

Shifting Transliterations in Elementary School: Understanding How Transliteration Practices
Contribute to Grade Three Students' Construction of Meaning

by

Jacqueline L. Filipek

A thesis submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy

Department of Elementary Education

University of Alberta

© Jacqueline L. Filipek, 2020

Abstract

Situated within social constructivist understandings of multiliteracies, this eight-month ethnographic study explored transliteracy practices in a grade three classroom. The intention of this research was to conduct an ethnographic case study to understand how digital and multiliteracies support the ways children construct meaning through transliteracy practices in elementary school. Findings revealed that transliteracy, using both digital and analog technologies across modes, media, genres, and platforms, is an effective lens to understand the shifting literacy practices of young 21st-century learners. Transliteracy is described in relation to four understandings of literacy: critical transliteracy, digital transliteracy, social transliteracy, and disciplinary transliteracy. Understandings and implications of a transliteracy mindset are articulated in their contributions to scholarship and pedagogy and through descriptive examples of transliteracy in the classroom. This study contributes to growing conceptual understandings of transliteracy and supports the fluid nature of transliterate learning. It promotes the use of multiliteracies, student choice, and opportunities to use more than one mode, device, or platform simultaneously at school. Canadian students constantly face many choices in literacies, thus, being transliterate becomes significant to their literacy education.

Preface

This thesis is an original work by Jacqueline Filipek. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, “An Ethnographic Study of How Multiliteracies Support Transliteracy In Primary School” No. Pro00069898, April 11, 2017.

Table of Contents

List of Tables

List of Figures

Chapter 1: Studying Transliteracy.....	1
Problem Statement.....	2
Research Questions.....	7
Rationale for the Study.....	8
Technology Context in Canadian Schools.....	11
Chapter 2: Research Frameworks and Literature Review.....	20
Research Paradigm.....	20
Social Constructivism.....	20
Constructing Meaning.....	21
Theoretical Frameworks.....	23
Understanding the Social Nature of Literacy.....	23
Multiliteracies Theory.....	28
Multimodality.....	32
Digital Literacies.....	33
Digital Reading.....	35
Transliteracy.....	36
Literature Review.....	40
Seminal Research on Print-Based Literacies, Reading, & Constructing Meaning...	41
Current Research on Digital Literacies, Digital Devices, & Constructing Meaning	46
Studies about Literacy Practices in Schools and on 21st-century Learning.....	50

Studies about Multiliteracies and New Literacies in Primary School.....	52
Studies about Transliteracy.....	55
Studies Using Ethnography to Study Literacy in Educational Settings with Children.....	58
Chapter 3: Research Design Methodology and Methods.....	62
Methodology: Ethnography.....	62
Ethnography as an Act of Writing and as a Process of Inquiry.....	64
Researcher Stance: Participant-Observer.....	65
Becoming an Insider.....	67
School Context - Eagle Peak Elementary School.....	71
School Recruitment.....	71
Research Site.....	73
Participants and Focal Student Recruitment.....	74
Duration of Data Collection.....	76
Digital Technology Context.....	77
Data Collection Methods.....	82
Kidwatching.....	83
Observation.....	84
Field Notes and Expanded Field Notes.....	85
Interviews.....	87
Collection of Artefacts.....	89
Audio and Video Recording.....	91
Ethical Considerations.....	91

Thematic Analysis Process.....	95
Constructing Meaning and Analysis.....	99
Researcher Reflexivity.....	101
The Transliterate Ethnographer.....	101
Chapter 4: Transliteracy Findings.....	105
Focal Student Profiles.....	105
Andrew.....	105
Emily.....	108
Kwento.....	109
Benson.....	112
Classroom Teacher Profiles.....	113
Denise Carpenter.....	113
Mila Rayne.....	117
School Description.....	119
Classroom Description.....	121
Transliteracy Survey.....	122
Classroom Structures	124
A Typical Day in Grade Three.....	124
Mrs. Carpenter’s Class Money System.....	128
The Leader in Me – Leadership Groups in Grade Three.....	130
Transliteracy Examples.....	133
Example 1: Daily Morning Routines: Agendas, Schedule, & Literacy Centres.....	134
Agenda Writing.....	134

Daily Schedule.....	137
Literacy Centres.....	139
Example 2: Using Google Drive and Slides (Andrew).....	141
Example 3: Remembrance Day.....	149
Example 4: Dance Unit Final Project.....	152
Example 5: Social Studies Activities: Transliterate learning Through Research.....	156
Tunisian Ceremonies Across Resources.....	157
Choosing from Many Sources to Learn About Peru.....	161
Example 6: Transliteracy Across the Curriculum.....	165
Chapter 5: Discussion.....	167
A Transliteracy Mindset.....	167
Critical Transliteracy.....	169
Awareness of Cheating and Monitoring by Outside Sources	171
Choosing Texts and Material.....	173
Critically Evaluating Appropriateness of Information.....	177
Using Transliteracy to Discuss Critical Topics from Media.....	180
Digital Transliteracy.....	182
Directly Learning Digital Transliteracy Skills and Practices.....	184
Learning About Usernames, Passwords, and Storage Methods.....	193
Text to Voice, Voice to Text.....	197
Editing Tools.....	200
Transliteracy for Troubleshooting and Problem Solving.....	205

Social Transliteracy.....	210
Internet Games Inspiring Traditional Literacy.....	216
Social Transliteracy in Student Created Clubs.....	220
Technology-Based Language.....	223
Disciplinary Transliteracy in Content Areas.....	228
Simultaneous and Reciprocal Transliteracy Practices Across the Curriculum.....	235
Research: Learning to Use Search Engines and Their Intricacies.....	240
School Provoked Transliterations.....	242
Conclusion.....	247
Chapter 6: Contributions and Significance.....	249
Barriers to Transliteracy.....	249
Equipment Barriers.....	250
Connectivity and Program Barriers.....	251
Systemic Barriers.....	253
Financial Barriers.....	254
Expertise Barriers.....	254
Pedagogical Barriers.....	255
Reducing Barriers.....	256
Defining Transliteracy.....	256
Transliterate Learners.....	259
Contributions to Scholarship.....	260
Constructing and Expressing Meaning.....	261
The Six Language Arts and Multimodality Theories - Trans versus Multi.....	262

Transliterate Research Methods: Implications for Qualitative Research Methods.....	264
Contributions to Teacher Practice.....	266
Concept-Based Curriculum and Transliteracy.....	266
Implications for Teaching.....	268
Confidence, Choice, and Differentiation.....	268
Guided Practice and Modeling.....	272
Resources, Tools, and Multiliteracies.....	276
Recommendations for Transliteracy Pedagogies in Elementary Classrooms.....	282
Limitations of this Study.....	283
Future Research.....	285
Rethinking the Boundaries of Literacy Learning.....	287
References.....	289
Appendices.....	315
Appendix A: Information Letter to Accompany Consent Forms.....	316
Appendix B: Parental or Legal Guardian Informed Consent Form.....	318
Appendix C: Teacher Informed Consent Form.....	321
Appendix D: Minor Assent Form.....	324
Appendix E: Typical Features of Good Field Notes.....	325
Appendix F: Ethnographic Interview Questions.....	326
Appendix G: Transliteracy Survey for Students	327

List of Tables

Table 1: Use of Networked Technologies in the Classroom to Support Learning: Frequency

Table 2: Leadership Groups in Grade Three

Table 3: The Six Language Arts in the Remembrance Day Ceremony

Table 4: Transliteracy Across the Curriculum

List of Figures

Figure 3.0: Classroom Layout

Figure 3.1: Example of Symbaloo Webmix

Figure 3.2: Literacy Centre Rotation Chart

Figure 3.3: Example of Keyword Highlighting in Science Notebook

Figure 3.4: Example of A Digital Book That Highlights and Defines Key Words from Bookflix

Figure 4.0: Chromebook Storage Cart

Figure 4.1: Images of Classroom Store Set-Up

Figure 4.2: Sample Agenda Page and Message Projected on the SMART Board

Figure 4.3: Samples of Student Purposeful Writing

Figure 4.4: Example of a Daily Schedule

Figure 4.5: Examples of Graphic Organizers used by the Students for their Olympics Research

Figure 4.6: Andrew's Google Slides Presentation

Figure 4.7: Examples of Student Planning for Dance Routines

Figure 4.8: Samples of Student Work (using Google to complete assignments)

Figure 5.0: Examples of Encouraging Critical Transliteracy in the Classroom

Figure 5.1: Example of Layout on olympic.org Website

Figure 5.2: Images of Creating Stop Motion Videos

Figure 5.3: Using an iPad to Build Structures in Science

Figure 5.4: Preparing for the Twitter Board in the Library

Figure 5.5: Examples of Kwentó's Drawings Related to Undertale

Figure 5.6: Anime-Inspired Drawing

Figure 5.7: Student Created Story

Figure 5.8: Example of a Text Message

Figure 5.9: Examples of Learning to Write Short and Powerful Messages

Figure 5.10: Examples of Invitations to Use Transliteracy Practices in Social Studies

Figure 5.11: Transliteracy in Math

Figure 5.12: Simultaneous and Reciprocal Learning Using Transliteracy

Figure 5.13: Whole Class Planning for the Olympics Research Project

Figure 5.14: Emily's Connections to the Olympics

Figure 6.0: Commercially Available Transliteracy Games

Figure 6.1: Using Ozobots to Learn Coding and Writing

Chapter 1: Studying Transliteracy

No matter what the future has in store, we need to prepare ourselves and our kids with a shared vernacular and a core set of life skills that transcend the technology flavor of the week and reinforce critical thinking, kindness, and responsibility (Esch, 2012, para. 2).

It seems as if every day new technologies emerge to educate, respond to human need, provide information, or help us communicate with one another. The commonly used phrase, “I think there’s an app for that” is sometimes used comically to describe the influx in mini, quickly downloadable programs designed to make life simpler. It is also a realistically forthright description of the ever growing, user-created, digital world people have access to at their fingertips. In academia, researchers and teachers are challenged to keep current with rapidly introduced new digital technologies. Research concerning the 21st-century learner aims to understand the context in which students today are living and learning. In educational systems, shifting technologies both in and out of school may quickly influence pedagogical practices due to what Esch (2012) describes as the technology flavor of the week.

This research study emerged from my curiosity about how concurrent use of multiple resources, media, learning platforms, and tools (digital or not) impact today’s elementary classroom environments. I wondered how studying literacy practices might help researchers and educators to reflect upon pedagogy and think differently about concepts such as the “Digital Divide” or “Digital Learners”, especially in a time when digital technologies are growing steadily. I also pondered how digital texts (those requiring electricity or batteries and often experienced on a screen) and analog texts (those that do not require electricity or batteries and

are often paper-based) work together to help students to learn and thrive in a constantly changing digitally intense era.

Problem Statement

This dissertation is the product of an eight-month ethnographic study of transliteracy in a grade three classroom. During those eight months, I explored student learning activities and constructions of meaning. As an initial explanation (to be developed in further detail throughout this dissertation), transliteracy encompasses how people can use knowledge of a variety of technologies to build literacy and communicate in a variety of contexts. It is a recognition that constructing meaning involves fluid thinking across and within a multitude of resources. An assumption of transliteracy is that literacy learning is not linear, nor restricted by time and space, but deeply connected to social networking and collaboration. Transliteracy can also offer a different analytical perspective on literacies to help understand the many ways humans communicate, collaborate, and construct meaning. For educators to be able to make sound pedagogical decisions, it is important to know more about what their students do as they engage with the multiplicity of resources available and accessible. Technology changes, curricula shift, and new practices and programs are constantly impacting how and what is taught in elementary classrooms. Transliteracy is not just how students are using such resources but is about what is happening as they construct meaning.

The question of how digital technologies impact learning came to my mind via multiple personal life experiences. As a current post-secondary literacy instructor, pre-service teacher supervisor, researcher, mother of four children, volunteer children's programs leader, and former elementary school teacher, I have spent much time with learners of varying ages from multiple perspectives. Throughout my doctoral studies, the great impact digital technologies have on

literacy and learning became even more apparent as I encountered a range of research discussing the use of electronic devices and computers in schools to build, maintain and enhance new literacies. In addition to delving into research exploring the potentials of digital technology in classrooms, I also heard stories of trepidation and nervousness from teachers/pre-service teachers around computers and technology replacing proven successful literacy practices. I learned of others' questions about how to use traditional/analog texts (books, paper, pencil tasks, etc.) alongside digital and multiliteracies. Some educators seemed to struggle to balance and trust using new technologies with old, especially when there remains limited available research on using both simultaneously. Research has a difficult time keeping pace with advances in the digital world as technology changes rapidly and becomes quickly outdated. Thus, the answer to the question of how students construct meaning within hybrid environments continues to be unclear.

Technology is swiftly changing education. Today's Canadian classrooms are different from what I experienced in my childhood. Then, analog texts took precedence in learning; computer studies took place in a separate lab room during a designated period. There were no computerized devices in the classroom. If my class was to break away from normal analog-based studies to do something as exciting as watch a movie, a television and VCR (reserved well in advance from the school library) were rolled in on a special cart. Computer and video time were separated from other learning experiences. Little connection was made between literacy practices and computers; there was no crossover. When I was a young student, computers were seen as a way to learn programming and other technical skills (such as keyboarding)—not as tools for literacy development or to connect to other classroom or content learning. The internet was just emerging as a way to share information through computers across distances.

In schools now, computers and digital devices are integrated into classroom experiences and included in provincial curricula. These electronic tools are considered a significant part of literacy practices and development since they impact how people receive, construct, and express ideas. Literacy is now recognized as a set of socially situated practices developed throughout life via ongoing interactions with the world around us, rather than a learned set of skills acquired at a designated time such as in language arts class. In education today, literacy is seen as a way of participating in a social or cultural community, which includes roles, rules and expectations both in and out of classrooms.

The increasing presence and use of technology in the formal classroom and in our everyday lives (Chromebooks, smartphones, iPads, etc.) has not seemed to quell continued reliance on analog methods and resources for living and learning. People have adopted new literacy practices, particularly those impacting personal communication like email and texting, alongside continued use of paper-based practices, like writing shopping lists and reading paperback books. In schools, students and teachers now move seamlessly between books, posters, handwritten notes, and other analog means of tackling learning, and electronic devices and methods, such as online videos, music, SMART Boards (interactive whiteboards), and handheld tablets. I find it exciting for the future of education that technological advancements have brought forth countless interesting and useful venues for learning and expression—blogging, fan fiction, social networks, online newspapers, and instant messaging to name a few. However, along with those fun and intriguing ways to communicate comes the need to learn to use them and required knowledge of how to select the most appropriate tools, media, genres, and platforms for the learning task at hand. Transliteracy is what this is about—moving seamlessly

between multiple modes of communication by using and selecting fitting literacy practices to suit one's needs and interests within the boundaries of availability, capability, and cultural practice.

Although much research exists which explores how children use digital devices for learning, I believe paper-based and traditional analog literacies still play a large and important role. Throughout my graduate coursework, I focused on digital literacies and multiliteracies, and in moving through research conducted for this dissertation's study design, I began to wonder if the relationship between and use of analog and digital literacies has changed. There is a growing common understanding that most North American children come to school with some digital literacies experience (see Hoechsmann & DeWaard, 2015; Teo, 2019; Van Dijk, 2017). Since digital technologies are now deeply immersed in daily life, they cannot be viewed as separate tools or additions to learning; nor can electronic technologies in the classroom be examined as subjects separate from other means of educating. There are increased expectations that members of society, even children, use multiliteracies which include digital tools to participate in social and learning activities. Being prepared to live and learn in a swiftly changing digital environment will continue to be important for Canadian students, and school curricula must adapt to fit the new technologies.

Current research on early learning demonstrates that many children have experience with digital technologies, as well as with printed books, paper and crayons/pencils/ink before entering formal schooling (for example, Dezuanni, Dooley, Gattenhof, & Knight, 2015; Neumann & Neumann, 2014; Statistics Canada, 2017). To best meet the needs of learners living through rapid shifts in technology while still using analog methods and tools, it is necessary to understand how they negotiate their many options for communication and make selections as part of their learning. My study aimed to illuminate how the shift in balance, weighting of

choice, and dynamic relationship between digital and analog learning has important implications for teaching and literacy practices in elementary school.

Transliteracy is a term that encapsulates the idea of using multiple media and platforms (not just digital ones) to construct meaning. My research is based on my assertion that transliteracy can be an accurate way to describe how children communicate and build meaning. Thomas et al. (2007) write,

the concept of transliteracy calls for a change of perception away from the battles over print versus digital, and a move instead towards a unifying ecology not just of media, but of all literacies relevant to reading, writing, interaction, and culture, both past and present. (p. 2)

It is not about focussing on new styles of literacy, rather about capturing and expressing ways people engage with combined literacies. Mobile devices and computers have had an impact on learning and, as such, children growing up in this digital age seem to be transliterate in ways very different from even a generation above (parents/adults); the current proliferation of information and communication impacts interactions and how meaning is constructed. I believe it is important to understand what transliteracy is like for younger people and how they draw upon their available multiliteracies so educators can best meet student needs and interests in school.

The intention of this research was to conduct an ethnographic case study to learn how digital and multiliteracies support the ways children construct meaning through transliteracy practices in elementary school. New and quick-shifting digital technologies, along with their subsequent new/revised multiliterate and multimodal experiences, have changed transliteracy practices. It has become important to understand:

- the transliteracy experiences of young 21st-century learners;
- how those students use multiliteracies to become transliterate; and
- how educators can plan to a student’s literacy needs and interests while also supporting their transliteracy practices.

Research Questions

Questions that drove my research involved examining how multiliteracy practices of grade three students support their transliteracy and how students construct meaning in transliterate ways. I specifically sought answers to the following questions:

1. What are the multiliteracies and transliteracies practices students engage in as they construct meaning?
2. How do students in grade three use transliteracy practices to construct meaning?
3. How do the chosen transliteracy practices impact meaning that is constructed?

The following queries were used to frame the context of data collection to further the depth of research/knowledge and examine the theoretical frameworks from which I describe observed practices and experiences.

- Where do students look when they want to know something?
- How do students engage with literacy for pleasure or information?
- How do students see the relationship between traditional texts and digital texts?
- Do digital and analog practices supplement each other equally? Does one literacy practice extend or reinforce the other? How?
- Are digital and analog practices used simultaneously?
- Are digital and analog practices used for different purposes?
- How does the teacher support various ways of constructing meaning?

- How are literacy tasks discussed in terms of media and purpose? (Example: Are books for reading and iPads for playing?)
- Where are devices and traditional texts placed (i.e. physical location)? How are they accessed?
- Who controls access and availability?
- How are more permanent digital devices used (such as SMART Boards and sound systems)?
- Why do students select certain modes, genres, platforms, technologies, media or tools?

Rationale for the Study

The rationale for this study is rooted in both theoretical and social reasoning.

