed that of the respondents who defined literacy in terms of twenty-first century practices (n=5) most (4 out of 5) were middle and high school teachers (Table 2). Two of them, Adam and Edgar, both high school Science teachers, defined literacy in terms of their subject area—technical literacy, scientific method, and writing for a specific audience (Scientists)—or processes used: logical problem solving. One of these teachers, Adam indicated he also taught Mathematics.

Table 2: Content Area Teachers' Definition of Literacy

Case /	Definition of Literacy

Respondent	(Question #3)
1 Adam / HS, Math, Science	Technical literacy and open-ended logical problem solving and applied deductive reasoning [sic] skill sets in accordance with integrated learning strategies derived from the 6 step iterative do-loop scientific method.
2 Beth/ HS, Science	Ability to comprehend the written, verbal and visual, and convey ideas back in the same fashion
3 Charles/ K-2, all subjects	The ability to identify, understand, interpret, create, communicate, compute, and use printed and written materials associated with varying contexts.
4 Debra/ MS, English Language Arts	The ability to understand, interpret, and respond to text: written, oral (including conversation), and visual.
5 Edgar/ HS, Science	In my subject area, spoken and written communication is a key component of being a scientist, even a student scientist. The scientific method is not completed until the observations, hypothesis and experimental results are communicated to other investigators. Thus scientific literacy is first of all the ability to communicate scientific results; in the class room this is the task area of the "lab report". After science classs [sic] is long forgotten, scieintific [sic] literacy evolves to the ability to

	read and interpret technical literature, be this magazines, videos, blogs or TV shows.
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HS= High School (students ages 14-17); MS= Middle School (students ages 12-13)

How do Teachers' Use Technology?

Question #26 on the survey asked teachers to report how often they used technology. As shown on Table 3, more than half of the respondents (55.9%) said they used technology “daily” or “often” (more than twice per week).

Table 3: Percentage and Frequency of Respondents' Use of Technology

Frequency	Percentage
Daily	27.3
Often (more than twice per week)	28.6
Sometimes/Infrequently (once or twice per week)	28.6
Rarely (once or twice per month)	15.6

Two factors appear to impact how technology is positioned in these classrooms. First, despite the reported frequency of technology use, in some instances there appears to be disconnect between how often teachers used technology and how they defined literacy. Second, a closer look at one open-ended question, Question #4, which asked respondents to report strategies used in their classroom for literacy instruction (Table 4), shows little evidence that technology is integrated and used as a teaching or learning

strategy. In fact, only one of the teachers, Beth, indicated using technology daily and also made reference to technology or digital tools in her definition of literacy.

Table 4: Strategies Used in Teachers' Classrooms

Case / Respondent	Strategies Used (Question #4)	Use of Technology (Question #26)
1 Adam / HS, Math, Science	Scientific Method thinking like a scientist- 6 w questions, 2 Qs SQ3R SQW3R mandatory marking period scientific research paper optional presentation science projects engineering club	Rarely (once or twice per month)
2 Beth/ HS, Science	Use multimedia and visual aids/demo's regularly	Daily
3 Charles/ K-2, all subjects	Reading Strategies Writing Strategies	Sometimes/ Infrequently (once or twice per week)
4 Debra/ MS, English Language Arts	Reading comprehension strategies; book talks; strategies to develop written expression; strategies to develop oral communication skills; modeling oral and written language; pair-sharing; collaborative [sic] group work; specific strategies geared toward	Often (more than twice per week)

	preparing students for standardized testing (answering multiple choice questions, open-ended questions, responding to a prompt in a given time period, etc.)	
5 Edgar/ HS, Science	Students are routinely assigned to write lab reports following an accepted editorial style for science writers. Students work in small groups to discuss experiments, results and procedures. Reading assignments throughout the year gradually build up in the complexity of technical details and the levels of arguments presented. Students are assigned to do presentations two times a year on a research topic.	Daily

As shown in Table 4, Beth and Edgar reported using technology daily but only Beth explained that it's used for demonstration. Debra also indicated using technology "often," but like Edgar she does not describe how technology is used in the classroom. Although Beth, Charles, Debra, and Edgar described literacy in terms of visual, computing, and interpreting digital texts, much of the emphasis in these teachers' classrooms (as shown in the kinds of strategies used) appear to be on reading and writing strategies. The teachers indicated they placed emphasis on reading and writing strategies (Charles, Debra) or identified examples of strategies introduced.

Limitations

As mentioned above, there appears to be overlap in how teachers selected the demographic data to indicate their grade level and subject taught. Those teachers identifying themselves as Math and

Science teachers (84.8%) are likely to be elementary, middle, and high school teachers. Elementary teachers are responsible for teaching all subjects and it's likely that based on the wording of Question #2 (see Appendix A), they selected the subjects they teach more than 80% of the time. Another limitation is that self-reported data is limited to the perceptions of the participants. This survey data is useful to provide an overview of self-reported practice. But, corroboration with other data sources namely observations, or classroom artifacts, is needed to offer credibility to the survey results. Although classroom observations were conducted for the original school district evaluation, because the survey was anonymous, observation data was not included in this study because we could not connect results to specific teachers. Finally, this study was conducted with a small sample based on data from one school district. Therefore it is difficult to make generalizations about practice beyond the specific context.

Conclusion and Implications

Gee (2008) calls for students to attain traditional reading and literacy skills as well as necessary twenty-first century skills. He also believes literacy instruction should use digital tools and technologies to support multiple literacy skills, namely information literacy, reading online (multimodal) texts, media literacy, critical literacy, collaborative learning, visual literacy, discourse-specific vocabulary, and production of various texts (Gee, 2008); practices that should be evident across subject areas.

Unfortunately, we found that the teachers' reported use of technology did not reflect twenty-first century literacy practices. Additionally, there appears to be disconnect between how teachers perceive literacy in today's context and what they are doing in their classroom to foster students' literacy development as twenty-first century citizens. These results suggest that teachers are still not keeping pace with students' outside-of-school practice by using digital tools and technologies to enhance classroom practice.

Despite the limitation with the sample size and context used for this study, technology integration appears to be lacking in secondary content areas. More specifically, technology utilization in these classrooms does not reflect the everyday use of digital tools in our society. Daily technology-based

practice is needed across subject areas to ensure it is seamlessly incorporated into the teacher's repertoire.

We hypothesize that when teachers integrate daily technology-based practices into the classroom, it is likely that they will be able to articulate how it's used in everyday practice for teaching and learning.

Professional development that facilitates reflective practices can be a mechanism for supporting teachers' technology use as a pedagogical method and foster opportunities for them to articulate how they use technology and other digital tools to support student learning. Professional development that is job-embedded can help to foster teachers' efficacy with different digital tools and increasing their knowledge of technology resources which can be effectively integrated into the classroom (Corio & Moore, 2012; Jones & Moreland, 2004; Kay, 2006; Mims, Polly, Shepard, & Inan, 2006).

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Appendix A: Excerpted Survey Questions Used for the Study

Question #1

I teach __ grade(s)? Check one.

K-2

3-5

Middle School

High School

Question #2

I spend more than 80% of my time teaching the following content area(s). Check all that apply.

Mathematics

Science

Social Studies/History

English language arts

Reading

Art

Physical Education

World Language

Music

Question #3

I would define “literacy” as ____.

Question #4

The specific literacy strategies I incorporate into your classroom on a regular basis are ____.

Question #26

I use technology in my classroom to support teaching and learning.

Daily

Rarely (once or twice per month)

Sometimes/ infrequently (once or twice per week)

Often (more than twice per week)

**Digital literacy and digital pedagogies for teaching literacy: Pre-service
teachers' experience on teaching rounds.**

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Abstract

When pre-service teachers go into primary schools on teaching rounds it is highly likely that they will encounter a different learning environment to the one they met as students. Over the past decade, both teaching and learning have changed radically. As new information and communication technologies (ICT) are developed, their use has been adapted to meet educational needs. Many school students read, write and view in an interactive and complex way with new technologies and social media outside of school hours, such that the way they learn and use literacy is different from the way their teachers learned.

New pre-service student teachers not only have to contend with a technology enhanced classroom, they also encounter university systems in which much of the interaction occurs online. Pre-service teachers need to have, or develop a high level of digital literacy themselves whilst simultaneously learning how to use a range of technologies within digital pedagogies.

The study discussed here is an action research project that was part of a larger joint project, and involved volunteers from a whole cohort of Australian Aboriginal pre-service teachers who were undertaking a targeted Bachelor of Education course for Aboriginal students. This course was designed to include supports such as extra home tutorial assistance, negotiation of assignment due dates and a lighter load in the first two years. The students all lived in regional or remote rural locations and studied in block mode which included intensive face to face classes on campus and online components when they had returned home. They also had two teaching practice rounds in which they were required to

utilise technology for teaching and to develop digital pedagogies. Focus groups, research articles and interviews with volunteer third and fourth year pre-service teachers and their lecturer were used to investigate what was learned in relation to the development of their own digital literacy and digital pedagogies for teaching literacy.