Sociocultural and constructivist ideas have pushed thinking about literacy beyond print-based reading and writing into spaces in which a variety of media and modes of expression are equally valued. Jaeger (2011), known for her emerging work in transliteracy theory and research, argued that in today's world, print-based text is not the dominant means of communication, yet much of the instruction in schools is still anchored by print literacy. She wrote,

We now have to read across electronic platforms, apply previous knowledge to a new application, broaden our scope of reading to include critical evaluation for credibility, and apply rules of decoding and encoding to new content platforms, such as video, Skype, blogging, and online discussions to become productive members of society. (p. 44)

Sociocultural literacy research no longer supports the view that meanings are held within text alone but are constructed multimodally within individuals living in particular contexts.

Transliteracy encompasses constructing meaning across texts and modes and is becoming more important for students at increasingly younger ages. As there continues to be greater

integration of educational technologies in schools, teachers and researchers face new challenges in understanding how digital technologies influence children's literacy development, literacy practices, and construction of meaning (Burnett & Merchant, 2019; Coiro, 2020; Cope & Kalantzis, 2015; Fahrman, et al., 2020).

Yelland (2008) suggested being digitally literate and multiliterate, that is, being able to function with and use many literacies and multiple modalities in a variety of contexts, is necessary for today's children. Subsequently, notions of literacy are being redefined, or revisited, in light of digital texts and technology use (Kinzer, 2010; Levy, 2009; Parry & Burnett, 2017; Singer & Alexander, 2017). As Yelland (2008) stated, "we can undermine children's ability to succeed in the future if we only emphasize the reading of traditional book literacies in a multimedia world" (p. 33). The internet and devices used to access it are key in helping young children develop multiliteracies (Burnett & Merchant, 2016; Leu, Kinzer, Coiro, & Cammack, 2004; Yelland and Gilbert, 2013) and play a big role in how students learn today and in the future.

Alongside developing beliefs about how children construct meaning are changes in the resources they draw on to make meaning. The internet and digital technologies have brought forth new modes of communication and access to information. Thomas et al. (2007) urged, "we need ethnographies of transliteracy, studies of its social, cultural, and power relationships and of its networked vernacular from the perspectives of those who live and work within it" (para 2). There is a growing body of research exploring effective integration of mobile and handheld devices into classroom learning (Burnett, 2016; Dezuanni, Dooley, Gattenhof, & Knight, 2015; Lynch & Redpath, 2014; Marsh, 2014; Yelland, 2013), yet, with the increasing amount of new and digital literacies experienced by students, Jaeger insists "warning bells are ringing," (2011).

She wrote, “new literacies require focused awareness across mediums so we must teach students different techniques for analyzing and synthesizing information” (p. 44). Multiliteracy practices offer new capacities to transcend boundaries beyond print-based texts but there is currently little research on what children actually do when they engage with multimodal texts across different platforms, tools, contexts, and media (Ipri, 2014; Liu, 2005; Sukovic, 2014, 2017; Thomas et al., 2007).

There are strong connections between multiliteracy and transliteracy concepts. Not only are children engaging in multiliteracies using multiple modes, they are seeking multiple media to construct meaning. A Canadian study by Johnson, Riel, and Froese-Germain (2016) of 5,436 students in grades four to 11 revealed that 99% have access to the internet outside of school and 49% of the youngest group in the study (grade four) have access to their own or someone else’s cell phone on a regular basis. Gutnick, Robb, Takeuchi, and Kotler (2011) found that 36% of children between the ages of two and 11 are using both the internet and television at the same time. These studies, along with others conducted around the world (see Holloway & Görzig, 2020; Holloway, Green, & Livingston, 2013; Rideout, 2013), suggested at a very early age children not only have access to the internet as well as multiple forms of media or devices at the same time, but are opting to use devices simultaneously. Current international research suggests children have access to digital technology and begin using it at very young ages. Gillen et al.’s (2019) study on how digital technology informs the literacies of children aged zero to three in six different countries (Finland, Spain, UK, Israel, Portugal, and Sweden) reported that 100% of the participants had some form of digital technology in their lives—noting between five and 13 types of digital devices in the household. Some of the young children were reported to engage with technology by watching television or YouTube cartoons, playing games on apps on tablets or

smartphones, or being part of video calls with relatives. Although use of digital devices were often mediated and monitored by the children's caregivers, each child experienced a variety of devices throughout the day both at home and in other settings such as daycares.

Although there is increasing amount of research on young children's digital practices (e.g., Burnett, 2016; Dezuanni, Dooley, Gattenhof, & Knight, 2015; Gillen et al., 2019; Lynch & Redpath, 2014; Marsh, 2014; Yelland, 2013), very few studies have explicitly explored young children's transliteracy at school. There are urgent calls for detailed research and knowledge describing the ways children are reading digital texts and engaging in digital literacies (Coiro, 2011, 2012; Forzani & Leu, 2012; Levy, 2009). There is also a need for research on what children do with multiple texts and on how instructionally to support the development of literacy in children across the educational spectrum from elementary to high school (Goldman, 2004, p. 4; Sukovic, 2017). Simpson and Walsh (2012), in their study of digital reading practices, suggest "reading digital texts on screen with their rich complexity of semiosis is a challenge for which our traditional models of learning to read are not fully prepared" (p. 39) and claim there is clearly a need for more research in digital literacy and multiliteracies practices for 21st-century learners.

Researching within a transliteracy conceptual framework also addresses the gaps created by the current dichotomy in literacy research that often favours studying either analog or digital literacy practices and less often explores how students use and move across both in their learning. Knowing how children use their resources impacts future teaching and learning decisions in schools.

Technology Context in Canadian Schools

According to Statistics Canada (2017), nearly all Canadians under the age of 45 use the internet every day, and approximately 60% feel life is better as a result of technology use. Of all

provinces, Alberta has the highest percentage of internet users at 94%. When asked how they perceive technology, 77% of Canadians agreed it helps to communicate with other people, 66% agreed it saves time, 52% agreed it helps to make informed decisions, and 36% agreed it helps to be more creative.

A Canadian research group called *People for Education*, surveyed all of Ontario's public elementary and secondary schools, receiving responses from 70 of their 72 public school boards. The report, *Connection to Success: Technology in Ontario*, indicated that 97% of elementary schools reported that teachers use technology to communicate with students—an increase since 2014 when only 88% of schools reported online communication (People for Education, 2019). Some of the tools for communication used by the teachers included web applications (e.g., Remind, Seesaw, and Class Dojo), online classrooms, texting, and email. The report also revealed that 33% of elementary schools encouraged students to “bring your own device” (BYOD) to school each day. The study claimed that the trend of BYOD is “a way for schools to increase access to technology without the cost of purchasing devices” (p. 4) and that 64% of elementary teachers with BYOD policies, plan lessons with the expectation that students will have and use their own devices. Devices used in schools included personal laptops, tablets or iPads, and smartphones/handheld mobile devices. The study reported that 27% of schools begin BYOD in grade four whereas 19% begin in kindergarten. There are, however, equity concerns with device use and students when BYOD policies exist. Even if families do purchase devices for their children at school, not all families can financially afford the same types of devices and inequity and other issues can result when some students have devices that work better than others, when students do not have the required programs on their devices, when devices cannot

connect properly to the network, when devices are not charged, when students have forgotten their passwords or logins, or when students forget their devices at home (Johnson, 2019).

Alberta does not have current data on specific device use in their schools, particularly on how many schools have BYOD policies. The most recent publication was in 2012 (*Bring Your Own Device: A Guide for Schools*) and was situated as a guide to implement or inform policy making around BYOD at school (Alberta Education, 2012). The document presented BYOD as part of the province's vision for education in Alberta, but many BYOD programs still remain optional in school boards or do not exist.

Media Smarts, Canada's Centre for Digital and Media Literacy, along with the Canadian Teachers' Federation, reported that in 2016, 97% of teachers said they were provided with some kind of networked device for use in school. If this statistic holds true in 2020, it suggests almost all Canadian students will see or use a networked device at school. Despite some literacy practices moving to solely digital systems (such as library catalogues only accessible through digital databases as opposed to a paper card system), schools continue to be reliant on both digital technology and analog technology for educational and administrative purposes. There were no reports of any face to face schools in Canada that are completely digital or paperless. Further expressed in the 2016 Media Smarts survey, of the 4,043 K–12 Canadian teachers surveyed, less than 22% report frequently using technology to support learning (see Table 1) despite more than 90% of teachers claiming it is very or somewhat important students learn digital literacy. More teachers reported using networked technologies occasionally or rarely in the classroom.

Canadian teachers also reported two main challenges when it comes to utilizing electronic technology in the classroom—lack of technical support for maintaining electronic

devices and networks, and lack of proper training to use devices to meet curricular goals (Media Smarts, 2016). Consequently, books and paper still remain a significant part of Canadian students' daily schooling. It is unlikely analog tools and resources will disappear from classrooms soon, since teacher ability to use and integrate technology remains a challenge. Table 1 further represents a sample of Canadian teachers' experiences with networked technologies suggesting aspects of transliteracy related to collaboration and networked communication are rarely to never used in many classrooms. Technical aspects (such as creating groups) or independent work which incorporates use of the internet for self-learning modules are more frequently used. This description of networked technology use implies further research and a better understanding of transliteracy has the potential to shift how networked technologies can support more than digital literacy and technical skills-based learning in the classroom.

Table 1

Use of Networked Technologies in the Classroom to Support Learning: Frequency

	Frequently	Occasionally	Rarely	Never
Break students into groups and use one or more technologies to match different learning styles	22%	43%	21%	14%
Have students work collaboratively using a wiki or Google Doc	11%	22%	19%	47%
Provide access to self-learning modules that allow students to proceed at their own pace	13%	27%	23%	38%
Use social media to introduce students to broader conversations about a topic	9%	23%	22%	47%
Use networked technologies so students can communicate with others outside the classroom as part of the learning exercise (e.g. experts, veterans, community members, students in other schools)	3%	15%	27%	56%

Johnson, M., Riel, R., & Froese-Germain, B. (2016).

In their study of Technological Pedagogical Content Knowledge (TPACK) in school, Koehler and Mishra (2009) further explain why some teachers struggle to use technology. They conclude:

Most traditional pedagogical technologies are characterized by specificity (a pencil is for writing, while a microscope is for viewing small objects); stability (pencils, pendulums, and chalkboards have not changed a great deal over time); and transparency of function (the inner workings of the pencil or the pendulum are simple and directly related to their function) (Simon, 1969). Over time, these technologies achieve a transparency of

perception (Bruce & Hogan, 1998); they become commonplace and, in most cases, are not even considered to be technologies. Digital technologies—such as computers, handheld devices, and software applications—by contrast, are protean (usable in many different ways) (Papert, 1980); unstable (rapidly changing); and opaque (the inner workings are hidden from users) (Turkle, 1995). On an academic level, it is easy to argue that a pencil and a software simulation are both technologies. The latter, however, is qualitatively different in that its functioning is more opaque to teachers and offers fundamentally less stability than more traditional technologies. By their very nature, newer digital technologies, which are protean, unstable, and opaque, present new challenges to teachers who are struggling to use more technology in their teaching. (p. 61)

This suggests professional development and technical support has potential to increase and improve the use of technology by teachers in schools when specific uses of technologies are taught alongside access to technology. Simply providing teachers with devices or access to new programs is not sufficient to increasing teachers' use of technology in their teaching. Other studies have similarly reported the need for further professional development for teachers and claim that the decision to use more technology in the classroom often rests on individual classroom teachers and their knowledge and experience (Howard & Mozejko, 2015; Mac Callum & Jeffrey, 2014) .

In Canada, federal government mandates allow each province to determine and carry out its own curriculum and funding for education. As such, provincial curricula vary across the country and differ in how they consider and implement technology in schools. In the Province of Alberta, where my study took place, funding had been allocated to bring internet across the

province and to all schools. This program, called SuperNet (launched in 2001), continues to receive financial support and is regularly updated. The program ensures schools, colleges and universities, as well as a host of other public institutions in remote and rural communities, are connected to high-speed internet.

Additional funds and research in Alberta were designated to support the integration and use of technology to bolster learning. For example, the Baseline Technology Assessment (2015) was completed to determine the SuperNet's capacity to uphold the Learning and Technology Policy Framework set by the provincial government. The policy included five directions related to (1) how technology supports student-centred learning, (2) how research and innovation is used by teachers and administrators, (3) how educators maintain professional learning about technology, (4) how policy leverages technology in support of student-centred learning, and (5) the extent to which students, teachers, and administrators have access to appropriate and reliable digital learning environments (Alberta Education, 2015). Unfortunately, no further research assessing technology use in Alberta schools has occurred since 2015 which is perhaps due to changes in provincial funding models and priorities.

Notwithstanding, a majority of provincial school authorities (73%) have acknowledged they are moving away from creating or implementing a separate technology plan (Alberta Education, 2015). The aim is to instead incorporate technology within overall education plans and goals which "... has helped education needs drive technology, rather than technology driving education" (p. 13). With student-centred learning being a top goal of provincial school authorities, 61% feel there is still significant work to be done to achieve student-centred learning through use of technology. Despite the ambitions of Alberta school boards, stalls in new curriculum development and funding cuts have resulted in Alberta provincial curricula falling far

behind changes in technology. The language arts curriculum has not been updated since 2000 and does not account for research in new literacies, multiliteracies, and literacies related to digital technology. The lack of updated technology policy and curricula is a growing issue.

An additional result of the Baseline Technology Assessment (2015) was that limited financial resources were a main obstacle to achieving provincial technology implementation policies. Among financial challenges come concerns about insufficient quantity of computers and access to devices. It was reported 64% of students do not have daily, on-demand access to technology at school, which the government claims is essential to student-centred learning, nor did the respondents feel the speed of the internet was sufficient for student needs (p. 17). The current financial climate in Alberta adds strain to the education system as there have been recent cutbacks for various reasons, including political changes, economic recession, and COVID-19 ramifications (school closures and funding losses). As financial pressures on schools increase, teachers and students are positioned to find creative and effective ways to use resources already available, which may be limited in numbers and may or may not include digital devices.

Alberta Education's Learning and Technology Policy Framework (2013) suggested that technology, online learning, and digital learning can offer ways for students to develop three key outcomes of education: To become an "engaged thinker" and an "ethical citizen" with "entrepreneurial spirit", also known as The Three E's. The policy focuses directly on student learning and considers student needs first and foremost in decision making. The Alberta government sees electronic technologies as means for students to learn at their own pace, anywhere, at any time and as platforms for personalizing learning (Alberta Education, p. 15), although, more current research and policy development is required in Alberta to keep pace with technology changes. Alberta Education's view is more reflective of a historic, distance education

view and does not account for the collaborative nature of the internet and the opportunities offered through new apps, programs, and social media.

Technology can no longer be seen as an addition to or just a tool for learning, nor as a subject in itself. It is now deeply immersed in the lives of Canadians both socially and educationally. Technology has also become embedded within some Canadian school curricula suggesting a shift in the approach of educational leaders and a willingness to explore revitalized learning models. The next chapter of this dissertation situates this study in additional theoretical understandings of learning and within beliefs of digital technology and multiliteracies.

Chapter 2: Research Framework and Literature Review

Research Paradigm

Kuhn (1962/2012) suggested that researchers “never learn concepts, laws, and theories in the abstract and by themselves. Instead, these intellectual tools are from the start encountered in a historically and pedagogically prior unit that displays them with and through their applications” (p. 47). He believed that paradigms, which are common beliefs about how problems should be understood and addressed, can “determine large areas of experience at the same time” (p. 128). This chapter outlines how this study is connected to other language and literacies research. It begins by describing theories that frame my epistemological understanding of knowledge construction and then specifically how I theoretically frame and understand multiliteracies, digital literacies, and transliteracies. The literature review that follows also situates this study in other relevant research and knowledge to either support or contest ideas related to my research questions. Theoretically framing this study supports the rationale and significance of this work offered in Chapter One and guides the methodological research design in Chapter Three.

Social Constructivism

This study is situated within an interpretivist paradigm. Interpretivism supports the notion that there is no single reality or truth. It includes research approaches that “emphasise the meaningful nature of people’s character and participation in both social and cultural life” and employ methods of research that “adopt the position that people’s knowledge of reality is a social construction by human actors” (Chowdhury, 2014, p. 433). The specific theoretical perspective that frames this study is social constructivism. Vygotsky, who is well known for his seminal work in social constructivist theory, observed that thinking has social, cultural, and historical origins, and even when people are alone, their thinking involves a dialogue with others’ thoughts and ideas (Vygotsky, 1978). Vygotskian views include the notion that the

processes of thinking and learning are reciprocal: “people’s thinking shapes their physical and symbolic worlds, and their engagement with those worlds, in turn, shapes how they (and others) think” (Smagorinski, 2007, p. 67). Central to social constructivism is the recognition that knowledge is not attained but rather constructed through the collaborative experiences that structure people’s thinking, identities, and construction of meaning (Gee, 1996; Goodman, 1996; Street, 1984). This study is rooted within a social constructivist theoretical paradigm of thought such that what people do, say, and think results from social interactions as well as from living in specific social contexts (Vygotsky, 1978).

Social constructivist theorists acknowledge that situated sociocultural interactions and influences play a fundamental role in learning (Gee, 1996; Street, 1984; Vygotsky, 1978). Bruner (1986) suggested, “society provides a tool kit of concepts, ideas and theories that permit one to get to higher ground mentally... They provide a means for turning around upon one’s thoughts, for seeing them in a new light” (p. 73). Social constructivists recognize the importance of the social world and contexts to meanings and, thus, this theoretical framing plays a significant role in how I understand, discuss, and situate my beliefs of knowledge, learning, and, subsequently, construction of literacies and meaning.

Constructing Meaning

Social constructivism recognizes the impact of the social world on constructing meaning. Prominent social constructivist views, such as those based on Vygotskian principles, have spurred additional theories highlighting, for instance, context, critical thinking, identities, power relations, and language development as factors affecting how children construct meaning, and in turn, how literacy educational practices, curriculum and policy are developed. This study was developed from the position that construction of meaning can be equated with learning.

Understandings are constructed using one's funds of knowledge (Moll, Amanti, Neff, & Gonzalez, 1992) to build or make meaning in new experiences. Meaning is constructed when people read, write, speak, listen, view, or represent ideas. Additionally, because of the unique background knowledge of individuals, there can be multiple and varied meanings constructed within similar experiences among people. For example, if two people read the same book, they may have different reactions and understandings because, although the author of the book may have an intended meaning, each reader has different life experiences, knowledge, and emotions and uses them to make sense of what they read. Chambers (1985, 1991), for example, suggested that readers always make some type of response to what they are reading because of their psychological make-up, which comes from all their experiences that make them who they are—their identity.

Rosenblatt's (1982) Transactional Theory supports the notion that meaning is constructed not attained. Reading not only involves responding to what is read but is also the result of what the reader brings, in terms of funds of knowledge, experience, and stance, and what the text evokes from the reader in a reciprocal way. The reciprocity of what the text evokes from the reader may be different with subsequent readings, as personal experiences and knowledge are constantly changing. Rosenblatt's theories support the idea that readers continually transact with a text as they construct meaning: "Reading is a transaction, a two-way process, involving a reader and a text at a particular time under particular circumstances" (p. 268).