Background

There is an increasing volume of research and theoretical literature on digital communication, 'new' digital literacies and the use of digital technology as teaching and learning tools in classrooms. The literature that was used to inform the current study came from several areas: digital literacy, digital pedagogies, the ICT skills of Indigenous tertiary students, and using digital pedagogies to teach literacy.

The foci of the literature on digital literacy seem to fall into two broad categories, developing critical and discerning abilities in the students and providing up-skilling for the teachers. Most of the current generation of students have grown up with digital technologies, and it has been claimed that not only are current students techno-savvy but also that they think and process information differently from their predecessors (Prensky, 2001. p1). The use of Prensky's term 'digital natives' as applied to all of the current generation of students has been questioned as it 'obscures inequalities in access to technology' (Hague & Williamson, 2010, online at <http://cmslive.curriculum.edu.au/leader/default.asp>). The latter authors also note, for example, that the types of technology and media that are said to generate informal learning are 'products of the commercial landscape, usually designed for purposes other than education' and that students may not be learning anything that is transferable to their education. They also note that students may not be able to discern the commercial side or impact of that on them. A

number of studies stated that teachers need to teach students how to use digital media alongside of teaching them critical skills (Hague & Williamson, 2010; Luckin, Clark, Graber, Logan, Mee & Oliver, 2009; MCEETYA, 2010).

When developing students' skills with digital technologies for education purposes, it is also necessary to consider how the technology has changed what is now regarded as Literacy. Literacy itself now entails a wider range of interconnecting elements including decoding and writing text in multimodal forms and scripts, visual interpretation, site navigation, media manipulation, and comprehension. This includes comprehension of the words and how the media may impact or alter the meaning of the words (Asselin & Moayeri, 2011; Poore, 2011). In a recent text based on classroom research Walsh (2011, p12) indicated that multimodal literacy 'may [also] include listening, talking, enacting and investigating as well as writing, designing and producing such texts'

As the notion of what constitutes literacy changes, approaches to teaching literacy in schools also changes (Carroll, 2011). These changes are more than teachers adopting new tools to teach literacy in the same way as before. As an awareness of the way in which literacy has changed, fundamental changes in literacy pedagogy are being developed. In the current study the pre-service teachers researched their practice in teaching literacy in elementary/primary classrooms through the medium of ICTs. The lecturer investigated the best ways he could support the students' development of digital literacies and the development of their own digital pedagogies to teach literacy.

What is digital literacy?

The Australian MCEECDYA report (2010) into ICT in Education in the middle school years identified three strands of digital proficiency: working with information, creating and sharing information and using ICT responsibly. They further identified six processes involved in digital literacy. These are: accessing, managing and evaluating information, creating new understandings, communicating with others, and using ICT appropriately. It was reported that of students assessed on these categories, only 57% of Year 6 students met their expectations (p6).

Students may use ICTs competently for social networking but need teacher guidance for learning based digital literacies (Luckin et al, 2009). It was also noted that students are not expert at evaluating the relevance of material found online, its accuracy or the authority of the person who uploaded it.

What is digital pedagogy?

Digital pedagogy includes several axiomatic changes to traditional pedagogy and has more in common with a constructivist approach, in which students construct their own knowledge in a social context. However, digital pedagogy goes beyond that to include teaching about and for digital technology for learning. Central to digital pedagogy is the co-construction of knowledge. A digital pedagogy includes planning for learning which is less content than problem-solving based. It can present knowledge as problematic rather than as fixed. As such it promotes higher order thinking skills and students move from remembering content to gaining a deep understanding of concepts (Kent & Holdway, 2009). It develops critical analysis, metacognition and reflection, often through creation, editing and publishing online (Luckin et al, 2009). Further, digital pedagogies can include Web 2.0 technology for social networking, with

the use of blogs, wikis, i-phones and i-pads for learning. In this way digital pedagogies help to promote connectedness to the wider world. (Kent & Holdway, 2009).

In order to embrace digital pedagogies teachers may find they are no longer the experts and that they need to change from being users of technology, such as when they find and print off activities for students, or information for themselves to use in teaching, to becoming co-creators (Poore, 2011).

As not all students have navigation skills or use the whole range of ICT competently (MCEEDYA, 2010), teachers need to demonstrate how to identify, select, analyse and use ICT information such that students develop critical digital literacy (Asselin & Moayeri, 2011). Teachers also need to accept that there will be fundamental changes to activities, rather than using old activities on new media.

Using digital pedagogies to teach literacy

Some recent studies have investigated current classroom practices around digital pedagogies for literacy. For example Oakley (2008) investigated using a language experience approach with digital storytelling using power point with voice recordings and Ciampa (2012) studied the use of electronic storybooks to increase reading motivation. Both found the methods successful in motivating students and teaching an aspect of literacy. A series of linked studies were undertaken to investigate a professional development model of up-skilling classroom teachers in pedagogical practices with ICT to teach literacy. An initial survey demonstrated that many primary students were not choosing to read print based texts for leisure outside of the classroom. In the study across nine schools only 10% of Year 5-6 boys (but 44% of girls)

indicated they enjoyed reading for leisure. However, 96% of boys indicated their preferred leisure activity was playing computer games (Walsh, 2011, p6).

Walsh (2011, p7) indicates that as literacy purposes and uses outside of school have changed, that pedagogy for teaching literacy needs to change to capitalise on the skills students are developing in other contexts. She states: 'Teachers need to be able to develop pedagogy that embeds digital communication technologies and texts to meet curriculum outcomes and assessment requirements, while at the same time maintaining students' engagement with print-based technologies, particularly literature'. Walsh further indicates that teachers need to be aware of the increased number of processes involved in making meaning and producing digital texts and that the way digital texts are accessed are also different. Instead of a linear, sequential process, as in reading or writing a traditional paper based text, digital texts encourage a browsing, selecting and sampling strategies incorporating images, sound and interactive elements (p11).

As yet there is scant published research into the development of pre-service teachers' digital pedagogies to teach literacy so the current study is timely.

How is the digital literacy of Australian Aboriginal pre-service teachers developed?

A scan of the literature indicated that there is very little research into the use of ICT in higher education to support the learning of Indigenous students. There are several reports into the education of Indigenous tertiary students (DEST, 2005; Gunstone, 2008; Harrison, 2007; MCEEDYA, 2009) they have not however focussed on digital literacy. There are however a number of studies which investigated the development of ICTs in tertiary populations which

have some relevance. One of the key early studies that investigated changes to learning, described interactive multimedia as being able to provide a 'situated learning model', in which students are able to learn 'within the context of real world applications', which makes learning authentic, allows for modeling, scaffolding, collaborative knowledge construction, and promotes learner reflection (Herrington & Oliver, 1997, p 127). Recent research has indicated that ICT learning is socially constructed, is active and engaging and incorporates diverse knowledge systems (McLoughlin & Lee, 2010). The researchers note that there are challenges for staff to provide 'personalised learning experiences using suitable learning technologies that cultivate independent learning skills, while also scaffolding learner reflection and the development of generic competencies' (McLoughlin & Lee, 2010, p 38). Several other studies investigated technology and higher education, such as a study of undergraduates use and ownership of emerging technologies (Oliver & Goerke, 2007); a networked learning community approach (Watson & Prestige, 2003); multimedia, science and distance education (Bowyer, 2003); developing a smart community in higher education (Baskin, Barker & Woods, 2003); and research undertaken at a number of Australian Universities into the use of ICTs learning technology (Moyle & Owen, 2009) but they did not identify the impact for equity groups.

There were a few studies that investigated ICT use with Indigenous tertiary students, however they were mostly seeking to identify barriers to learning via ICT. For example one such study investigated equity and the use of ICT in higher education (Barraket & Scott, 2001). That study found that women, older students, those from low socio-economic groups and Indigenous and rural or isolated students studying in block mode were disadvantaged. The study found that poor levels of information literacy and the resultant lack of confidence led to lack of access to

the technology and to technology supports. They further noted that it was students with the greatest need that had the least access. (Barraket & Scott, 2001, pp 3, 8). A later study (Gibb, 2006) had similar outcomes noting that rural students studying in block mode were doubly disadvantaged. The students in the current study fit a number of the factors identified as they are mostly female, mature aged and Indigenous, from rural or isolated communities and studying in block mode. Whilst it might be argued that singling out Aboriginal students in this study could have a negative impact, the disadvantage suffered by Indigenous Australians across a several sectors including Health, Housing and Education is well recognised and successive governments have tried to redress that disadvantage. This study documents part of the learning journey of such students to come to some understanding of their learning needs in order to better provide support.

A commissioned study identified three types of barriers to e-learning which contributed towards a 'digital divide' in the Vocational Education and Training (VET) sector. These were (a) Connectivity, that is the infrastructure and access to the internet; (b) Capability, described as the internet skills and confidence and valuing the internet; and (c) Content that was relevant and useful (Australian Institute for Social Research, SA, 2006, p 3).