Rosenblatt contributed the idea that readers can also take multiple stances to text. She suggested that a reader can take a stance along a continuum of efferent to aesthetic stances while reading. Reading stances are tied to purposes for reading within a certain context. A reader might take a more efferent stance to read for information and a more aesthetic stance to read for

pleasure, although as Rosenblatt acknowledged, the text sometimes gives confusing cues. Stances can also move along the continuum even within a single reading experience. Rosenblatt's recognition of the importance of the reader's selective attention in the reading process, the reader's reciprocal relationship with the text, and the notion of reader stance have implications for understanding how readers construct meaning in relation to their lived experiences. These lived experiences are key in reading research and continue to be relevant when considering literacy practices in the 21st-century such as viewing images or video, listening to digital books or text read-alouds, and engaging with haptic technology through apps or computer games and programs.

The seminal reading and literacy research that follows sits within a social constructivist paradigm and supports that meaning is constructed in various social contexts using a variety of texts and media.

Theoretical Frameworks

Understanding the Social Nature of Literacy

Over the last century, theories, fields of study, and philosophies such as behaviourism schema theory, linguistics, psycholinguistics, and transactional theory have each played large roles in informing understandings of literacy. Auerbach (1991) asserted, "there can be no disinterested, objective and value-free definition of literacy: The way literacy is viewed and taught is always and inevitably ideological" (p. 71). Defining literacy has been and continues to be a complex process and, consequently, shifting and concurrent theoretical frames result in fluctuating and often conflicting school literacy practices. For example, schools have seen pedagogical approaches and philosophies such as phonics-based instruction (e.g., Chall, 1967), whole language teaching (e.g., Goodman, 1965), basal reading (Jenkins, 1950), balanced literacy

(e.g., Stainthorp & Rhona, 1989), and comprehensive instruction approaches (Wanzek, 2014). Dewey's (1927) philosophies on continuity and interaction of experiences, that all experiences are influenced by past experiences and that current experiences can be understood as a function of one's past, ring true of the shifts in literacy theory. Researchers and teachers use their knowledge of what is happening around them alongside current conceptions to develop new ideas about children's literacy development and practices.

Historically, it was believed that knowledge and learning were considered habituated association (Alexander & Fox, 2004, p. 6). Literacy was viewed as a perceptual process by which knowledge was imposed upon unknowing learners through direct instruction, rote work, and memorization tasks. In accordance, understandings of literacy suggested that it, too, was a perceptual process, for example, readers looked at the words and gained all knowledge or information from the print itself. In developed countries, this bottom-up, structuralist paradigm prevailed as the common understanding in both research and practice until the early 1950s when researchers began to recognize that readers bring with them prior knowledge and expectations for print.

Since that time, a great deal of research and theorizing has moved the field ahead into new research revealing that social aspects, such as power relations, identity, social and cultural norms, expectations, and beliefs play a role in literacy development. Alexander and Fox (2004) suggested that "instigation for that marked change came as a result of a confluence of social, educational, political, and economic factors occurring in that decade" (p. 4). The post-World War II baby boom resulted in many children entering school systems in the 1950s and early 1960s, prompting the need to find ways to educate a large population of students. Public interest in literacy, particularly reading acquisition, also began to rise with a publicly defined and noted

need to compete both academically and intellectually across nations (Alexander & Fox, 2004, p. 4). Additionally, changes in public attention paid to literacy provoked multiple and shifting literacy research studies to inform new instructional practices in schools. This attention and expressed need prompted teachers and researchers to actively seek to conceptualize what literacy is, how it happens, and how to teach it. Social constructivist ideas were, and continue to be, highly influential in shaping current widespread beliefs about literacy as a sociocultural construct.

This study is rooted in sociocultural beliefs that literacy involves social or cultural acts, are practices influenced by identities or languages, and are ways of communicating with others for various purposes. It is a set of skills and strategies but also practices used to interpret or make meaning of others' ideas. It is also an interaction between text and reader based upon one's funds of knowledge at a particular time and in a particular context.

Literacy is contextualized meaning construction and does not just involve reading and writing in school. It encompasses situated practices of reading, writing, listening, speaking, viewing, and representing in all facets and domains of life. Social constructivist theories also support that literacy is situated in sociocultural practices (Barton & Hamilton, 1998; Barton, Hamilton, & Ivanič, 2000) that over time can evolve and change in response to new technologies and social contexts (Leander & Boldt, 2014; Leu, Kinzer, Coiro, & Cammack, 2004; Henrkisen et al., 2015). It is also widely recognized that literacy can be understood as multiple literacies carried out in multiple ways for a variety of purposes (Cope & Kalantis, 2000; Heath, 1986; Street, 1984; The New London Group, 1996). To study literacy, it is important to recognize that context (both local and global), modality (Kress, 2000), functions of language (Halliday, 1969),

funds of knowledge (Moll, Amanti, Neff, & Gonzalez, 1992), and social and cultural practices all play a role in constructing meaning.

The notion of multiliteracies states that people use many literacies purposefully in the multiple ways as they live their lives and interact with others. Lankshear and Knobel (2006), leaders in sociocultural literacy research, suggested that “literacies are the socially recognized ways of generating, communicating, and negotiating meaningful content through the medium of encoded texts within contexts of participation in Discourses (or, as members of Discourses)” (p. 64). Thus, literacy “becomes a community resource, realised in social relationships rather than a property of individuals” (Barton & Hamilton, 1998, p.12). Additionally, Meek (1983) in support of the social nature of literacy and language development stated, “So, if we are to help our children to be literate, what should we do? Informally, every day, we induct them into ways of behaving of which language is a vital part, especially in narrative” (p. 237). Literacies are purposeful and situated meaning-making practices, related to and impacted by historical, social, cultural, and political influences as well as our personal and social identities.

Beginning in the 1980s, several studies, commonly named New Literacy Studies, attempted to further explore what literacy is and the role of social and cultural influences in literacy development. There was also a particular interest in how literacy was connected with changes in technology (Street, 2012). New Literacy Studies demonstrated that information and communication technologies such as the internet and mobile devices challenged what was known of literacy previous to the rising use of computers. The following widely used definition of new literacies accounted for the changes in texts, modes, and mediums for constructing meaning available because of new technology developments.

The new literacies of the Internet and other ICTs include the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other ICTs to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others. (Leu, Kinzer, Coiro, & Cammack, 2004, p. 1570)

Although the notion of “new” in the term, New Literacy Studies, might be questioned, as technology seems to change faster than research can keep up with, it is not about “new and different literacies” in the sense that they did not previously exist but is about new studies about literacy that represent shifts or changes in how literacy is conceptualized. Bowen and Whithaus (2013), for example, claimed that “alphabetic literacy has privileged words, their sequencing, and rules of usage as the primary organizing system for articulating experiences as texts” (p. 5) but further suggested the notions, such as what a page is perceived to be, or aspects such as directionality, are being reorganized and challenged by non-alphabetic languages, images and video, and multimodal and digital texts (Coiro, 2008; Levy, 2009; Kinzer 2010).

The early 2000s marked a shift in literacy research that embraced new studies about technology and literacy, particularly social research on how people communicate using computers and digital devices. Continued study in new literacies has furthered understandings of literacy and have influenced curricula and pedagogical practices. New literacies research has also provoked more questions about literacy and what people do with it in multiple contexts, especially as online and digital contexts change and evolve.

Multiliteracies Theory

The term, multiliteracies, is credited to the New London Group based on their collective paper written in 1996; however, the notion of multiliteracies was preceded by the movement in academic literature that supported that literacy could no longer be viewed as a singular entity but as an ideological concept that held social influences and implications (Street, 1984).

Sociocultural literacy researchers at the time, such as Brian Street, David Barton, and Shirley Brice Heath, sought to deepen understandings of how literacy functions in specific contexts and within or among groups of people. The pluralized use of the term, literacies, arose through such investigations as a way to recognize that literacies are varied, complex, and socially and contextually situated. Multiliteracies theory is clearly aligned with a social constructivist paradigm of thinking in that it supports that human knowledge is constructed within and relative to social and cultural contexts. According to The New London Group's (1996) theory, construction of meaning, or meaning-making, occurs within reciprocal interactions of members of both local and global communities. Thus, the concept of multiliteracies theory is based on the following two main notions:

1. Multiliteracies “relates to the increasing multiplicity and integration of significant modes of meaning-making, where the textual is also related to the visual, the audio, the spatial, the behavioural, and so on” (p. 64).
2. Multiliteracies is “a way to focus on the realities of increasing local diversity and global connectedness” (p. 64).

As the New London Group began their work in the early 1990s, Cope and Kalantzis (2000) wrote that literacy was formerly “conceived as a stable system based on rules such as mastering sound-letter correspondence” (p. 5) and, thus, The New London Group set out to find new ways

to conceptualize the literacies they were seeing in their varied research. They strongly supported a more complex understanding of literacy through their multiliteracies theory and in their efforts to propose that literacies are constructed within sociocultural experiences inclusive of local and global communities as well as multiple modes of meaning-making. They strongly emphasized that “meaning-making is an active and dynamic process, and not something governed by static rules” (p. 74). Furthermore, they saw semiotics, the study of meaning-making through signs and symbols, “as a creative application and combination of conventions” (p. 74).

In their attempt to expand views of literacy teaching and learning, The New London Group (1996) argued that “literacy pedagogy now must account for the burgeoning variety of text forms associated with information and multimedia technologies” (p. 61). At the time, the importance of sociocultural influences was well recognized and established as well as the idea of literacy as a social practice (Barton, 1994; Street, 1984). Multiliteracies theory, however, sought also to capture more than just local literacies by focusing on the many meaning-making channels emerging in response to international changes in communication and information sharing.

This research study draws specifically from understandings of multiliteracies (New London Group, 1996) and transliteracy (Sukovic, 2017; Thomas et al., 2007) in coming to see how children construct meaning. Multiliteracies theory was articulated in response to a changing essence of literacy and the need to acknowledge an increasing multiplicity and integration of significant modes of meaning-making (visual, spatial, audio, behavioural). Multiliteracies focus on the multilingual and multimodal aspects of language embedded in social practices. They include diverse ways of communicating using digital technologies, multimedia, and the internet using multiple discourses and forms of representation. Multiliteracies thinking supports a human dimension to literacy development in that literacy is not just a technical endeavor but shaped by

each communicators' life experiences (Barton & Hamilton, 1998; O'Rourke, 2005; Moll, Amanti, Neff, & Gonzalez, 1992; Rosenblatt, 1969; Street, 1984). Literacy researchers involved in shaping the multiliteracies theory recognized a shift in how people communicated at the time by responding to and recognizing increasing local linguistic and cultural diversity as well as global connectedness (The New London Group, 1996, p. 64). This theory is useful in that it gives structure to understanding literacy as multiple and diverse.

The New London Group's (1996) response to changes in information and communication technology was a recognition that forms of meaning-making other than just print are important in constructing meaning. They proposed a metalanguage, that is, "a language for talking about language, images, texts, and meaning-making interactions" (p. 77), of multiliteracies based on ideas of design: available designs, designing, and redesigning. They suggested that within all discourses are particular design conventions, for example, styles, genres, dialects, and voices, and when we make meaning, we draw upon available designs and available resources.

Available Designs, according to The New London Group, are the resources for Design and "include the 'grammars' of various semiotic systems: the grammars of languages, and the grammars of other semiotic systems such as film, photography, or gesture" (p. 74). The New London Group (1996) suggested that these macrofunctions can be understood as different functions of Available Designs that "produce distinctive expressions of meaning" (p. 75). Designing will "more or less normatively reproduce, or more or less radically transform, given knowledges, social relations, and identities, depending upon the social conditions under which Designing occurs" (The New London Group, p. 75).

Leander and Boldt (2013) re-examined the New London Group's theory on multiliteracies and claimed that it does not account for non-text-based literacies such as the

literacies of the body and movement. They suggested that there are literacy activities that are not “projected toward some textual end point but as living life in the ongoing present, forming relations and connections across signs, objects, and bodies in often unexpected ways” (p. 26). They also highlighted limitations of the New London Group’s original multiliteracies manifesto such as the notion that multiliteracies are defined only as texts that can be designed and re-designed within rational control, which discounts the spontaneous movements and actions that are unplanned and not part of a teacher’s expected text-based outcome. Leander and Boldt drew attention to the importance of seeing actions and movements (an example from their study includes a boy who engaged in a spontaneous sword fight with his friend because they were reading about one in a book) and emphasized the importance of seeing things beyond what is designed and expected by the teacher.

Inclusive of further thought on the original multiliteracies theory, such as Leander and Boldt’s (2013) work described above, multiliteracies understandings have greatly impacted and transformed general views of what literacy is and how it is constructed in today’s both real and virtual worlds. Changing thinking about literacy as a singular concept to understanding it as multiliteracies that recognize multiplicity and diversity greatly impacts the study of literacy education. The notion of multiliteracies has shifted educational research focus towards examining the real local and global lifeworlds (The New London Group, 1996, p. 65) in which people practice literacy and make meaning. Students are using multiple digital devices and platforms to learn, they collaborate with others across time and space, and they rely on many multimodal ways to interact with each other and make meaning. Often, they are also operating in a creative play space as they explore and engage in many literacies simultaneously.

Multiliteracies theory has had great positive impacts on education and continues to be influential in many current pedagogical frameworks and theoretical constructs.

Multimodality

Multimodality is an integral part of multiliteracies theory. Conceptions of multimodality stem largely from Halliday's seminal work in social linguistics and his theories concerning the grammars (linguistic set of rules) of human languages. At the time Halliday wrote *Language as Social Semiotic* in 1978, he held the ontological belief of language as meaning potential.

Halliday (1978) wrote that meaning potential is "a form of human semiotic, in fact the main form of human semiotic; and as such I want to characterize it in terms of the part it plays in the life of social man" (p. 51). He believed that language is as it is because of the functions it serves in people's lives and, thus, it can be understood in terms of those functions (p. 4). From his work exploring the social functions of language, Halliday (1978) determined three macrofunctions: ideational (language as reflection, comprising experiential or logical functions), interpersonal (language as action), and textual (language as texture, in relation to the environment) (p. 187). The macrofunctions can define language (of any mode/s) in terms of its content and meaning potential, social influences and relations, and mechanistic functions.

When the New London Group published "A Pedagogy of Multiliteracies: Designing for Social Futures" (New London Group, 2000), in Cope and Kalantzis' (2000) *Multiliteracies* book, Kress (2000) also contributed a chapter called "Multimodality." It is in this chapter that Kress wrote more extensively about the multiple modes of meaning-making outlined in the multiliteracies theory to define multimodality. Multimodality and multiliteracies carry the same assumptions in that both theories support that meaning is made within social interactions and relationships.

Kress's (2000, 2010) expansions on multimodality continued to draw on innovations in communication due to multimedia, mobile device use, and changes in information and communication technologies but remained grounded in the notion that meaning can be made using multiple modes and Available Designs for meaning. Like Halliday, Kress asserted that people are language makers, not simply language users, and do so in social contexts. According to Kress (2010), a "mode is meaningful: it is shaped by and carries the 'deep' ontological and historical/social orientations of a society and its cultures with it into every sign" (p. 114). The notion of multimodality, that we use multiple modes, such as visual, spatial, auditory, and behavioural modes, to communicate and make meaning, and that all language in itself is multimodal, has profound implications for understanding how children construct meaning across platforms in my research.

Kress (2000) suggested that a revolution is taking place in the area of communication. According to Kress, written language is becoming dislodged from the central role it has previously held in public communication (p. 182), and the focus is moving towards exploring other just as relevant and significant ways, or modes, people communicate with one another. Kress suggested that modes such as 'written language' or 'spoken language' cannot, in any case, be regarded as monomodal (p. 184) and that we need to consider all language to be multimodal. He drew on social semiotics in his theory of multimodality to discuss the issues of "the relation of 'mode' and of the 'material stuff' through which a mode is realised, which has to be related to the human body, its 'senses', and its engagement with the world" (p. 184).

Digital Literacies

From New Literacy Studies and multiliteracies work came the term *Digital Literacies*. In both academic research and publicly created spaces, such as websites, there are two ways to

define digital literacies: conceptually and operationally. Often, how researchers define digital literacy is determined by their purposes for discussing it in a particular context. Operational definitions describe digital literacy as the ability to use sets of skills or perform certain tasks. These types of definitions are often used when standards or outcomes are created in school curriculums. Conceptual definitions of digital literacy suggest it to be a general idea or ideal. Digital literacy is often recognized in conceptual definitions in plural form as digital literacies. Conceptual definitions are built upon the processes and social interactions resulting from the use of digital technologies and are related to knowledge, skills, attitudes, and behaviours in the use of a broad range of digital devices. This suggests that skills are but one part of digital literacy and should not be viewed as the premise of the concept. I believe that both conceptual and operational ideas about digital literacies should be viewed together. Social, political, cultural, and economic framing, as well as skills and strategies, need to be considered in understandings of digital literacy.

Hague and Payton's (2010) definition is both conceptual and operational, as it does capture both the ways children use digital technology and what being digitally literate means for children's learning. They stated,

digital literacy involves critically engaging with technology and developing a social awareness of how a number of factors including commercial agendas and cultural understandings can shape the ways in which technology is used to convey information and meaning. It means to be able to communicate and represent knowledge in different contexts and to different audiences. This involves finding and selecting relevant information, critically evaluating and recontextualising knowledge and is underpinned by an understanding of the cultural and social contexts in which this takes place. (p. 1)

Furthermore, Lankshear and Knobel (2008) stated, “digitally literate people are quick on their feet in moving from one kind of medium to another ...know what kinds of expressions fit with what kinds of knowledge and become skilled at presenting their information in the medium that their audience will find easiest to understand” (p. 3). This framing for understanding digital literacy suggests children learn to make sense of the world and to use tools and ICTs to enhance their learning both within and outside of school and across texts, platforms, and media.

Digital Reading

A subset of digital literacies research falls specifically on digital reading. Particularly in recent years, researchers have explored what happens when people read digital texts and whether there are important differences between digital and analog reading. Digital reading involves using multiple modes of communication, such as text, video, sound, and graphics that are experienced on a digital or electronic device. It is the ability to use computers and related Information and Communication Technologies (ICTs) effectively and critically to make meaning of text within a social or cultural context in a digital format. Coiro (2020) discussed three important patterns and ideas informing current conceptions of digital reading:

1. “Digital reading involves complex and overlapping comprehension processes, such as navigation, evaluation, and integration, that are influenced by individual differences in competence and motivation, the design of digital reading interfaces, and differences in task and purpose” (p. 24).
2. “Reading competently across digital spaces requires the ability to effectively move back and forth across multiple media, modes, purposes and context” and that digital reading should “encompass both cognitive and affective purposes for reading that merge social and academic settings” (p. 25).

3. “Reading competence in the 21st century is multidimensional, developmental, and goal oriented” (p. 25).