Part of providing relevant content relates to the language used. As language and culture are intrinsically intertwined and each person is a product of his/her own culture, any text produced will be biased towards that culture in terms of language usage and meanings, visual images, and cultural knowledge. As such, unfamiliar cultures will be excluded to greater or lesser extents depending on the proximity of one culture to that which produced the text. Therefore, when a website is developed it will also reflect the mainstream culture of those who created it and will inadvertently be less accessible, or exclude those from other cultures and those

who are less familiar with the dominant culture. In creating websites suitable for Indigenous learners McLoughlin and Oliver (2000, p 58) argued for ‘cultural localisation, which means incorporating the local values, styles of learning and cognitive preferences of the target population’. They indicated that web designers would have to look beyond surface level design considerations in order to achieve a design that was culturally inclusive. The design guidelines that they developed are located within social constructivist theory in which learning is viewed as being socially constructed ideally through active participation and real life tasks. The guidelines include: learning tasks that support different learning styles, providing scaffolds, flexibility and choice of tasks, the opportunity for students to collaborate with peers and for them to be able to add cultural content to the site, and learning activities that ‘provide bridges to the student’s culture and community’ (p69). However, an investigation of distance education and equity for Aboriginal students (Gibb 2006, p 21) found that there were differences between the ‘preferred Indigenous learning practices and current online distance educational processes’ and that students were thus ‘doubly isolated’, demonstrating that online course writers have been slow to adapt and incorporate the findings of earlier studies.

Further, when the students have to learn by distance or through block mode internet connectivity and speed issues have an impact on learning. Added to these challenges for university provision and student access and equity, ensuring inclusivity and catering for the learning needs of different cultural groups can be difficult. For example, research has indicated that Indigenous students like to make deep connections and that relationships between students and between students and teachers are most important in supporting their learning (Gibb, 2006). Other research outcomes that relate to the current project include designing pedagogy to

encourage independent learning and problem solving, building a community of e-learners and developing the technical vocabulary and textual practices around electronic media (Doherty, 2002, p58).

The current research will increase our understanding of factors influencing the success of Indigenous pre-service students with ICT learning, and the development of their digital pedagogies for teaching literacy.

Method

This paper focuses on one aspect of research undertaken as part of the larger study. The larger study investigated the variables of e-technologies, access and equity for University participation of mature aged, English as an additional language speakers and Indigenous students, many of whom live in rural or remote locations.

A participatory action research model was chosen for this section of the research in which third and fourth year Australian Aboriginal pre-service teachers in a course exclusively for Indigenous students, researched their own practices. During the semester in which the action research was conducted, the students were studying a subject on 'Research and ICT'. In that subject they learnt about and were required to undertake some action research by setting a question, such as '*How can I use ICT to teach writing in Year 3?*', and then investigating it. They did this by preparing lessons that incorporated some form of technology and teaching those lessons while on two separate teaching rounds, one in a rural school and one in an urban school. They were able to reflect on the first practice and then adapt it for the second practice. The pre-service students were encouraged to post online reflections and join in discussions about how to

use the new technology when teaching. Students kept a reflective journal to map the progress of their own learning. The aim was to develop strategies to build student skills and teaching capacity with ICTs and develop a supportive learning community. Students also evaluated their own teaching and its effectiveness in terms of student learning and finally, wrote a research article which linked their practice to the theory. Volunteers were called for to take part in the research study, (n=19: 11 were third years and 8 were fourth years) so that the researchers could undertake focus groups and have access to the article they wrote as their final assessment piece. While some of the students investigated using ICTs to teach subjects other than literacy, only those who investigated teaching literacy are the focus of this paper. Literacy was chosen as a focus for the paper, as the students had recently received instruction in literacy pedagogy and a number of the volunteers had written their articles on using digital technology to teach literacy.

At the same time as the pre-service students were investigating their practices, the lecturer conducted his own action research. He did so by designing and teaching the subject and reflecting on how to further develop the group's ICT skills for teaching along with theoretical understandings and research skills. In this paper the lecturer's reflections provide elaboration and triangulation of the student data.

This study is also informed by some of the findings from Phase 1 of the project in which the Indigenous tertiary students' use and familiarity with digital technology was examined. The students filled out a 'tick the box' survey and joined follow up focus groups in order to gauge which technologies they used at home and at University, the frequency of use and which they felt competent in using. An audit of the courses they had undertaken in their studies was done in order to ascertain how much was technology based and which technologies and technological

skills were needed, and how much information they had gained so far about teaching literacy. This background information was necessary to interpret the analysis in terms of increases in knowledge. For example, the audit indicated that all of the pre-service students in the current study had passed two University 'Language and Literacy' subjects and so had knowledge of curriculum, genre theory, research and practice related to teaching and learning literacy, but this did not include any theory related to digital pedagogies for teaching literacy. The fourth year students had passed one further Language and Literacy subject on teaching English as a second or other language, and some pre-service students had been able to use an Interactive Whiteboard on a previous teaching round.

The survey and follow up focus group interviews conducted in Phase 1 of the larger study revealed that all of the pre-service teachers used computers for word-processing, emailing, social networking and the blended component of the course. At the beginning of the research, none had smart phones, blackberries, nor i-pads, although two had i-pods for listening to music. None had used wikis, were not very familiar with Web 2.0 technology and none considered themselves highly competent technology users.

Analysis and findings

In an analysis of the current data, the research articles of the volunteer pre-service teachers were examined for themes related to their own learning about using ICTs, their understanding of digital pedagogies, student learning via ICTs, strategies for teaching literacy and the linking of their experiences to research and theory. The unit outline and other subject materials were examined and considered along with the reflections of the lecturer to determine how the digital literacy and digital pedagogies of the pre-service teachers were developed. In the

following analysis and discussion, examples from individuals are used to highlight overall findings and show differences amongst students.

Analysis revealed that around half of the students not only developed digital pedagogies for teaching literacy, they were able to link their experiences to the theory. As might be expected those who indicated a reasonable initial level of ICT skills were more confident in using ICT in the classroom. Overall, however, one half (mostly fourth year students), tended to tackle more complex use of ICTs or use them for broader purposes in their classrooms and to engage at a deeper level with the theory. The other half (mostly third years) tended at least initially, to couple the ICTs with traditional strategies, using the interactive whiteboard (IWB) as a regular whiteboard. Third year Lilly, for example, was in a Kindergarten class, and she used the book *'The Very Hungry Caterpillar'* by Eric Carle to teach vocabulary and sentence writing. She read the story, asked the students questions and wrote their answers on the IWB. Other learning activities such as matching words and pictures were similar to what could be done on a regular whiteboard. In her reflections her comments were mostly at the level of a new user coming to terms with the various functions of the technology. She did discuss how she could hide and reveal content and make things bigger or smaller. She did not, however, discuss how using technology changed her pedagogy, how that related to student learning, nor did she discuss the theoretical background.

Another third year, Kate was working with Stage 1 children on narrative writing. The children used digital cameras to create picture stories and then wrote narratives from that. She said *'I discovered the enthusiasm of the students as many of them had not had the opportunity to use digital cameras before.'* She noted that *'Some children took random photos, but they still*

managed to write narratives, incorporating correct grammar learnt from a previous lesson, thus making the activity of using a digital camera successful.' She only used one form of technology with the class and her assessment of the success of the lesson was basic. She did not consider how she might further develop her own pedagogical practice so that the children understood that taking sequential pictures would help them structure a successful narrative, nor how she could use the ordering of the pictures to teach grammatical items such as past tense or 'before and after' in a meaningful context. Both of these students felt that the lessons were a success in terms of student learning and in terms of using ICTs to teach literacy. However, there was no deep reflection on their own practice nor an indication of how they might develop or improve.

By comparison fourth year Carol, taught Exposition writing to Stage 2 Year 4 children, 76% of whom were from other language or dialect backgrounds. In her interactive whiteboard lesson she used you-tube video and joint construction of an expository text on the topic '*Why we should keep our waterways clean*'. Students then drafted their own exposition. They were put into groups to use their notes and photos from the related excursion to produce power-point presentations. In a reflection on her teaching Carol noted that even the better students struggled in writing the exposition genre and concluded that she had not provided sufficient scaffolding to ensure success. The inclusion of the power point presentation added to the complexity of what the students were expected to do. She stated '*this proved to be a difficult task for the children who had limited ICT skills, and some children ran out of time.*' She realised that even though they were working in groups, without teaching the skills in technology use, the task was over complicated for them. Whilst this lesson was less successful, Carol was able to analyse why and how it might be improved in the future.

Another fourth year, Kylie demonstrated a complex use of digital technologies. She used the IWB to view photographs taken by the K-2 children with digital cameras and recounts in the form of Powerpoint programs, animated nursery rhymes and digital storybooks. She indicated that this was to '*build their field of knowledge and to scaffold their learning*' whilst she constructed recounts prior to the class jointly constructing a recount. Her discussion demonstrated a thorough understanding of genre theory, scaffolding learning and how and why using digital technologies could be used to develop digital pedagogies for teaching literacy. She did find that in the first school, when children were required to work alone to write a recount only a few could do it competently. She also noted that more scaffolding was needed and put this into practice in the second school for a better outcome.