Although somewhat attributed to “unspecified variations in reader, text, activity, and context” (p. 26), Coiro recognized inconsistencies in how digital reading is defined across contemporary studies and suggests a multifaceted, consistent heuristic to characterize how digital reading can support readers in digital contexts and can ground policy in common beliefs.

Digital texts themselves are documents that are presented in a digital format that can be multimodal and may include hyperlinks, images, video, sound, icons, and conventional text. Digital texts are read or viewed via electronic devices such as computers, smartphones or watches, tablets, eBook readers, gaming devices, digital signage, and more. Coiro (2005) further suggested that traditional print text has been through various editing and revising stages and the finite information is bound to pages within a book whereas internet texts, which “are not carefully edited, link to vast amounts of related information, and are designed to deceive or persuade young readers” (p. 33). Reading digital texts presents challenges for young readers in both digital and critical ways and new or different reading practices may be required as readers construct meaning online or using digital texts.

Transliteracy

Transliteracy is a term used to account for 21st-century changes in how people construct meaning across texts and other modes of communication. Transliteracy is not a new idea, as we have always relied on multiple ways of communicating and learning, but it is transliteracy practices that have changed over time in response to cultural, social, and individual purposes for literacy. Transliteracy is a concept that fulfills the need for a way to encapsulate the idea of how people use multiple forms of information and contexts to construct meaning.

A research group called the Production and Research in Transliteracy (PART) group developed the first widely accepted definition of transliteracy: Transliteracy is the ability to read, write and interact across a range of platforms, tools and media from signing and orality through handwriting, print, TV, radio and film, to digital social networks (Thomas et al., 2007, p. 10). Following the above published definition of transliteracy, there was an increase in transliteracy research, particularly in library studies. In fact, it was a teacher librarian who introduced me to the term in an educational technology graduate course. Discussions of transliteracy in libraries studies often focuses on various ways of obtaining and using information and it is often linked to visual and information literacy. Online material created by librarians, such as training materials and library support, recognize the importance of transliteracy in teaching their patrons to use a variety of digital tools to not only access information but to contribute to a culture and society immersed in digital technology (e.g., Newman, 2010). Mackey and Jacobson state, (2014) transliteracy has

captured the imagination of librarians because it overtly addresses the influence of emerging technologies on literacy rather than viewing technology as a secondary consideration. Librarians know that social media continues to have a significant impact on our students and that we need a pedagogical response to this networked participatory environment. (p. 12)

Current research on transliteracy continues to emerge in academic journals and teaching guides in addition to user-created material found online. Perhaps because those who research digital technologies and concepts engage regularly with online spaces, much of the research, even empirical studies, can be found using the hashtag #transliteracy.

Current understandings of transliteracy include both traditional and emergent literacies, involve mapping meaning and integration across different media, and provides a way of theorizing how literacies transact with each other for meaning-making (Ipri, 2010); thus, transliteracy can be considered a cultural phenomenon and is a lens through which to examine meaning-making within society and culture. According to Sukovic (2014), an educator, researcher, and librarian, transliteracy can co-exist with other models or ideas of literacy, such as multiliteracies, as its approach is about the fluidity of movement across contexts, modalities, technologies, and genres. Stemming from her latest research, Sukovic (2017) further defined transliteracy as

an ability to use diverse analog and digital technologies, techniques, modes, and protocols to search for and work with a variety of resources; to collaborate and participate in social networks; and to communicate meanings and new knowledge by using different tones, genres, modalities, and media. Transliteracy consists of skills, knowledge, thinking, and acting, which enable fluid “movement across” in a way that is defined by situational, social, cultural, and technological contexts. (p. 8)

The focus of transliteracy is on the interaction of literacies through mapping meaning across different media and not about developing literacies about media (Ipri, 2012, p. 532). Thus, multiliteracies account for WHAT is happening in terms of learning and constructing meaning and transliteracy accounts for HOW and WHY constructing meaning happens.

Sukovic (2017) described three areas that constitute transliteracy: 1) working with a multiplicity of resources such as a range of media technologies and techniques; 2) working with others through communicating and collaborating in person and via digital media; and 3) presenting results of work using different tones, voices, modalities, formats, and genres (p. 52).

Therefore, transliteracy can be understood as constructing meaning across a whole range of contexts, technologies, genres, and modalities.

Conversations about transliteracies, digital or print-based, often explore the ability to read across texts. Derived from the verb ‘to transliterate,’ “meaning to write or print a letter or word using the closest corresponding letters of a different alphabet or language” (Thomas et al., 2007), transliteracy is a concept that fulfills the need for a way to encapsulate the idea of how people use multiple forms of information to construct meaning. In their presentation on Transliteracy and Metaliteracy, Mackey and Jacobson (2011) responded to a question inquiring whether transliteracy is just about skills and skill development by advocating that it is not, but has to do with one’s ability, motivation, and inclination to learn to be transliterate. They also discussed that having access to and awareness of different means, platforms, tools, and media plays a significant role in developing transliteracy. This speaks to teaching more than just skills to students in classrooms; it means focusing on the bigger picture of why engaging in digital and transliteracy practices is important and valued. For example, it could mean teaching students about the benefits or disadvantages of using multiple media sources (like Wikipedia, YouTube, blogs, and the encyclopedia) to learn about a topic. The terms *intermediality* (Lapp, 1999 as cited in Bamford, 2003) or metaliteracy (Mackey & Jacobson, 2014) are also used in some academic research to describe transliteracy practices. Intermediality is described as the combined literacies needed to read in a multimedia world and is a way to examine and discuss the complexities of the online and digital text use of children. Metaliteracy is seen as a reinvention of information literacy in a social media age.

Becoming transliterate means coming to understand the basic premises behind using information sources in a variety of ways and not specifically just how to use the tools to do so.

Tools and applications come and go, but the reasons why we might use those types of tools linger. For example, if you teach students how to use a search engine (such as using keywords and expanding and narrowing searches) and more importantly what search engines can be used for, it will allow students to open almost any search engine (Google, Yahoo, Bing) and be able to use it to find what they seek. This might include teaching and learning about some of the main components of most search engines so that whether students come across Chrome, Firefox, Explorer or Safari, they can use it (at the very least basically) until they learn the specifics of each program.

Transliteracy refers to how we use multiliteracies collectively to construct meaning and is not just about the skills we use or need to do something but is about sociocultural understandings and inherent knowledge of particular social and cultural communication practices. I believe transliteracy as a part of my conceptual frame has provided an effective means for thinking about current understandings of digital literacy, thus offering me further ways to explore and discuss the literacies practices of these young students. In this study, a transliteracy lens was used to describe literacy practices because it involves recognizing skills and strategies as a part of literacy development but also includes metacognitive and social understandings of individual learning.

Literature Review

The following review of the literature discusses important theoretical, conceptual, and empirical studies relevant to my research. To be able to study how young children construct meaning, it is important to understand some of the processes they use when engaging in literacy events and practices. This literature review begins with seminal research on text-based reading and writing, as it continues to support the context for how I understand constructing meaning but

also gives me insight into reading and writing multimodal texts across multiple platforms and media. A discussion of current studies on digital reading follows and then research in the areas of 21st-century learning, multiliteracies, and transliteracy. The final section outlines ethnographic research used to study literacy in education settings and is presented to highlight the benefits and challenges of using ethnography.

Seminal Research on Print-Based Literacies, Reading, and Constructing Meaning

The complexity of reading and print-based literacies cannot be reduced to a single definition or context. They are acts that require continual refinement. Reading and writing are contextual, situated processes of constructing meaning and are dependent on what the reader/writer brings to the literacy experience, such as funds of knowledge and personal and social identities (Gee, 1996). Reading and writing also must be understood in their larger sociocultural context to recognize that literacy practices are influenced by power, identity, and social and cultural beliefs (Barton & Hamilton, 1998; Street, 2001). To be a reader or writer means being able to make symbolic connections within a language in addition to constructing, interpreting, comprehending, or constructing written text. Readers (and writers) draw on language cueing systems to communicate and construct meaning in many contexts (Goodman, 1965, 1996, 2014); fluency, vocabulary, phonological awareness, motivation, funds of knowledge, society, culture, and power all influence when, what, how, and why one might engage in literacy.

Literacies are informed by multiple theoretical perspectives from many fields, such as brain research, psychology, sociology, anthropology, linguistics, and education. Current literacy research acknowledges that processes both internal and external to the body and brain impact literacy development. Text-based literacies, such as reading and writing, are complex processes.

They are social and cultural acts and practices influenced by identities or languages as ways of communicating with others for various purposes. They include skills and strategies used to interpret, or make meaning, of others' ideas, and are interactions between texts and readers and writers. The theories of text-based literacies described below support seminal understandings of literacy and stem from research that was qualitative and longitudinal, taking place in real contexts, such as schools and homes.

Clay's (1966) seminal work in emergent literacy involved the study of over 100 New Zealand children over their first year of school. She strongly believed that children are active and constructive in their learning. Her explorations and understandings of social context and interactions of mother and child while reading brought the awareness that literacy begins at home well before children enter school. She learned that when parents read with their young children, the children can begin to develop book and print knowledge, such as how books physically function, which is an important part of early literacy development. Clay's work challenged current beliefs at the time that literacy development began at school. Clay's work continues to encourage research in early engagement with texts to develop fundamental understandings, such as the purposeful nature of text, and that understandings of reading are constructed within social practices. Clay's sociocultural early literacy research and writing in reading recovery as well as in assessing early literacy development supports the recognition that reading and writing are tied to the context in which children are situated and that exploring literacy practices can provide valuable information about relevant pedagogy tailored to individual literacy needs.

Margaret Spencer Meek, along with other prominent researchers, such as Michael Halliday, Yetta Goodman, and Shirley Brice-Heath, contributed to a strong foundation for seeing the social nature of literacy and offered practical implications for educators. Spencer Meek

(1983) wrote, “if we are to help our children to be literate, what should we do? Informally, every day, we induct them into ways of behaving of which language is a vital part, especially in narrative” (p. 237). Further study on literacy as a social practice, such as Britton’s (1988) extensive research on reading and writing in elementary classrooms, also supported the notion that literacy can establish and maintain relationships and can be a place where people can think together. Many researchers have built upon the idea that how a reader makes sense of a text depends on what they bring to it. Chamber’s (1985, 1991) ideas that who we are and all of our experiences create the response that readers make when reading. Recognizing literacy as a social and cultural construct is important in understanding why and how we use literacy in everyday life and school.

Goodman (1996), through his extensive research on whole language and reading, has made large contributions to understanding how reading is actually making sense of print, not simply taking meaning from the page. He has determined that reading involves both the words on the page and the readers’ knowledge and expectations for print. Reading is making meaning alongside a text by using previous knowledge of both the topic and reading in general. According to Goodman, “making sense of texts involves complex control, both by readers and writers, of how language works and how texts are constructed” (p. 2). Goodman (2014) has since extended this claim to include digital texts in his understanding of constructing meaning, and he continues to advocate for whole language teaching in schools today.

Goodman (1965) called reading a psycholinguistic guessing game. His work with miscue analysis highlighted that when people read, or construct meaning, they use four language cueing systems: phonology, semantics, syntax, and pragmatics. In the English language, using your graphophonemic system involves applying your knowledge of orthography (symbol system) and

phonology (sound system) to decode and encode text. The semantic system is the meaning system people apply when reading and is linked to their background knowledge and their understanding of what makes sense. The syntactic system is the grammatical system where people draw upon their knowledge of sentence structure, grammar, and morphology when reading. The pragmatic system is related to how language is used socially and within social contexts and includes understanding dialects, registers, gestures, and language that has implied meaning. As Gee (1989) wrote, “It is not just *what* you say, but *how* [emphasis in original] you say it” (p. 5). Goodman (1996) expressed that constructing meaning using these four language cueing systems is consistent among all languages, except sign languages, and not just the English language. People use the language cueing systems concurrently to identify unknown words and make sense of what they are reading.

Goodman’s notions of the language cueing systems to construct meaning informed how I understood constructing meaning using digital literacy processes and other multimodal texts in this study. Through their work understanding the multimodal reading and writing of first graders, Martens et al. (2012) contended that “young children can and do think and read multimodally” and do use the language cueing systems in the same ways when viewing non-text based representations, such as artwork (p. 291). They suggested that just as writers use graphic and sound symbols (words) using syntactical structures to create meaning, artists use elements of art and principles of design to create meaning. Graphic cues in written text are similar to elements such as line, value, shape, texture, colour, and syntactic cues are similar to design elements such as balance, patterns, contrast, movement, and emphasis (p. 286-287). Thus, texts that are digital or visually based can be understood to have been created with as much structure and purpose as

writing, and because of that, we draw upon our language cueing systems to construct meaning when engaging with them.

Goodman's (1965) whole language research suggested that readers do not need to read every word to understand what they are reading. Most readers scan ahead, skip words, come back to parts they did not get the first time, and move their eyes and thoughts all over the page when they read. People do these things to help construct meaning. Goodman refers to errors people make when they are reading as miscues, not mistakes, and suggested that if educators look closely at the miscues students are making, such as omissions, substitutions, insertions, and repetitions, that they can better understand the cueing systems students are drawing on, and subsequently, those they need help with. Psycholinguistics continue to be an important aspect in accepted conceptions of reading and support many assessment and reading intervention programs (e.g., Leveled Literacy Intervention (LLI), Fountas & Pinnell, 2009).

Psycholinguistic understandings of literacy are also important in framing multiliteracies and transliteracy. In classrooms, students rely on their foundational literacy skills and understandings to develop literacies in both digital and more traditional environments. Both print-based and digital literacies involve the development of certain skills, processes, and understandings (for example, the alphabetic principle or phonemic awareness, or that tapping and then holding your finger in a fillable field will open the virtual keyboard). Of similar importance are the contexts of engaging with literacies, what people bring to literacy experiences in terms of funds of knowledge, as well as their experience with the topic, current skills and strategy knowledge, motivation, interest, confidence, and ability.

Current Research on Digital Literacies, Digital Devices, and Constructing Meaning

Research on digital literacies, and what children are doing when they engage with them is prominent in literacy research and, because of rapid changes in information and communication technologies, has already experienced shifts in what and how digital literacies are studied. In the early 21st-century, research on digital literacies centred on personal computer-based systems and programs. Even the structure of the internet was different, as it was used more as an information retrieval system (Web 1.0) as opposed to the user-created and social interaction system we use today (Web 2.0). In fact, technology experts predict Web 3.0 as the new paradigm for describing how people interact online. Web 3.0 involves collecting a context of use and interests from the user and then providing them with the most useful and relevant information (“Web 3.0,” 2019). In my own online use, I am already seeing the implementation of these ideas through the use of tools such as tracking programs and prediction services.

Research in the early 2000s on children’s digital literacies focused mainly on desktop computer use, particularly digital reading, suggesting that higher demands for inferential reasoning, synthesizing, comprehension monitoring strategies, and strategic evaluation exist when people engage in online reading, such as multimodal websites and digital books (Coiro & Dobler, 2007; Forzani & Leu, 2012; Levy, 2009; Serafini, 2011). Coiro (2011) claimed that traditional reading practices used for offline reading (previewing the text, setting goals, making predictions, asking questions, monitoring understanding, and making connections) are “necessary, but not sufficient, to successfully navigate and make sense of online informational texts (p. 108). Coiro’s (2009) work exploring adolescents’ reading on the internet revealed five differences between online reading comprehension and print-based reading comprehension: (pp. 59-63)

1. Students need new skills such as using search engines, navigating multilayer text, and monitoring their pathways on the internet.
2. Dispositions toward the internet affect online reading abilities; “Certain attitudes, self-judgements, and beliefs about the internet are positively related to effective strategy use when reading challenging online texts” (p. 60).
3. Students often seek answers on the internet collaboratively.
4. Reading processes should inform reading instruction.
5. The nature of reading comprehension is changing because of digital technology.

Coiro’s work highlighted that differences do exist between online and offline reading that play a role in children’s construction of meaning. Such differences reside in structures of text, purposes for reading, collaborative reading, and dispositions towards technology and reading on new platforms.

In their international quest to help governments around the world to share experiences and seek solutions to common problems, the Organisation for Economic Co-operation and Development (OECD) developed the Programme for International Student Assessment (PISA) as an international survey aimed at evaluating education systems worldwide (approximately 70 economies) by testing the skills and knowledge of 15-year-old students. The 2009 PISA assessment, *Students Online: Digital Technologies and Performance*, results revealed that digital reading specifically involves scanning and skimming documents, assessing the relevance of what is read (and disregarding the distractors), understanding the hierarchical structuring of information in menu trees and tab sets, using hyperlinks and search engines, knowing how to advance text and return to text already read, learning how to zoom in and out or increase/decrease font sizes, and knowing how to start and stop embedded videos and podcasts

and how to adjust the volume and picture. The PISA results also suggest that a skilled reader of digital texts must become familiar with the use of navigation devices and tools, be able to mentally represent the movement of the page and be able to move in the correct direction, consider that what is showing in a window is not necessarily all there is, and be able to overcome apparent discrepancies, for example, the fact that the arrow oriented downwards on the scrollbar actually moves the text upwards. There is an upcoming PISA assessment planned for 2024 titled Learning in the Digital World as much has changed in both schools and the digital world since 2009. Further international study on the impact of ICTs and digital device use among young people will provide required insight into pedagogy and scholarship for learning using digital tools and texts.

In 2007, smartphones such as the iPhone were released, initiating a vigorous and competitive pursuit by phone companies to create the best and most popular phone. Mobile communication quickly changed to meet user needs and interests. In a short period of time, smartphones allowed people to carry a handheld, battery-operated device that could email, text, browse the internet, take pictures and video and function in a similar way to a personal computer.

In spring 2010, Apple Inc. released the first iPad (Apple, 2010), again thrusting phone markets into competition to create the best tablet with the best access to the internet, email, and programs. Along with changes in communication because of smartphones and tablets, however, came changes in software, programming, and use. There was a large shift to using mobile apps—easily-accessible applications that run a program, game, or function on a smart device, as opposed to using large software programs downloaded and which require large quantities of memory and space to run. Mobile apps also shifted some people from consumers/users to

creators as app sharing programs, such as iTunes and Google Play, allowed anyone to create, post, and share/sell apps.

Wi-fi and internet access also expanded, and social media markets grew. Mobile devices, such as smartphones and tablets/iPads, impacted digital literacy research, and there was a noticeable shift in the focus of digital literacies in the early 2010s to studying tablet and app use in schools (Dezuanni, et. al, 2015). Building on the important understandings gleaned from studying personal computers in the previous ten years, a large body of digital literacies research moved focus to mobile devices. In some developed countries, schools began to purchase iPads or tablets for classroom use. Other schools required families to purchase their own devices such as iPads or laptops as part of school supply lists as part of bring your own device programs (BYOD). Even if children did not experience mobile devices in school, they were likely to have access to one outside of school.

Mobile devices, such as smartphones and iPads/tablets, especially because of touch screens and child-friendly apps, have targeted young children and have been designed to be more accessible and popular with early learners (Neumann & Neumann, 2014). Current research on mobile device use in early learning and elementary school suggests that although statistics have shown little increase in time spent on screens over the last few years (Rideout, 2013, 2015, 2017, 2019); children aged zero to eight on average still spend less than two hours daily on screens and children ages eight to 12 spend less than five hours—how children use that time on screens is changing (Marsh, et. al, 2016). Through studying UK preschool students' use of apps and how those apps promoted play and creativity, Marsh et al. (2016) and Gillen et al. (2019) discovered that it is not the types of possible play that change in digital contexts but the nature of children's play. Marsh et al. (2016) wrote, "Contemporary play draws on both the digital and the non-

digital properties of things and in doing so moves fluidly across the boundaries of space and time in ways that were not possible in the pre-digital era” (p. 250). An example of this continuity from their study was that in digital contexts, children still engaged in fantasy play—a concept repeatedly studied in children’s offline environments, such as pretending to be a princess. Similarly, within the digital context, children also took on roles that would not occur in real life, such as being a superhero but through the use of an avatar (p. 247). Additionally, Marsh et al. also discovered that sometimes while using an app, play would extend off-screen, and the child would pretend to become the character that they played in the game.

Other research on young children and mobile apps claimed that although many apps are designed for young learners and are often free and accessible, they often promote a dated transmission model of learning where it is assumed that children will learn simply by interacting with an app (Dezuanni, Dooley, Gattenhof, & Knight, 2015). They also suggested that free apps are often of lower quality, especially free digital books, and that overall, the presence of a constant adult was required for successful use of more complex, but better-quality apps.

Studies about Literacy Practices in Schools and on 21st-century Learning

Several studies have explored what students living in the 21st-century will need from their school experiences (see Burnett & Merchant, 2015; DuFour & DuFour, 2010; Moller, et. al, 2009; Saxena, 2014; Silva, 2009). In their comparative analysis of international frameworks for 21st-century competencies, Voogt and Pareja Roblin (2012) maintained that people today need many of the following skills: problem-solving, creativity and information and communication technology literacy. They indicate that many educational systems rely too heavily on memorization and knowledge-based competencies. This mismatch between information on 21st-century students’ needs and actual educational practices is recognized as a serious concern for

today's learners and has provoked increased research into learning what supports successful literacy practices (see Anderson, 2019; Backfisch et al., 2020; Burnett, 2015; Burnett & Merchant, 2015; Cope & Kalantzis, 2015; Coiro, et. al, 2008; Johnson, 2019; Kress, 2010; Walsh, 2011).

Basing their research on the assumption that changes in technology lead to changes in literacy practices, Simpson and Walsh (2012) studied the impact of technology on 21st-century learners' reading practices to see the balance of traditional and new reading practices in the classroom. Many teachers were simply transferring traditional teaching to digital media, that is, "old pedagogy being used with new technologies" (p. 38), and thus missed opportunities to engage students in the dynamic literacy learning that is possible with digital texts. Their research suggested "the integral relationship between processing texts and modes, whether image, sound or movement, means that we need new approaches to both teaching and assessing reading" (p. 38), which holds important implications for teacher development. Similarly, Johnson (2019) noted some dysfunctional practices resulting from digital device use, particularly smartphones, in classrooms, and how the "un-new" (p. 215) practice of scanning and uploading textbook chapters prevailed in some classrooms. There was an administrative push in the schools in her study towards BYOD (Bring Your Own Device) that perpetuated the outdated practice of digitizing current written text simply because teachers were told they could not use paper textbooks instead of finding new ways to use digital literacies for learning. Johnson found that the teachers in her study were polarized in their support of smartphones as valuable learning tools as their physical limitations, such as screen size and keyboard, as well as from the perception of smartphones as a toy used for gaming and listening to music. In reference to the BYOD policy, Johnson claimed, "the original intentions of how a digital device might be used in the classroom has clashed with

the actual performance of how these technologies are actually used” (p. 219). She believes that how young people use and practice literacy with smartphones is not aligned with contemporary schooling and there is a mismatch between new media, sociality, and schooling.

In other studies, however, it is noted that literacy practices are changing because of electronic devices and the availability of information (see Jewitt, 2004, 2005; Lovell, 2014; Wong, 2016). With new devices come varied layouts of text, multimodal texts, and changing access to a variety of literacy experiences. Electronic devices can include computers, smartphones, tablets and iPads, and other interactive electronic tools to display texts such as SMART Boards, and many classrooms are now equipped with various devices that avail different opportunities for multiliteracies. This, however, leads to questions about what happens when students have to choose from a wide variety of texts and devices as they construct meaning. It is undeniable that literacy needs and practices have changed, so the more researchers know about the literacy practices of 21st-century learners, the better teachers can meet their needs in school. Burnett and Merchant (2016) claimed that “any attempt to re-examine literacy education for the 21st-century needs to meet the specific challenges of curricular integration and the moving target of new technologies head-on” and “promoting 21st century literacies does not involve replacing one set of learning goals with another. It does, however, necessitate a recognition that resources for communication are richer, more diverse, and more flexible than before” (p. 272).

Studies about Multiliteracies and New Literacies in Primary School

For many years teachers and researchers have explored ways to meet the diverse needs of learners and ways to differentiate learning within a classroom. Current digital technologies have brought sounds, images, video, and participation into reading experiences that can appeal to

many children and, at the same time, meet their diverse learning needs. Lankshear and Knobel (2011) wrote that within sociocultural perspectives there are four substantial constructs taken up to study literacies (1. recognized ways, construed in a social practice sense, 2. meaningful content, 3. encodification and 4. discourse membership) but “that they can take on distinctive nuances and parameters when directed to the study of *new* [emphasis in original] literacies” (p. 292). One example is the well-regarded theory by Kress (2003), who identified that language can be multimodal and use more than one mode to communicate information or ideas. Multimodality looks very different across digital mediums, devices, and applications (software) than within more traditional analog texts such as a children’s picture book.

Although in some circumstances, it might appear that digital technology is simply a tool for developing traditional notions of literacy, research clearly shows that information and communication technologies such as the internet are challenging contemporary literacy-related concepts. Twenty years ago, when the New London Group proposed the term and conceptualization *multiliteracies* for understanding and describing literacy, they also offered a pedagogical framework for enacting multiliteracies in classrooms. Shifts in thinking toward literacy as multiliteracies have since prompted much research into the implementation and success of multiliterate and multimodal literacy practices, including theoretical, empirical, and program studies among a variety of communities (Brice, 2016; Burnett, 2009; Chera & Wood, 2003; Craft, et. al, 2014; O’Mara & Laidlaw, 2011; Marsh, 2006; Wong, 2016). Common to many of these studies is the argument that multiliteracies thinking and pedagogy is necessary in present education systems and environments (Rowse & Walsh, 2011; Siegel, 2012).

Dunn, et. al (2014) studied children’s views on the use of popular culture in the teaching of writing in primary school. The children, ages 6-7, showed a wide range of expertise and

knowledge about a large array of media texts and artefacts such as popular culture characters. The study showed that the children were more successful in constructing meaning when tasks involved a familiar popular culture character, such as Nintendo's Mario (p. 26). Their research affirmed that popular culture is deeply inscribed in childhood play and that "much of the textual landscape in which children are developing their understandings about literacy revolves around popular culture and emergent electronic texts" (Carrington, 2005, as cited in Dunn, Niens, & McMillan, 2014). The children in their study demonstrated their enjoyment and desire to include popular culture in their writing because of the relevance popular culture plays in their lives.

Other researchers have explored teacher implementation of multiliteracies pedagogy in classrooms. Burke and Hardware (2015) conducted a case study with 13-year-old English as Second Language students to see how traditional literacy practices, such as narrative writing, can be augmented to engage digital literacies (p. 147). The teacher purposefully employed a multiliteracies pedagogy, as outlined by the New London Group (1996), in planning and implementing multiliteracies activities such as digital storytelling. The students and teacher were also interviewed and participated in focus groups regarding their in- and out-of-school lives and digital literacy practices. Interview questions included topics of maintaining online relationships with others and the types of online social engagements in which they participated. The analysis of the study used the four strands of the multiliteracies pedagogy (situated learning, overt instruction, critical framing, transformed practice) to relate to and discuss specific examples of multiliteracies used in the classroom. Burke and Hardware observed that using multimodal practices, such as creating digital storybooks, gave the students a voice and agency in making a valuable contribution to their literacy growth. In their digital books, students could critically discuss social topics such as religion, poverty, and death without the limitations of only text-

based composition. The researchers also noted that writing digital books as a part of a novel study allowed the students to bring in their personal perspectives and to make connections between their own lives and what they were learning in school. This multimodal alternative drew upon their out-of-school literacies and experiences with using social media. This study highlights how multiliteracies instruction is an important part of the differentiation of learning, as some students need a different pathway beyond traditional writing to feel successful and to contribute to the literature discussion in their class.

In another study on developing multiliteracies through the implementation of particular activities, Barry, et. al (2015) discussed an *iPlan* pedagogical model (developed by researcher Dr. Nea Stewart-Dore) in relation to multiliteracies in the classroom. The authors suggested that the *iPlan* framework develops students' understandings of multiliteracies texts and how to present their learning in multiliterate ways (p. 8). The framework is related to multiliteracies ideas and teaching, such that students learn to access and build knowledge, interrogate meanings, select and organize information, and represent knowledge beyond the use of print and paper-based texts. As the goal of this pedagogical model is to "encourage students to be independent, autonomous, lifelong learners who read and write imaginatively and critically in diverse situations" (p. 2), it supports my belief that multiliteracies teaching can provide new avenues for becoming transliterate constructors of meaning.

Studies about Transliteracy

Because transliteracy is connected to digital and online learning, it has a short history as a concept used to describe how people interact with texts and communicate with one another. In 2005, the idea of transliteracy was first introduced by Alan Liu who headed the Transliteracy Research Project. The project was funded for five years and consisted of graduate students and

scholars in the humanities, social sciences, and engineering at the University of California.

According to the Transliteracies Project website, the goal was to establish working groups to study online reading from different perspectives. It states:

An example of an initiative upon which the Project may work is the design of a technology to improve the community experience of reading while accommodating different experiences of texts according to age, literacy level, nationality or background, professional or personal interests, and so on. Technological development will be integrated with humanistic and social-science research (empirical, historical, interpretive, critical, aesthetic) that explicitly questions what “improve” or “community” might mean. The idea is to exploit cross-disciplinary expertise to approach online reading from multiple angles simultaneously, rather than just as an engineering problem, just as a hermeneutical problem, or just as a social problem. The goal, in other words, is avoid producing a quick-fix extra “feature set” for online reading, but instead to create a demonstration technology founded upon deep, wide reflection on the issues.

(Transliteracies Project, 2005, Overview section 2)

The Transliteracies Research Project working groups strived to engage in “a rigorous discovery process (equivalently, a “recovery” process) to learn about, share, and assess leading-edge research developments (technological, social, intellectual, etc.) related to online reading.”

(Transliteracies Project, 2005, section 1). The project was intended to draw from many fields, and to take the approach both of object-analysis (“what is it? how does it work”) and reader-analysis (“who is it for? what practices are enabled or hindered?”). The project resulted in transliteracy research conferences, online data sharing, funds supplied for related research, and a collection of links to articles and research on digital literacies and topics related to transliteracy.

As part of their research dissemination, the group organized the first ever transliteracy conference. A researcher named Sue Thomas attended and was inspired to further develop understandings of transliteracy (Thomas et al., 2007). In 2006, she formed a transliteracy research group called PART (Production and Research in Transliteracy) who came together to research whether the internet was changing how we read and write. It was PART that developed the first definition of transliteracy (referenced earlier in this document) that is still the most common definition cited in transliteracy studies.

Investigations of transliteracy are often concerned with the fluency of movement across complex information contexts (Sukovic, 2017). Goldman (2004), who specifically studied transliterate practices, extensively examined the cognitive aspects of constructing meaning through and across multiple texts. She suggested that society has moved from being an industrial society to a knowledge society in which there are great demands placed on teamwork, problem-solving, career flexibility, and adaptability. According to Goldman,

a knowledge society implies a world where, routinely, connections are made among multiple sources of information, choices are made among multiple sources of information, choices are made about what information to ‘trust’ and what to question; about what information to pass on to others and what not to; about how to ‘index’ information so it can be subsequently retrieved when relevant and appropriate, not be retrieved inappropriately, and be distinguished from irrelevant information. (p. 3)

Her study involved asking high school students to read three different related texts and retell what they read. Results revealed that information across two or more texts could be consistent and complementary, contradictory, or componential (the information across texts is part of a larger whole). She suggested, “the different ways that information across texts is related has

implications for the construction of coherent mental representations of the content across texts” (p. 32). Goldman also learned that some intertextual connections are made at a surface level, such as noticing repetitions of content, whereas some connections occur at a deeper meaning and situation level and are at an interpretative level based on the learner’s mental representations of each text (p. 33). Importantly, she noted that “construction of connections across texts with regard to the representation and construction of meaning is the authority assumed by the reader for making connections” (p. 35). Goldman’s study has implications for understanding transliteracy practices and supports the sociocultural beliefs of literacy in that social context and learners’ funds of knowledge play a large role in how meaning is constructed across various texts, platforms, and media.

Studies Using Ethnography to Study Literacy in Educational Settings with Children

Ethnographic research in the field of literacy has brought focused attention to literacy as sociocultural practice. Seminal ethnographic studies on literacy, to name a few, include Barton and Hamilton (1998), Besnier (1993), Heath (1983), Kulick and Stroud (1993), Prinsloo and Breier (1996), Scribner and Cole (1981), Street (1984), and Taylor (1984). Historically, ethnographic data collection relied heavily on written text, such as field notes and text-based reporting; however, Kress (2011) stated that traditional ethnographic data collection tools are not always most appropriate for studies that consider multimodality and social semiotics. Consequently, as ethnography continues to be widely used in school settings, additional methods such as video recording, online social participation, and children as ethnographers have become acceptable means of collecting data. The following are examples of ethnographic studies that used less traditional means of data collection and analysis to study children and learning in and outside of school classrooms.

In their ethnographic study of embodied learning using videographic participation, Degerbøl and Nielsen (2015) claimed that using video observation in ethnographic educational research can be a good option to “capture the multisensuous dimensions of a learning situation” (p. 60), as it allows the researcher to experience the situation with the whole body. They suggested it also makes it possible for the researcher to be “where ever needed and gives the opportunity to capture the complexity of the teaching situation or to get close to the one(s) in focus” (p. 65). Using video recording in the study broadened their view of the whole classroom and captured learning events they may have missed otherwise.

The influx of digital literacies into schools has led ethnographers and other qualitative researchers to conduct studies in a variety of online and offline spaces in which children dwell (Burnett, 2015; Marsh, 2014; Valentine & Holloway, 2002) and test new methods of data collection and analysis. Lange (2014) studied children’s YouTube experiences using digital ethnography methods through observing mediated interaction with the public, participating online, posting video field notes, and studying interactions online and in person. Lange’s writing on her ethnographic methods offered useful considerations for studying digital literacies online as there were data on children’s interactions occurring in online spaces. Lange studied interactive moves through YouTube rather than examining YouTube as an artefact. She suggested interactive moves involve posting a video that communicates a message followed by others posting comments or feedback. She learned that exploring interactive moves provided much insight into how children shaped their learning opportunities and how they crafted their technological identities (p. 233). The importance of public mediation can be overlooked in classroom practices, but as Lange discovered, it was instrumental in influencing how the children

saw themselves and their acceptance of critical comments. Online feedback and comments, whether positive or negative, often helped children to improve the videos they created.

Sponsiello and Gallego-Arrufat (2016) used an ethnographic approach to study Second Life (a multiplayer, online game, secondlife.com). One aspect of their research revealed how technological problems occurred and impacted educational opportunities. The authors suggested that teachers who want to undertake activities in online worlds should first have a thorough understanding of the online environment and program as the technical problems can subjugate intended literacy events and practices. Sponsiello and Gallego-Arrufat observed through their research that appropriate use of available tools and innovative teaching strategies can improve educational experiences in online worlds. They write, “the attention of the teacher in facilitating interaction in-world is an essential feature for the success of the educational experience, as it is nourished by the interaction between the participants” (p. 295). Thus, I believe it is important for me as an ethnographic researcher to become familiar with the tools, games, devices, and activities the students are using and engage in them as a participant would. This impacted my understanding of the importance of being a participant-observer throughout my own data collection.

Another example of data collection using ethnography to study children at school is Hohti’s (2016) narrative ethnography. Hohti used the children’s writing in her analysis of what was happening in the classroom. The children participated in open-ended writing using a laptop to share their own observations about classroom life. The researcher then used the children’s ‘small stories’ (Bamberg & Georgapoulou, 2008 as cited in Hohti, 2016) to talk about the everyday classroom activities and interactions. Hohti’s work is distinctive as she called upon the students to be ethnographers and to describe their experiences, much like ethnographers would

write field notes. Using the children's writing enlightened her understanding of the children's perspectives of their everyday lives in the classroom and helped her to see the meanings in what they engaged in at school. She asserted that research should start from listening to what children have to say about their classroom events and "the things and doings" that matter to them (p. 88).

Much can be learned from other ethnographers' use of both traditional and new data collection and analysis techniques and methods. Because of recent shifts to employing new tools, it has been useful to consult other empirical studies that have shared the benefits and challenges of not only studying new literacies but also using new literacies to study children.

The next chapter explores the qualitative research design and methods used in this study and outlines the context as well as the participants. The specific research methodology, ethnography, and data collection methods are discussed as well as how transliteracy contributed to both the data collection focus of the study and the methods used to collect and analyze data.

Chapter 3: Research Design, Methodology, and Methods

Methodology: Ethnography

This study used ethnography as a methodology to study the transliteracy practices of grade three students in one classroom. Ethnography provides an in-depth exploration of a bounded system based on extensive data collection through a focus on the practices and activities specific to groups of people (Creswell, 2011). Ethnographic research is well aligned with my inquiry interests and experiences and was appropriate for the data I sought in my study. My previous experience with ethnography included completing a graduate research methods course on ethnography that involved a mini ethnographic data collection component, co-writing an article about experiences of becoming ethnographers, and using ethnography as a methodology for my Master of Education thesis research on family literacy events and practices in a home with a child with a learning disability.

I also drew from much educational ethnographic fieldwork in situating my understanding of literacy (e.g., Barton & Hamilton, 1998; Gee, 1996; Heath, 1983; Taylor, 1983) Ethnographic fieldwork, according to Spradely (1979), “involves disciplined study of what the world is like to the people who have learned to see, hear, speak, think, and act in ways that are different” (p. 3), and it is not about studying people, he claims, but is about learning from people. Given its in-depth exploratory nature, ethnography is a suitable methodology to meet the purposes of this study, that is, to explore how multiliteracies contribute to transliteracy practices in children’s construction of meaning. Ethnographic data collection methods allowed me to directly observe classroom activities and dynamics through creating a social relationship with the participants over an extended period. Additionally, ethnography has enabled me to examine transliteracy and

constructing meaning through examining students in various contexts at various times in their literate lives at school.