Other difficulties experienced by students include a statement by Laurie that many teachers would relate to. She said '*It took almost half the lesson for the students to log on to the computers*'. A few pre-service teachers discussed the problems they had trying to use the technology to teach. For example: '*The experience with the use of ICT at this school was daunting (for me). The children were ranging in ages from 5-6 years of age and they clearly had more knowledge on the IWB than I did. A few situations arose where I was perplexed and three children immediately ran to my aid.*'

Fourth year, Shirley commented on the benefits of using ICT for literacy including being able to produce, adapt and change resources, the variation in formats and the range of information and programs available.

Overall, the majority of the pre-service teachers indicated growing familiarity and confidence in using ICTs in teaching and most did link their practice to the theories they had

learnt about at University and through their readings. The theories most frequently cited were 'Constructivism' and Vygotsky's notion of scaffolding learning by working with students in their 'zone of proximal development'. Many commented on the ability of ICTs to engage students and how that then encouraged learning to take place. Those Pre-service teachers explained their understandings of how digital pedagogy could engage students and the make them active participants in learning. Shirley noted that it was possible to build rapport by engaging the whole class . She stated:

I made a conscious decision to make each lesson as interactive and engaging as possible so that each student could be involved. Part of the rapport was built by ensuring the inclusion of all students throughout each lesson.

Some pre-service teachers noted that there was a shift in power from teacher to more a more collaborative approach in which the teacher was more of a facilitator. They stated that digital pedagogy is constructivist in that knowledge is co-constructed. One pre-service teacher indicated that the perception that merely using technology fostered learning was incorrect. However, another pre-service teacher noted that using technology '*could be empowering for students with low literacy skills*'.

One pre-service teacher discussed the theory of multiple intelligences and how '*use of digital technologies favoured and improved visual literacy which can lead to visual intelligence*'. A number of others discussed the possibility of the improvement of visual literacy (the ability to understand and interpret the meaning of information contained in images). Other statements about using digital technologies for teaching included that it could enhance social interaction, that it enabled the opportunity to provide motivation and learning that is relevant and relates to

the real world. Further, that it fostered cooperative group work, accommodation of different learning styles- in particular visual and kinaesthetic, open ended questioning, hands on activities and that it developed language proficiency.

Overall the Indigenous pre-service teachers experienced a rapid learning curve in which their own digital literacy was developing and at the same time they were developing digital pedagogies for teaching literacy. Keeping reflective journals and posting to the online discussion blog gave them the opportunity to think deeply about their teaching, record those thoughts, try different teaching strategies and then reflect again. They used the reflections to interpret the applicability of the theory they had learned about in class and readings to write a research article. Those articles revealed their understandings of using digital pedagogies to teach literacy. It was clear from the articles that there was still a range of understanding of using digital technologies to teach literacy. As might be expected, the fourth years, in general, were better prepared and had greater theoretical understandings even when their own level of digital literacy was initially low.

As for the lecturer, he identified a range of issues that impacted on pre-service teachers' success in using digital technologies in their placement. The pre-service teachers did not have access to interactive whiteboards and limited access to some software and resources such as digital cameras whilst on campus. He felt that it was therefore important that a comprehensive range of opportunities for hands-on learning was available to pre-service teachers while in their placement schools. The pre-service teachers were placed in different primary schools. Problems arose when the number of pre-service teachers on practicum in one of the schools exceeded the digital technology resources available and some of the supervising teachers did not have the

necessary expertise in using digital technologies to support the professional learning of pre-service teachers.

The lecturer also commented that the professional development of academic staff at his university was pivotal to effective pre-service learning. The lecturer commented that, as a result of the study, he would change his pedagogy in the future. He said ... *I want to try to incorporate more workshop time for students, and access to the technologies while they come here on their block periods, and also for us as academics to get up-skilled in using the technology.*

To encourage student interactions between face-to-face blocks, the lecturer indicated that he planned assessment tasks for the 'ICT and Research in Education' subject that provided both a scaffold for progressive learning and skills acquisition, and opportunities for students to *respond and support each other*. Students were encouraged to join in an online discussion blog to share their work as it progressed. In practice however this proved difficult for some students who were less confident about the quality of their work than others. The lecturer attributed the reticence to share written work to the dynamics of the differently staged year groups. He explained that while some 3rd years had more confidence in the personal use of technologies, they had had fewer opportunities for applying that knowledge in classroom placements and in particular they had less experience with interactive whiteboards. The 3rd year students were also at a different level than the 4th years in terms of experience with academic writing. The lecturer believed that the dynamics of combining the year groups was not productive in terms of culturally appropriate delivery:

In terms of quality teaching ... that was very problematic, and I think it caused them some frictions within the class. When you're dealing with Indigenous students ... they don't want to be

shown up as incompetent in front of their peers ... and if the 4th years have had the opportunity, obviously they're going to be better equipped.