Heath (1982) asserted that the task of the ethnographer is to “describe the culture of the group being studied, and to identify specific cultural patterns and structural regularities within the processes of both continuity and change” (p. 35). In her chapter called, *Ethnography in Education*, Heath furthermore described three principles of ethnographic operation:

1. Leave aside ethnocentrism and maintain an open acceptance of the behaviours of all members of the group being studied;
2. When it is impossible to participate in and describe the full activities of the group, make a principled decision to learn and describe selected activities, settings, or groups of participants;
3. Relate data from specific pieces of the study to existing knowledge about other components of the whole of the culture or to similar pieces that have been studied in other cultures (p. 35).

Green, Skukauskaite, and Baker (2011), building on Agar’s (2006) conceptualization that ethnography is a non-linear system, have further added to Heath’s principles by suggesting that it is not the length of time that makes a study ethnographic but the logic-in-use that guides the researcher’s decisions across all phases of the study (p. 312). They suggested that “to construct an explanation of cultural processes, practices, meanings and knowledge previously unknown, the ethnographer uses abductive, recursive, and iterative processes” (p. 311). According to Green, Skukauskaite, and Baker (2011), using abductive logic involves

- (a) examining differences in expectations and understandings (points of view) between the ethnographer (outsider) and member(s) of the group being studied (insiders);

- (b) following historical and future pathways (roots and routes) to uncover insider (emic) knowledge through iterative actions and recursive logic;
- (c) constructing grounded connections among cultural processes, practices, and local knowledge among members to develop explanations of what was previously unknown to the ethnographer (p. 311).

This chapter is a description of how I attended to and carried out my research within the margins of the above-described principles of ethnographic operation by seeing ethnography as non-linear, by leaving aside ethnocentrism, by identifying the boundaries of events, and further in my analysis and literature review, by building connections among data within this study and across other studies.

Ethnography as an Act of Writing and as a Process of Inquiry

Within the literature on ethnography are two prominent perspectives: ethnography as an act of writing (e.g., Clifford & Marcus, 1986; Geertz, 1973; Hohti, 2016; van Maanen, 1988) and ethnography as a process of inquiry (Gordon, et. al, 2001; Bloome & Green, 2005). An important part of data analysis is continually writing and rewriting towards creating thick descriptions (Geertz, 1973) of “events, behavior, conversations, activities, interpretations, and explanations that, taken together, help to create a portrayal of the soul and heart of a group, community, organization, or culture” (LeCompte & Schensul, 1999, p. 17). Although this report on the findings is not necessarily on the culture of the grade three classroom, because transliteracy practices are social and cultural acts, it does point towards what it is like for the students there and what it means to be a grade three student in that particular context.

Shagrir (2017) discussed using a combination of three types of ethnographic writing allows readers of ethnographies to come to a more full understanding of analyses of data

collected—which she called “what happened behind the scenes”—to reach findings and conclusions, to find practical applications of research, and to recognize how the researcher collected and analyzed data (p. ix). The three types of written performance include:

1. Descriptive-Theoretical texts: describe ethnographic research processes;
2. Reflective-Narrative texts: describe personal narratives as a researcher about events, situations, experiences, thoughts, difficulties, reflections, impressions, and interpretations;
3. Research-Theoretical texts: include theoretical and academic texts that describe other relevant ethnographic research.

As stated early, this research employs the stance of ethnography as a process of writing but also as a process of inquiry, which is equally important. This dissertation includes all three types of writing, particularly in the literature review and description of methodology but also later in the sections on findings, discussion, and implications.

Although writing is always an important part of ethnography, as it is how ethnographers portray “being there” (Geertz, 1978), thinking of this methodology as also a process of inquiry, shifts attention away from simply the act of writing to the whole process of ethnographic inquiry using a variety of data collection methods. Ethnographic research aims to collect detailed and rich descriptions of a discrete location (Geertz, 1973) that portrays an insider’s perspective.

Researcher Stance: Participant-Observer

As an ethnographer, I needed to be always cognizant of my researcher stance. Ethnography involves being immersed within a group to examine the knowledge members need to know, practice, and understand to socially and culturally participate in social activities (Heath, 1982; Mills & Morton, 2013). Within ethnographic studies, the researcher is regarded as the

most important research tool (Powdermaker, 1966, p. 19) who collects data from a participant-observer stance. Spradely (1979) stated that participant observation involves engaging in activities appropriate to the situation as well as observing the people and activities of the situation. He also suggested that participant-observers seek to become explicitly aware of the ordinary and “approach social life with a wide-angle lens” to take in a broad spectrum of information (p. 56). As a participant-observer, I recognize that my role shifted along a continuum of participation, depending on the nature of the task and the students’ interactions. On one end of the continuum, there were situations in which it was most appropriate to step back and observe to not interrupt the natural flow of interactions in the everyday life of the classroom. Alternatively, there were also times in which it was appropriate to engage in the activities in the classroom to understand what it is like to be an insider in the classroom through full participation. Participant observation is about learning through exposure to and involvement in everyday activities and routines in natural research settings (LeCompte & Schensul, 1999, p. 91). As I spent more time in the classroom, I was able to participate more in the activities. Sometimes, my participation opened doors for conversations, and at other times, I participated to build rapport with a student or to be in close proximity to what they were doing. Participant-observation was very important to this study, as it helped me to understand better how the students engaged with activities, but it also greatly aided my movement to seeing what was going on from the perspective of an insider. Additionally, I believe it takes time and effort to develop rapport with young children such that they feel comfortable talking about their learning experiences in a genuine way. I wanted to commit the beginning of my study to building a relationship with the students, thus, it was important that I be there and be invited into their conversations around literacy and learning over a longer period of time.

Becoming an Insider

In an ethnographic tradition, I desired to understand and present a sociocultural phenomenon from the perspectives of the participants or insiders. I sought to uncover the locally constructed and shared meanings children construct through engaging in multiliteracies and transliterate practices. I immersed myself in the everyday school lives of the children as an ‘insider’ to understand what the children do and why by participating in their routines and completing activities with them. LeCompte and Schensul (1999) wrote, “ethnography assumes that we must first discover what people actually do and the reasons they give for doing it before we can assign meaning to their actions, beliefs, and interpretations” (p. 1). As a researcher in multiliteracies, transliteracy and digital literacy, I aimed to bring the best of myself every day to my studies and work. Creswell (2011) suggested researchers can position themselves in their research by talking about themselves, sharing their experiences, and mentioning how their interpretations shape their discussions about the site or group. To position myself, in addition to being a graduate student, I am an adult educator, mother, Canadian, and previously, an elementary school teacher. Sharing this may help readers see how I have come to understand and value educational research, as well as the variety of fields and lenses from which I view literacy and learning. Some thinking and elements of the self that I originally brought to this study have changed as a result of the research process and discoveries. While these differences resulted from diligent efforts in the exploration of the topic and learning, it is important to note this researcher reflexivity does affect the research process and findings. By acknowledging this, I identify that I am conscious of how my role as a researcher and as a person impacts the design, implementation, analysis and meanings built from findings.

In my research, it is important to define what I mean as an insider, as my objective was not to be “one of the students,” nor was it to be seen as a teacher, or classroom helper. Because there are often very clearly defined roles of adults and children in schools, I needed to establish a new place where I could describe and create that role with the students through my interactions. I wanted the students to be able to trust me, to speak candidly with me, and to invite me to see and participate in what they were doing as they might with an insider. For this to happen, they needed to know that I was not assessing them in any way, nor was I there to be a teacher. I positioned myself as an interested observer, an extra pair of hands in the classroom, and as a visitor and caring adult.

The data collection period of my study adopted the perspective of ethnography as a process of inquiry, that is, “ethnography as a way (or more accurately, as a set of ways) of exploring, knowing, and acting in and on the world” (Bloome & Green, 2005, p. 181). To be able to see into the school life of the students I was studying, I needed to do more than just observe; I needed to be among them, see what they saw, hear what they heard, and talk with them about what they were thinking. They needed to see me differently than a teacher because I wanted them to be honest and not just tell me what they thought I wanted them to say. Rapport building was important in helping them to see me as a trusted adult.

Right from my first visit, I was warmly welcomed by the school, teachers, and the students. The teachers provided me with an opportunity to explain my study and presence in the school. When I offered an opportunity for the students to ask me questions, they asked about whether I was a student teacher and how my role may be similar to or different from that of a preservice teacher. This showed me that they had experience with students from the local universities being in their classrooms as student teachers and, thus, were keen to help someone

who was learning as they do. Our conversation about my role as a researcher and what I might do while I was in their classroom, as well as their experiences they were drawing upon from having student teachers, teaching assistants, and other paraprofessionals in their classrooms, contributed to their quick acceptance of my presence. Throughout the year, especially within the first few months, occasionally students would ask me clarifying questions about what I do at the university when I was not with them. Additionally, I told them that I also had elementary-aged children, with one of them in grade three, like them, and in addition to enjoying hearing occasional stories about them, I believe that it contributed to developing their trust. There were moments that students came to me for nurturing and care, such as asking for help with a Band-Aid or solving problems with friends. By the end of the first month of my data collection, many students in the class would run to meet me with hugs and high fives when I arrived and inquire about when I would return as I left.

As I reflect upon what contributes to becoming an insider in a classroom of elementary-aged students, I realize that many factors are at play. Establishing my role as a researcher took some time. I needed to describe my research project and explain some of my activities, but more importantly, I needed to gently ease into conversations with the students and recognize when I might have been making students feel uncomfortable, even if it was just watching over their shoulder. For example, early in my data collection, I spent time quietly walking behind their chairs and just looking at what they were doing. Some students would shift a bit in their chairs or move their bodies to cover their work. It was in those moments that I would gently smile and wander away. Some students were much quicker at sharing with me than others, and there were some that did not open up to conversation until much later into my research. It really helped the more reluctant students to see other students showing me their work or talking with them.

Perhaps it showed them that I was safe and not evaluating them but more asking about the processes they used to complete their tasks and the thinking that accompanied their learning. The two classroom teachers were friendly with me, always welcomed me in front of the class when I arrived and even gave hugs at times. They asked me questions throughout their teaching and involved me in class discussions. This also showed the students that my presence was welcome and that I had things to contribute as well.

One student, Clarinda, was working through some formal diagnoses at school and had support from teaching assistants. She also was a part of the Leveled Literacy Intervention (LLI) pull out program at the school, and regularly visited the sensory room. She was very reserved with me for the first six months of data collection, in the sense that she rarely approached me, but did respond when I asked her questions. Upon resuming classes after spring break, she really opened up to me. When I walked into the classroom door, she marched right up to me, looked me straight in the eyes (which she almost never did and was typical of what was suspected of someone who might be on the Autism spectrum) and said, “I bet you never knew that I have two different coloured eyes.” She greatly surprised me, and, in fact, I did not know that her eyes were different colours because she previously averted them and avoided eye contact. It was at that moment that our relationship as researcher and participant changed, and from then on, I learned much more about her.

The following sections outline the research site. Pseudonyms are used throughout this dissertation in place of the school name, location, and participants (including all adults and children).

School Context - Eagle Peak Elementary School

Human behaviour and the way people construct and make sense of their lives is variable and locally specific (LeCompte & Schensul, 1999); hence, it is important to regard my data collection within its particular context. For this research, I sought a typical, western Canadian classroom; one that was culturally, linguistically, academically, and socially diverse. Based on my experiences as a classroom teacher, my current involvement with elementary schools, my interest in empirical research, my understanding of government-mandated initiatives such as inclusive education, and my knowledge gained from professional conversations about school, I assume a typical classroom to specifically include multicultural, multilingual, and multigender students, students with diverse learning needs and interests, access to the internet and various devices (for example computers, laptops, iPads/tablets, and/or SMART Boards), access to some type of library within the school or close by, and use of electronic communication such as email or school websites. In addition to what might be typically available in a classroom, I sought to find a classroom that regularly draws on multimodal resources and that frequently uses digital technology for teaching and learning whereby students have access to a variety of digital and technological devices. In this study, preference was given to a classroom that is representative of the multilingual and multicultural nature of many Canadian classrooms and one that relies on multiliteracies. In addition to the classroom itself, the students were observed in other spaces in the school, such as in the gym, library, music room, lunchroom, hallways, playground, and when applicable, on field trips.

School Recruitment

The school was recruited through a “friend of a friend” second-order network contact (Milroy, 2013). I began by asking colleagues if they knew of elementary teachers who used

technology in their classrooms on a regular basis. I was connected with a curriculum coordinator, Mrs. L., at a local elementary school. Through email, Mrs. L. described that she knew a “fabulous teacher” who is “adept at using a variety of technology with her students” (personal correspondence, Oct. 2017) and then invited me to the school to meet them both. During our initial visit, I learned about the school and some of the programs offered there, and for the first time met Denise Carpenter, the main classroom teacher. I then arranged a visit to the classroom and followed up with sharing my consent forms for the teachers, principal, and families. I could see from my initial observations that this classroom would offer a variety of opportunities throughout the day to observe the multiliteracy events and practices that I was seeking. Mrs. Carpenter offered to send the information letter and consent forms home with the students and track which were returned and signed. She used a printed paper list with students’ names in alphabetical order by first name with checkboxes. She attached the list to the returning forms. She used this same type of list to track many activities in the classroom, such as tracking field trip forms or turn-taking in the classroom. She also offered a classroom incentive that she uses when there are other forms that need to be returned to school: two class dollars when it is returned. The incentive was in no way connected to whether consent was given, simply whether or not the form was returned. Her class money incentive program is further outlined in Chapter 4.

In addition to meeting with the curriculum coordinator and Mrs. Carpenter, I held a brief meeting with the principal, Mrs. B, to discuss my study and to ask her consent. I sensed she also interacted regularly with the students. I also met with the other teacher, Mila Rayne, who shared the grade three teaching responsibilities with Mrs. Carpenter for science and social studies. It was not imperative that I observe while she was in the classroom, as I could have worked directly with Denise during literacy times, but Mila openly welcomed my research and promptly

gave consent as well. I did not feel that I needed to interview or seek other research sites, as I had found a group of students and teachers that fit very well with my data collection interests and who were willing to support my research. Of the 25 students in the classroom, I received consent from 24 of them. The teacher explained that she has a lot of difficulty receiving forms back from the one student who did not return his form, and over the course of the study, we sent forms home multiple times. Any information or interactions with the student were not recorded throughout data collection or were removed, and are not reflected in the study, apart from the recognition that the student was one of the 25 in the classroom.

Research Site

The research site, Eagle Peak Elementary, was an urban public elementary school in a large city in western Canada. The city has a large public-school board with over 98,000 students, a Catholic school board with around 42,600 students, and around 30 private schools. According to the local municipal census from 2012, the school neighbourhood has around 2,922 local residents, but the school board, within which Eagle Peak was housed, has an option for school of choice, meaning if there is room in a school, students may attend any of the schools in the district even outside of their local neighbourhood.

Figure 3.0

Classroom Layout



Participants and Focal Student Recruitment

The participants in this study included the 25 students within the class and the two teachers that taught them their core subjects. The teachers were assigned to teach different discipline areas and generally were not in the room at the same time. The homeroom teacher, Mrs. Carpenter, taught the students language arts, math, physical education, library, and art, and the other teacher, Mrs. Rayne, taught the students social studies and science. The students generally stayed in the classroom, and the teachers came to them. The students traveled to the music room for music class, which was taught by a music specialist teacher in the school and to

the gymnasium for gym class. Occasionally, the curriculum coordinator, Mrs. L., came into the classroom to teach technology-related classes.

The students fit with my expectations for a multicultural class in a typical Canadian urban classroom. Within the group of 25 students, there was cultural and linguistic diversity. Most of the students spoke English as their first language; however, eight children could speak at least one other language. One child, an immigrant to Canada from Korea, was learning English as an additional language and spoke mainly Korean at home. To obtain parental consent for my study, I needed to accommodate her family, as they could not read English well. Using Google translate and the student herself, we wrote a letter to her parents in Korean to explain the study and to ask their consent. The mother replied with an English handwritten note and the signed form stating that she would allow her daughter to participate in the study. Seven children spoke other languages at home such as Arabic, Mandarin, Korean, and Hindi. One student left the school for one month to travel back to China for a family visit. The students in this study were the main participants; however, because the teachers also contributed to the culture of the classroom and made decisions regarding learning experiences, they were valuable in providing insight into the students' lives, learning, and motivations and, thus, I included them and their perspectives in my data collection.

After four weeks of being in the classroom, I began to consider selecting focal students to study in depth through interviewing and targeted observation. These students (Emily, Andrew, Benson, and Kwento) were selected based on my interest in their multiliteracies and transliteracy practices and through my participant observation. I chose four students who had varying experiences with technology and whom I felt would willingly participate in more regular conversations and observation. I discussed my choices with Mrs. Carpenter, and she agreed that

the four students I selected would yield interesting and diverse data. Because she knew who these focal students were, she was able to provide me with additional information from her perspective as well as offer me time and space to interview them or work directly beside them when it was appropriate. Descriptions of the focal students and the teachers are included in the beginning of Chapter Four.

Duration of Data Collection

In ethnographic research, the researcher needs to be present for an extended period to understand and answer the research questions. In planning this study, I requested to spend as many weeks as possible throughout one school year. The school board has strict timing for reviewing applications for researchers to be in school classrooms; thus, the earliest I could be in a school was the end of October. Thankfully, I was able to recruit and connect with a teacher for my study quickly, so I was able to conduct research from the last few days in October until the end of the school year, which was 35 weeks in total. Many things happen in a classroom, so I was diligent in varying my times of visits so that I might observe and interact with the students in a variety of environments, even if visits were not during designated literacy blocks of time. Throughout my data collection period, I was in the classroom throughout a part of each day of the week, at recess times (both morning and afternoon) and lunch period, as well as joined them when they went to music class or club activities. I attended an out-of-school fieldtrip to the local zoo, attended in-school fieldtrips with other classes, and attended the school Remembrance Day ceremony, Christmas concert, and Family Fun day. I observed the students in their own classroom, the gymnasium, the sensory room, the music room, the library, the art room, and outside on the playground.

Digital Technology Context

Mrs. Carpenter offered time for devices every day. Generally, all literacy centres were apps on the Chromebooks, iPads, or time with her in a guided reading group. I only observed her doing guided reading with the students that required the most support; however, she told me that she reads with the students who require the most support most often and the more proficient readers less often. While she is doing guided reading with a small group of students, the others are all using devices. Mrs. Carpenter explained that she has tried multiple methods of using literacy centres, using both off device, hands-on activities and paper-based work but over time has shifted to all centres on the Chromebook. She believed they are more engaged and quieter on the computers, and she regularly used a site called Symbaloo to better control the sites the students use during centres. Symbaloo (www.symbaloo.com) is a website that acts as a landing page for linked websites (see Figure 3.1). It has an interface that looks similar to an iPad with tiles that look like apps. Users can use the tiles to link to websites outside of Symbaloo. When a Symbaloo page, called a Webmix, is created with various linked tiles, the owner can then provide a public or private URL (Uniform Resource Locator) which is a link that will take users directly to the webmix. Symbaloo can be set as the home page on a browser. Mrs. Carpenter manages the class Symbaloo page and places links to websites that she approved for the students to use. For centre time, her linked tiles on the Symbaloo webmix included both math and literacy games, as well as book/story read aloud sites, spelling, and encyclopedia pages. Using Symbaloo allowed Mrs. Carpenter to just provide her Symbaloo URL to the students and she did not need to give individual URLs for the many sites she wanted them to use. The students were able to use Symbaloo easily as the tile format was familiar and they could rely on the images that were automatically embedded as thumbnails when links were added.

Figure 3.1

Example of Symbaloo Webmix (from <https://www.symbaloo.com/>)



On the Chromebooks, the students are required to sign in with their own username and password, open Google Chrome, then sign in again into the district site and school account page. When on this site, they could access their email, Google Drive, and other applications linked within it. For literacy centres, they were to find the Symbaloo link posted on their school account webpage by Mrs. Carpenter. For centres, the students were placed in groups and each day choose a game or activity connected to the area in which they are to focus. The teacher put the digitized chart with the student groups and centre number on the board during centres. She also had a paper copy of her rotation schedule behind her desk. The greyed-out boxes in Figure 3.2 are either the teacher's name for guided reading or are a password required to use the website. If the site requires an additional password or teacher/classroom sign in, the teacher posted it or wrote it on the board, and the students typed it in themselves.

Figure 3.2

Literacy Centre Rotation Chart

Rotation 1	Rotation 2	Rotation 3	Rotation 4	Rotation 5	Rotation 6	Rotation 7
Guided Reading	iPads	Storyline Online	SpellingCity	Mathletics	RazKids	Keyboarding
Keyboarding	Guided Reading	iPads	Storyline Online	SpellingCity	Mathletics	RazKids
RazKids	Keyboarding	Guided Reading	iPads	Storyline Online	SpellingCity	Mathletics
Mathletics	RazKids	Keyboarding	Guided Reading	iPads	Storyline Online	SpellingCity
SpellingCity	Mathletics	RazKids	Keyboarding	Guided Reading	iPads	Storyline Online
Storyline Online	SpellingCity	Mathletics	RazKids	Keyboarding	Guided Reading	iPads
iPads	Storyline Online	SpellingCity	Mathletics	RazKids	Keyboarding	Guided Reading

In addition to centre time, students also used the Chromebooks and iPads for writing, creating presentations, and doing research. The students could use the computers for spelling or looking things up when needed as long as it was not disruptive and if they asked a member of the Technology Team (which was a classroom group assigned with helping with devices) to help retrieve it. The Chromebooks were kept in a portable cart that could be plugged into the wall to charge all the Chromebooks at once. The Chromebooks themselves were plugged into smaller removable bins that house five Chromebooks that could be taken out as a set if needed. All the Chromebooks slid into a designated spot that was labeled by a number. Each child was assigned a number, and that Chromebook had his or her username saved. The saved username, like a profile, allowed students to sign in more quickly, as it then only required their individual

password to be typed. This also helped the teacher to troubleshoot problems as she knew which children were using which device. There were enough Chromebooks for each student.

The Chromebook cart was shared with another class; typically, the Chromebooks stayed in the grade three classroom for the morning and the other classroom for the afternoon. There were times in which students from other classes would come and either wheel the cart away or retrieve a bin with a few Chromebooks in it. The students typically ignored the interruptions, and often taking the cart happened in the background and did not disrupt what was happening in the class. The cart was kept quite close to the door for easy access to the door and power outlet. One of the limitations of this classroom is that there were only three plugins, and one of them was inside the coat rack and not useable.

The iPads were kept in a charging box behind the teacher's desk or sometimes at the front of the room by the Chromebook cart. There were seven iPads for the class to share, and occasionally other classes borrowed them. The students added bumper balls to the edges to prevent damage if dropped and knew that they needed to take them off if they wanted to use them for games such as Osmo games (ex. Pizza Co., Tangrams, or Words – see Figure 6.0) (www.playosmo.com) or to record videos such as broadcasts, their physical education dances, or their stop motion films.

When students needed to use the Chromebooks or iPads, the Technology Team was asked first to be available to hand them out. A description of Mrs. Carpenter's classroom teams are described in Chapter Four. Students would form a line up to the Chromebook cart, and a member of the Technology Team would ask them their Chromebook number and then hand them their device. They were instructed to carry their device as carefully as they would a baby. Returning the devices occurred in the same way. If a student was using a device when it was not

a whole class time to use them, they still needed to find a Technology Team member to retrieve it for them.

The SMART Board, document camera, and FM audio system were other technologies that were used daily and regularly. Mrs. Carpenter used Google Docs to write the daily agenda message, do shared writing and share literacy centre schedules, and view websites on a daily basis. Sometimes these documents were prepared ahead of time, and sometimes the students and the teacher wrote them together.

Both teachers regularly used the FM system as did many of the teachers in the school. The FM system consisted of a wireless headset with a microphone. The teachers were able to turn the microphone on and off from the wireless control box they attached to their belt, pants, or pocket. This allowed their voices to be projected through the speakers in the ceiling when they wanted to speak to the whole class. They often addressed the students from wherever they were in the room and did not need to return to the front of the room to be heard.

Mrs. Carpenter's desk had a desktop computer and two screens. She used the extend the desktop feature of Windows so she could slide windows from one screen to the other when she wanted students to see images on the SMART Board. She was also able to prepare what she was going to do next or could continue to use her computer without disrupting what was projecting. She also had the document camera on a small table right next to her desk. The document camera was used often by Mrs. Carpenter. The document camera projected onto the SMART Board and was where the teachers could switch the output back and forth from the computer to the camera. The teachers used the document camera to walk students through paper activities, to show how to do something on an iPad, or to demonstrate something on their personal phones. One day, a guest came into the classroom to show the students how to make a small plasticine dog to

celebrate the Chinese New Year of the dog, and he used it to walk the students through the process step by step.

In social studies and science, Mrs. Rayne used the SMART Board most often for projecting videos and images to supplement the content they were learning. She also used Google images to aid in her explanations when students asked questions. Mrs. Rayne often suggested that they look something up together when there was a question and, in doing so, modeled how to research online. She also used the document camera to teach how to complete a worksheet or how to use the textbook.

Data Collection Methods

Hammersley (2006) stated that ethnography is a first-hand study of what people do and say in a particular context. Situated in cultural anthropology, ethnography involves participant observation (Spindler, 1982; Spradley, 1979) to discover cultural and social practices and patterns within and across groups of people. Ethnography is “a situated approach to the study of everyday life” (Bloome & Green, 2005, p. 185) as it “leads us into those separate realities which others have learned and which they use to make sense out of their worlds (Spradely, 1979, p. iv). Ethnography differs from general qualitative work in that ethnography is inward-looking, aimed to uncover the tacit knowledge of the culture of the participants” (Balaraj, 2014). The tacit knowledge I was looking for involved seeing students in many learning experiences and discussing their learning to see better how they use multiliteracies in transliterate ways.

Spradley (1979) wrote, “The ethnographer sees artefacts and natural objects but goes beyond them to discover what meaning people assign to these objects” (p. 6) and, thus, I engaged in collecting data in a variety of ways to get at such meanings. It is recognized that ethnography draws from many methods of data collection, including both qualitative and quantitative

techniques (leCompte and Schensul, 1999). Ethnographic methods of data collection I used for this study included observations, interviews, field notes, audio and video recording, photographs, artefact collection, and spatial mapping. I began my data collection by spending time in the classroom observing and paying attention to what everyday life is like there. Specifically, I noted particular structures such as the rules and routines, sociocultural dynamics, relationships among the students and teachers, classroom activities, and how the classroom was spatially organized. The data collection occurred two to three times per week for eight months between the end of October until the end of June. I adjusted my observation times throughout the day and week to see students at various times, although being in the classroom during literacy times and events was an initial priority.

My participant observation was ongoing throughout the tenure of data collection. I used my observations alongside information gleaned from informal conversations and interviews to develop questions for further inquiry. Additionally, observations and field notes were necessary to help me to better understand the content and context of the students' learning and were an important resource in data analysis. In addition to the experiences students shared in their interviews, I looked for opportunities to observe and discuss other activities that brought up further questions for me. My participant observation periods were flexible if more time in the classroom was necessary to reach data saturation. Following are specific methods I used for data collection.

Kidwatching

Owocki and Goodman (2002) describe the concept of kidwatching as a technique of documenting children's development. Although the concept has been used in educational settings since the 1930s, Goodman's work in 1970s and 1980s popularized and defined the concept to

help “teachers and researchers learn to use it to structure and enhance their work” (p. xi).

Kidwatching, like ethnographic data collection methods, involves using a variety of tools, techniques, and processes to observe and interact with students. Particularly, once I identified focal students to study, I used Kidwatching techniques to understand

- the children in terms of their identities, experiences, interests, attitudes, family language and literacy practices, familial and cultural backgrounds;
- what the individual students know and can do;
- how the students’ knowledge is used by the teachers to plan curriculum and instruction and their perspective of how students are meeting curricular goals;
- whether the classroom instruction, materials, physical environment, and social environment provided a variety of ways to achieve classroom goals (in accordance with their expected development) (p. x).

It is important to note that the following methods were not used in isolation from each other but recursively and sometimes simultaneously, as a kidwatcher does, throughout data collection.

Observation

Mehan (1982), in his discussion on exploring the structure of classroom events through ethnography as a different way of looking at schooling and asking questions about educational processes, suggested that ethnography attends to questions of *how* more so than questions of *why*. He supported that education, like other cultural domains, involves interactional accomplishments: “classroom organization, curricular programs, teacher effectiveness, and other so-called objective aspects of schooling are intersubjective phenomena, constructed in interaction” (p. 64). He further stated that intelligence, teacher style, and other subjective states of individuals are displayed in interaction and can be studied through ethnographic observation

and methods alongside other more objective aspects of schooling. He asserted that it is in the interactional work of participants that ethnographers can come to understand what is judged as acceptable/unacceptable or correct/incorrect in accordance with the classroom culture by seeing both of what is *constructed* in interaction and *displayed* in interaction. Hence, observation is an important aspect of ethnographic work and was a primary data collection method used in this study.

My observation included both depth and breadth. Even though at times I may have been focusing on a focal student, I needed to observe the class, environment, and other people in the room to help understand and document what that student was doing and saying. My observation also occurred both from a distance, such as from across the room, to close up, such as sitting in a chair next to a student.

As I observed the students and teachers in the room, I noted aspects such as proximity to others or resources, body language and eye movements, student groupings and friendships, language used, spaces used, who raised their hands and who was called upon, who took charge in group work, who lingered during transitions and who volunteered to help, and other aspects such as which students could successfully work independently and who required assistance. My observations were always contextualized by the subject area, time of day, and sometimes by extraneous factors such as weather and temperature, student mood or stress, and classroom social dynamics.

Field Notes and Expanded Field Notes

Field notes were both an important tool for recording my observations and thoughts as well as useful when doing further reflection through expanded field notes on classroom activities after classroom visits and while I was not researching on-site. Occasionally I engaged in

recording my thoughts using voice recording software on my smartphone, but, generally, I typed my field notes during my time in the classroom.

Field notes were written on a regular basis while I was on-site and included specific setting details and drawings. Expanded field notes were also written from memory or video recordings following observation periods when it was either inappropriate to write notes immediately or when there was no opportunity. Field notes are an essential part of ethnography as they “provide a means for developing and working through new theoretical connections and analytic understandings” and can be seen as an interaction between the field and the researcher (Emerson, Fretz, & Shaw, 2007, p. 355) See Appendix E for a description of typical features of good field notes.

On my first few visits, I used a paper and pencil to write notes, as I wondered if using a computer might be distracting to the students. In fact, students were more bothered with the paper method than they were with me using my laptop. As I was writing on paper, one student kept glancing at me nervously, and I asked him if it was bothering him that I was taking notes. He said that he could not stop thinking about what I was writing down. I showed him but continued to get the sense that it was making him and other students uncomfortable. I discussed this with Mrs. Carpenter, and she commented that perhaps the students were not used to someone writing about them in their presence that way. From then on, I brought my laptop for notes, and the discomfort seemed to fade. At times students would come over and glance at my screen, but for the most part, they were able to ignore the computer much more than the paper. I wondered if they felt that the paper note-taking represented formal assessment. I also wondered if maybe they were more comfortable with the use of devices, as they used laptops regularly, as did their teachers. I experienced their similar comfort when I took pictures, video, and voice recordings on

my phone. Their familiarity with using devices seemed to make them more accepting of my use of them in data collection.

As part of tracking my research process, I kept records of my daily activities regarding my research, notes of methodologies used during data collection, and my participation in activities. When relevant, I recorded my decision-making procedures, new motivations or directions, and my experiences with the participants. I also kept a working document of revisions to interview or inquiry questions I made in the moment and in response to individual participant's needs, interests, and comments, as that helped me to connect with what I intended to ask and did ask. At times, some questions became irrelevant or were answered in other responses.

To protect the data, I stored it electronically and created hard copies, including copies of photographs. The digital copies were sorted using observation date folders, and then parts of field notes or transcripts were copied and pasted into new documents for analysis. Information was stored on a non-server, personal computer to which only I have access. All files were password protected when stored.

Interviews

Ethnographic interviews are about ongoing joint construction of meaning through interactional relationships (Kvale, 1996) and, thus, both formal and informal interviews and conversations took place throughout the data collection period. Questions were added or deleted depending on the situation, and the length of interviews and conversations were guided by student willingness and attentiveness. I often used their body language to determine their level of comfort in answering my questions. For example, if they turned away from me, got very quiet, or avoided eye contact, it often meant they were uncomfortable and did not want to respond.

Answers to my questions were recorded digitally using voice recording apps, and I took notes during or following the interview or conversation when appropriate. The interviews were both planned and spontaneous and often arose from an event occurring in the classroom I wanted to know more about, a need to better understand the culture and dynamics present in the class, or as a follow up to something someone has said or done. Interview questions, framed by Spradley's (1979) discussion of the ethnographic interview, are included in Appendix F.

I did not engage in any formal interviews with the students until near the end of the study. The purpose of the interviews was to collect detailed information about their interests and home use of technology, and these formal interviews only happened with two of the four focal students: Emily and Benson. I did not interview Andrew as I felt he had already provided me with sufficient information through our informal conversations. I did not interview Kwento because, in consultation with Mrs. Carpenter, I decided that a formal question and answer style interview may have caused Kwento undue stress would not likely result in authentic discussion. I felt he was more open to discussion when he was in his own space at the table and I could seek information in more subtle and informal ways throughout class time by asking the questions as they fit with the conversation. For example, I was able to ask about devices in his home when we were talking about the video games he enjoyed playing and watching. I also did not sit with the teachers for formal interviews, rather sent them questions via Google Docs. I engaged in conversation with them regularly and learned a lot about their history and pedagogical beliefs throughout those discussions and did not feel that a formal interview was required. In fact, I learned more through informal conversations than when I asked direct questions such as the ones in the Google document interview. I also recognized that they were very busy with their teaching and home commitments and that extra interviews could only occur outside of school time.

Google Docs provided an effective way to collect more specific information from the teachers when they had the time for more thoughtful reflection.

In addition to informal conversations with students, and the two formal interviews, I used the online surveys to understand the students' experiences at home and school with devices and literacy. I selected Survey Planet as this was the survey site previously used by Mrs. Carpenter in her grade three classroom last year and was the one she was using again this year. I have used Survey Planet before and found it to be easy to create questions and it offers a variety of ways to display results. Mrs. Carpenter also mentioned that she likes that it can be anonymous and that she can easily link the student created surveys to Symbaloo as part of her class assignment.

Collection of Artefacts

Pahl and Rowsell (2011) called everyday objects *artefacts* and suggested they can be critical in supporting literacy development. They believe artefacts induce storytelling and contain in them ideas about the producer or owner's literacy practices. They wrote,

In its material forms (e.g., as text instantiated within a screen, a mobile phone, a colored notebook, within a rucksack or inside a decorated diary), literacy has material qualities. If we pay attention to lists, postcards, shop signs, graffiti, text messages, tattoos, Facebook updates, jottings, and scrawls that are found in the everyday, we focus on both the local and the global, the situated and the ephemeral. Writing is inscribed in all of these objects, and many texts such as books are also "thing-like" in their status. They can be understood materially; that is, a piece of writing that is sewn can be understood in relation to a tradition of textiles in the home. We bring together an interest in objects and their stories with a recognition that literacy is material in itself. (p. 133)

This statement supports the idea that multiliteracy artefacts are meaningful. Thus, I collected some examples of multiliteracies by photographing or photocopying students' work. I always asked the students before taking a photo of their work and most of the time they verbally agreed. If I wanted a photocopy, mostly because it would be clearer than from the camera on my smartphone, I asked the student first and then Mrs. Carpenter copied it in the office when she had time. Artefacts included both digital and print-based stories written by the children, pictures and representations created by the children, photographs and videos, schoolwork, online school websites, or physical items found around the classroom (such as small notebooks or school agendas). I am familiar with methods of capturing screenshots or using photographs of screens to capture digitally created literacy artefacts, and I have used sharing program such as Google Drive for students to virtually share documents and artefacts. The teacher and students permitted me to view students' digital presentations in Google Slides, and some students gave me verbal permission to make and keep a digital copy for my research.

I discovered something about the nature of shared documents such as Google Docs that impacted my research but also holds implications for classroom use: between the time the documents were shared with me and my research writing, some of the documents either changed, were deleted, or my access was revoked. Collaborative shared documents are much less permanent than I initially recognized. I often will digitize paper items, like special drawings from my children or a note I want to keep because, to me, a digital file is long-lasting or at least easier to keep track of than a piece of paper; however, a shared document can quickly and easily disappear, especially when it is controlled, or owned, by someone else. Unless I make my own copy of a file, or even content available on the internet, I do not get to control the length of time for which I have access. This can make shared or publicly available digital documents or files

seem non-permanent. This impacted me at one point when I was looking in my shared folder for a presentation shared with me by Mrs. Carpenter, and she had removed access. It was easily resolved, and I asked permission to then make my own copy, but it did make me aware of the potentially fleeting nature of digital artefacts, especially those controlled by others.

Audio and Video Recording

I often digitally recorded conversations, interviews, and natural events occurring in the classroom. I also took videos of students interacting with each other and doing group work. Digital photographs were used to record events and practices of literacy both on and off devices. These audio and video recordings, or texts, gave me an opportunity to review classroom events multiple times after they occurred outside of the data collection period and to create transcription notes of interviews and conversations for analysis. Power and Hubbard (2003) wrote that humans are good at selectively zeroing in on conversations in noisy environments and screening out background inference. This helped me to focus on what I wanted to hear; however, it also may have caused me to miss out on other information in the background. A video recording that can be viewed multiple times helps to focus attention on different aspects of a recorded experience each time I view it.