While the online discussion was not as successful as the lecturer had hoped, peer discussions in class were more successful. In Phase 1 of the study the lecturer commented that Indigenous students seemed to prefer oral presentations to written assignments and this was borne out in the Phase 2 data. In using technology to foster communities of practice within the student cohort, the importance of *seeing each other* was emphasised by the lecturer. At the close of Phase 2, the lecturer was actively exploring opportunities for pre-service teachers to interact 'face-to-face' via videoconferencing and technology such as Skype between block residentials, and while they were on practical placements in order to provide them with effective support:

we're trying to use Skype, and trying to set up a three way conversation with the lecturer to other students ... we're going to just talk it rather than actually write it ... I think oral communication is something that our students feel more comfortable with, so we've got to set up sort of a comfortable yarning type approach, which I think is more culturally sensitive to the students that we're dealing with, and again we need to have that facility.

Strong partnerships between the university and placement schools was also discussed by the lecturer as crucial to building communities of practice where the pre-service teachers could acquire professional teaching standards. As mentioned, disparities between resources and supervising teacher expertise in partner schools had a direct impact on pre-service teachers learning in digital pedagogies. The lecturer mentioned that while his university had strong partnerships with schools in the metropolitan area, they had not had such success in pre-service teachers' home communities, which were often great distances from the university. Again this

was a matter of time and funding to *work more with supervising teachers to support and access professional teaching standards in a practicum setting.*

Conclusion

This paper sought to explore the development of Australian Aboriginal Pre-service teachers' digital literacy and understanding of digital pedagogies for teaching literacy. As such it reports on data collected from an action research project that was part of a larger project investigating flexible delivery for equity groups at two Australian universities (Armitage, Campbell & Welsby 2011). The Indigenous pre-service teachers in this study did not rate themselves as proficient with digital technology at the commencement of the project. Similarly, many of the students in their classes on practicums rounds were unfamiliar or lacked competence in ICT use. This complicated matters for the pre-service teachers as they often had a wide range of digital literacy and familiarity with new technologies in their classes.

They also had the difficulties of being rural students studying by block mode identified in earlier research (Barraket & Scott, 2001, Gibb, 2006). In particular the problems of connectedness and capability identified in a study of Indigenous VET students (Kilpatrick & Bound, 2003) came into play. Towards the end of Phase 2 however, the lecturer found ways to improve the capability factor by switching from a written to oral and visual mode of online interaction. In doing this he encouraged building a community of e-learners that could share and problem solve together, elements deemed important by Doherty (2002). Finding culturally appropriate models of online interaction was also highlighted in research by Oliver and Goerke (2007) and whilst this study was undertaken with Australian Aboriginal pre-service teachers the finding may apply to students, from other cultural groups, who are still developing ICT skills.

The action research model has provided all parties the opportunity to reflect individually and discuss experiences and findings together. It has also been a useful way to discover the level of understanding and concept development in relation to developing pre-service teachers' digital literacy and concomitantly developing digital pedagogies to teach literacy. Whilst at the end of the study some pre-service students had developed greater competence than others in applying and demonstrating their understanding of digital pedagogies for teaching literacy, all had experienced it over two practice rounds and found the experience worthwhile.

The key findings were that both the lecturing staff and the pre-service teachers need more practical workshops with hands on experience with new technologies such as interactive whiteboards. Even so, pre-service teachers can develop digital pedagogies to teach literacy by combining theories about teaching literacy with the theory and practice of using new technologies in their practicum teaching. However, strong relationships need to be fostered between universities and schools so that both work together so that learning about digital pedagogies can be developed in a practical application. While those findings could relate to many mature aged students undertaking teacher education, Indigenous learners studying in block mode face added difficulties. Those difficulties can be addressed in part by using visual and oral connections online rather than only the written form so that a culturally appropriate way to develop a community of e-learners occurs. More research with a broader population of Pre-service teachers would provide further understandings about the development of digital literacies to use digital pedagogies.

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