Ethical Considerations

Behaving in an ethical manner and following ethical procedures was important to me at all stages of this research study. My awareness of working with young children in a school setting greatly impacted many facets of this study and became an aspect to which I was reflexive throughout this work. In addition to completing an ethics application to my university research ethics board, I also needed to apply to the local school board to conduct research. This application, called the Cooperative Activities Program (CAP), involved two levels of approval at

both the university and school board levels. For all ethics applications, I needed to describe how I would adhere to ethical guidelines and also explain how and why this research is important and relevant to my participants.

Before beginning any research, including finding participants, I completed and received ethics approval for working with human participants and for researching within my selected school board. This research study brought value to the local school board as it supported the district's focus on literacy growth while providing insight into students' literacy practices in an elementary classroom. The theoretical foundations upon which this study is based were similar to the theoretical framing of the school district in that the board publicly described learning as meaning-making and supported the use of technology to pedagogy and learning. This research study was a low-risk study for the participants. Apart from the interruption of school activities to engage in interviews or short conversations, my presence generally did not disrupt their day-to-day activities.

Prior to any data collection, I met with the administration in the school as well as Mrs. Carpenter and explained my study and procedures for conducting research in an ethical manner. I provided the participants with both the information letter and the consent forms to read and review. The forms and letters were a part of my effort to provide free and informed consent.

A very important component of my ethical considerations was protecting the identities of my participants when I recorded data and as I share my research results. The procedures I followed throughout the research were directed by the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2) guidelines on Privacy and Confidentiality as well as the provincial Freedom of Information and Protection of Privacy Act (FOIP Act). Procedures included assigning each student a pseudonym and using those names as I described

my research with others outside of the school, such as my graduate supervisor. I also did not use students' names in my notes and most often just used the students' initials. Despite not recording names, I do believe it is important to contextualize the study by describing the students' ages, grade, and genders, and so in my descriptions, readers are generally aware of the gender of the student and that they are all in grade three. I did not share any identifying information about the school or district, but I did note general demographic details about the school, such as its urban location, student population, and general socioeconomic area. In terms of dissemination of results from the study in this paper and any subsequent ones, no personal information regarding the identity of the children, their families, the name or specific location of the school is revealed.

Throughout my data collection, I carried out member checking practices with participants by sharing with them my interpretations of their experiences or words as well as checking their stories and my interpretations against others' experiences when later reviewing my field notes and audio recordings. Member checking can be difficult, but not impossible, with young students and can be particularly important in situations where the adult's interpretation of a child's experience is different than the child's interpretation. I often asked for clarification in the moment to see if I understood what the student was saying by either repeating back what they said or by asking a clarifying question. I also asked the teachers to support me in member checking as they both knew the students well and could share insight beyond what I could glean from my observations. I also participated in data triangulation by using two or more methods to check data against other sources of information during data collection and analysis. Denzin and Lincoln (1994) suggested that triangulation is not a tool or strategy of validation but is an alternative to validation as it adds rigor, breadth, and depth to the data. It is not a check of "truth" but a way to see ideas represented in other contexts and from others' perspectives. This often

involved reviewing audio files, photographs, field notes, and teachers' perspectives alongside each other to see if they shared similar perspectives. For example, when I was working to understand the students' stop motion videos they created as group projects, I needed to review all the parts I had collected to get a full picture of how transliteracy practices contributed to students' completion of the tasks and construction of meaning. Viewing only one piece of data, such as a photograph, was not enough evidence to illustrate what contributed to their learning. A photo is only one snapshot of one moment in time. I needed to view many photos over the course of the project. The photos alone were still not enough because they did not give insight into the students' thinking and decision making. I could see collaboration happening in the photos but I wanted to know more about what provoked division of roles or tasks and why the students chose some resources over others. Learning about the parameters of the activity from the teacher and the students helped as did listening to their recorded conversations as they worked. My field notes also yielded lists of resources they accessed as well as some responses to questions I asked students as I observed them when I did not have a recording device on. I also looked across the different small groups each working on their projects to understand how they were carrying out the task. This process of triangulation allowed me to focus on what I was seeing, hearing, and reading and to avoid making assumptions based on only one source of information. Other examples of when I used data triangulation in data collection was through asking the same (or a similar) question of multiple students, by surveying all students and not just the focal students, and by asking for clarification of the teachers' instructions or comments or my own interpretations of what I observed.

Thematic Analysis Process

In many ways, it seemed like my data analysis started at the beginning as I planned this research study. Working with transliteracy, a conceptual idea that is still in the early stages of development, meant that I was continually thinking and reading about what it meant to research with a transliteracy lens and what it meant to open my eyes and mind to discover it. I also felt that I needed to “cast a wider net” to do so, which is one of the reasons using ethnography was an appropriate and effective methodology. Throughout data collection, I often reviewed my field notes and photographs, as it helped me to focus my attention on different areas the next time I was in the classroom or revealed further areas in which to investigate. For example, one week the students were learning about highlighting keywords on a science worksheet (see Figure 3.3), and as I watched and listened, it struck me how there are many literacy strategies that are helpful for students to learn, such as finding keywords to help read nonfiction text. This observation provoked me to think about how thinking from a transliteracy lens can change teaching focus from learning to use the features of one particular text, or medium, like a paper worksheet in a duotang, to a focus on the strategy itself of using keywords. If the focus changes to how searching for and highlighting keywords looks different when reading or viewing texts in different media, it might improve students’ use of this technique when they not only come across the need to understand keywords in different genres or subject areas but when reading in different platforms or media. It is the strategy that should be the focus, more so than the medium, and it is helpful for students to know and see what that means when they are engaging with different texts, in different times and places. Observing and thinking about this idea further provoked me to look closely at how keywords are expressed in some of the digital texts they read, and I did see it, such as computerized highlighting of online read-aloud books, but I did not

observe either teacher discuss the connection between the keyword work in science with the online read aloud digital texts (see Figure 3.4).

Figure 3.3

Example of Keyword Highlighting in Science Notebook

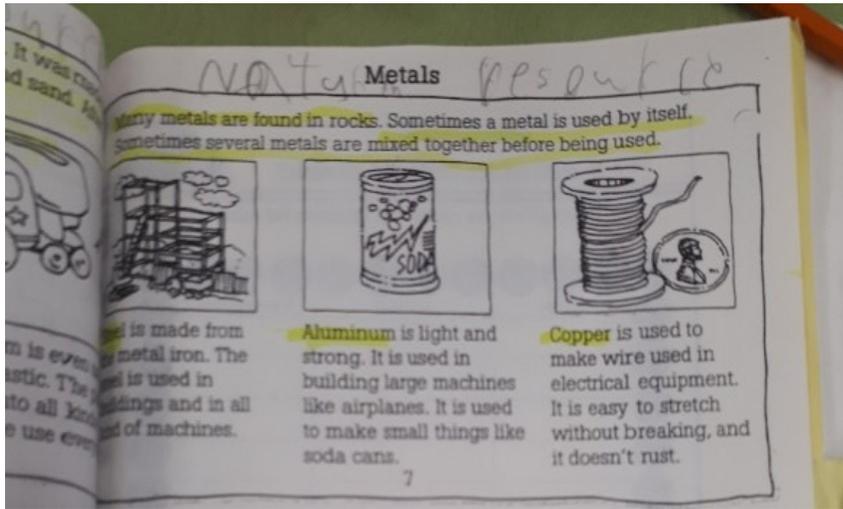


Figure 3.4

Example of A Digital Book That Highlights and Defines Key Words from Bookflix



Note: image retrieved from <https://bookflix.digital.scholastic.com/>

Atkinson (2017) suggested that ethnographic data analysis is like tracing the grain of everyday life. He wrote, "The grain is given by the naturally occurring forms of social order and

cultural forms. We need detailed and sustained *analyses* of how social life is actually enacted” (pp. 11-12) and “social actors undertake their everyday activities on the basis of socially shared conventions” (p. 14). Atkinson’s idea of granular analysis suggests that the big ideas can be discovered through exploring the mundane and minutia. Within the acts of everyday life is where we can come to think more about how and why people engage in social or shared literacy practices. Literacy practices are deeply rooted in social acts, which are simply what we do in a specific time and place, particularly in connection with others or their ideas. This notion drove my thinking about transliteracy and how I might frame it as a result of analysis. My goal in this research was never to suggest that there is a new “literacy” called transliteracy that must be defined and implemented in classrooms. What I hoped was to find many examples of transliteracy already occurring to help think through the potential of seeing literacy practices from the perspective of transliteracy. In today’s digital world, people use so many different texts, media, and platforms in their everyday life to communicate. Understanding of literacy practices that include a transliteracy view can highlight how meaning is constructed, not linearly, but in a messy way across and within resources. Transliteracy is always situated in the understanding that literacy is social and cultural and is constructed, not attained.

New social practices of literacy are seeping into people’s lives, whether they are wanted or not, and those practices and social acts within everyday life exist in children’s lives, too, and in how they learn and what they do in school. This highly social world connected by technology can point to the need to expand current understandings of literacy to see how literacy is reciprocal and can be practiced over and across resources. Constructing meaning does not happen in a single event, or single practice of literacy, but can happen over time, in the past, present, and future, and is within, across, and concurrent in many literacy experiences. I tried

many times to articulate my thoughts through an illustration or visual drawing of the motions of transliteracy but failed because the motions are different for each individual in each specific social and cultural experience at a non-static moment in time.

The grade three classroom at Eagle Peak Elementary provided many examples of constructing meaning through transliteracy practices, and part of my analysis involved writing about them and sharing a few relevant descriptions. Organizing my photographs and video and audio files to match field notes and interview transcripts was very helpful. I relied on both printouts, organized into a physical binder, as well as digital files. I found I was able to more easily use keyword searches and date searches with the digital files but being able to write on the paper copies and then physically manipulate and sort them was also a useful analysis practice.

Ethnographic data analysis often includes multiple readings and viewings of the texts alongside a researcher-developed coding system to find themes (Boyatzis, 1998). This was a long process of exploring various theories and ideas with which to consider as I analyzed the data. Analysis of emerging themes was driven by the conceptual frameworks of multiliteracies, transliteracy, and digital literacies, and by what characterizes the construction of meaning. Thinking and learning about transliteracy throughout the whole process helped guide my final analysis once all the data were collected, and my analysis and writing began. Once I spent time reading, thinking about, and writing descriptions of some of the transliteracy practices I observed, I worked with themes that were emerging.

Keeping my understanding of transliteracy in mind, and thinking more about what it could be, I analyzed the data for patterns of behaviour and discourse, the teachers' and students' use of literacies, examples of multiliteracies and transliteracy, and any and all oral, visual, or written expressions of learning and understanding. I also reviewed my list of data collection

guiding questions for further insights. This inductive analysis of identifying themes resulted in description and furthering theorizing about transliteracy practices in relation to constructing meaning. Although I feel this work will contribute to further understanding and defining what transliteracy means, it became abundantly clear that to understand best what it means to see literacy from a transliteracy perspective, juxtaposing transliteracy alongside current and highly important understandings of literacy will illuminate its potential for offering rich and engaging experiences in the classroom that reflect current social acts of constructing meaning. The big ideas of literacy that appeared most relevant to the data and themes emerging through analysis are critical transliteracy, digital transliteracy, social transliteracy, and disciplinary transliteracy. Other themes include transliteracy pedagogy and barriers to transliteracy. I have also included an emerging definition of transliteracy and my understanding of transliterate learners in an elementary context. To arrive at these themes, I engaged in reading, writing, and rewriting based on my field notes, reflections, transcripts, photographs, videos, voice files, artefacts, and online work. Multiple writings, comparison, pattern analysis, and engagement with wider literature is a continuous process (Coles & Thomson, 2016; Craft et al., 2014) and one in which I engaged throughout, and will continue to do as I continue to view literacy as transliteracy practices through future research and teaching about transliteracy.

Constructing Meaning and Analysis

Establishing whether someone has learned something is not always a straightforward process. In this research study, I sought to understand how transliteracy contributed to constructing meaning; therefore, I needed some clear guidelines about which behaviours, practices, activities, or artefacts would evidence constructing meaning and, if and how they might be connected to transliteracy practices. From a social constructivist and sociocultural

perspective, meaning is constructed within social and cultural contexts, which in this case is a culturally and gender diverse grade three classroom in a middle-class community in an urban Canadian city. In their exploration of digital and hybrid literacies in early childhood, Razfar and Yang (2010) suggested that learning, or constructing meaning, is “mediated by signs, symbols, and cultural artifacts that have been used over many generations, though each new generation transforms those tools to suit its purposes” (p. 114). They claimed that with the help of mediating adults or more competent members of the social group, “children learn to appropriately use symbolic tools to solve problems, participate in social activities, and, most important, engage in embodied meaning making” (p. 114). Furthermore, Gee (2004) suggested that meaning-making is also a transformation of identity through participation in the organized activities within a context. Thus, despite viewing meaning-making as an internalized process whereby past and present knowledge and experiences converge, it is possible to see the outcomes of constructed meaning within students’ use of cultural and symbolic tools, in how the students interact and communicate with one another and adults, within the roles and responsibilities they carry in their shared relationships, and through what they construct, create, or do in response to new ideas or information. If constructing meaning is related to engaging in transliteracy practices, then simply looking to the work they complete is not enough, because it can be assumed that many factors, such as the students’ funds of knowledge, the context, their current experiences, their proficiency and familiarity with the task, their identity, their motivation, the conversations they have with others in person or online, what they read, view, or listen to both in the past or present, how they critically view new information, and many more, all contribute to how they construct meaning. In this study, it remained important to situate the students in their social context and to attend to all their visible experiences as they engaged in new learning. I did not always know what they

brought to the learning, in terms of funds of knowledge, but I could observe their interactions with people and ideas through the use of symbolic tools, and I could hear and record their verbalized thought processes, and record the multiple literacies and tools they used in their learning. Typically, nine-year-olds are not always articulate about their learning, but when they make choices as they learn, they often know why, as a choice follows thinking and rationalizing. I found that questions including phrases such as “tell me why” or “explain a little more about” often gave me a picture into their path of meaning-making.

Researcher Reflexivity

To do ethnographic research, it is important to be reflexive. Reflexivity, as described by Cromby and Nightingale (1999), requires the researcher to be aware of his or her own contribution to the construction of meanings throughout the research. It also includes acknowledging the impossibility of remaining outside of the subject matter while conducting research. To do this, researchers need to find the ways in which their involvement with a particular study influences, acts upon, and informs the research. I recognize that my presence did impact the classroom. I also realize that my personal and professional beliefs and biases, as well as my own history, affected what I observed and reported. Researcher reflexivity and openly discussing my role in the study was important in informing my interpretation and reporting of the data. In my writing and dissemination of my thinking, I have positioned myself within the research and identified my point of view through choosing specific representations of existing research.

The Transliterate Ethnographer

Throughout research activities, I have become aware of how transliterate I am in my own research processes, especially in how I collected and analyzed the data. An ethnographer draws

from multiple sources as part of being reflexive and as part of qualitative research. Because of the multiple sources of data, it becomes necessary to find ways to see the participants in all aspects of their life. Although I was not immersed in a community as a cultural ethnographer might be and did not see the students in their home settings, I did try to see the children in different times and spaces throughout the day. Sometimes, that meant that I needed to use different tools to record my observations, my thoughts, and my field notes. I relied heavily on my smartphone in my data collection. It became a place where I could store my observations, but because of the multiple ways of collecting information, I was able to use several different methods to collect data, such as photographing students' work in the classroom. This allowed me to be less interruptive and disruptive, as they could continue their work without needing to physically hand me their paper. I also think because many of the students were familiar with being photographed or comfortable around smartphone cameras, they did not worry much or were bothered by having a camera taking pictures of their work. I think some students would have been more reluctant to share their work with me if I needed to take it away from them and photocopy it. The photograph was quick, familiar to the students, and allowed me to take many samples because it was so easy. I also relied heavily on the voice recorder app on my smartphone. I was able to quickly turn it on to capture conversations in the moment. Sometimes we were in spaces where going to get a paper and pencil or finding a place to start writing would have either disrupted the conversation or have been too late once I had retrieved those record-keeping materials. Being able to quickly press *record* without interrupting the conversation that was occurring made it very simple to gather a number of voice files. Sometimes, I used video when I was recording actions so that I could see what students were doing as they used a computer. I thought that a screen recording program might make it easier, but just taking a video

of the student working on the computer was much more efficient and again less disruptive, meaning I did not need to preload a screen recorder onto each Chromebook. It also allowed me the spontaneity of being able to record what I was seeing and not having to do that preparatory work. With my smartphone, I was able to take pictures of screens such as the SMART Board or images projected on the SMART Board from the document camera. I was able to take snapshots of things the teacher was showing me on her computer. I was also able to take pictures of students' work, maintaining a reference to the date that the information or that photograph was taken so that I could connect it to my other my field notes for the day.

In my analysis, I also moved through multiple sources of data. I needed to use multiple sources to gain a good picture of what I was thinking about and seeing. If I relied solely on my field notes, I feel I would have missed some important parts of the data to my observations, particularly those that happened in the social experiences. Within the photographs, I was able to see expressions on the children's faces, where their eyes were looking, and what their hands were doing. Some of that information is difficult to record quickly while trying to also record information about the context and the content of the experience. The voice files used with the field notes and the photographs also gave a bigger picture of some of the trends, literacy events, and practices I observed in the classroom.

In my writing, I also relied on various transliteracies. I sometimes used voice-to-text to get my ideas down quickly. I used editing tools built into my word processor program, and I looked things up on the internet for further information or for contextual information such as neighborhood demographics or theoretical connections. I sometimes watched theorists on video, such as on YouTube. I accessed the National Council for Teacher Education (NCTE) website, I sometimes read literacy blogs or social media, and I relied on various journal articles, books and

peer-reviewed work. I also attended literacy conferences and spoke with others interested in literacy research as I thought about and wrote about the data I collected. The way I collected data, analyzed data, and wrote was very transliterate and reflective of all of the multiliteracy practices as I engaged in transliterate ways to construct my own meaning of my experiences studying transliteracy in the Grade 3 classroom. I sometimes worked in cloud programs, like Google Drive, worked on my desktop, or laptop computer, or wrote my ideas on my phone as they came to me. I also wrote notes in a notebook, printed out transcripts and field notes and physically manipulated them as I came to think about and see themes emerging in the research. I sometimes even wrote down thoughts as they came to me on scraps of paper or other things that were handy to get my ideas down quickly. All of those became my data sources; from a note on a small slip of paper to lengthy Word documents, all were relevant sources. I analyzed and synthesized all the data across different devices and sources of information, including both traditional paper-based and digital sources. There were times when I felt one or the other would be better for the moment, more appropriate, or easier, depending on the circumstances.

The next chapters focus on discussing the findings and making connections to teaching and scholarship. Chapter 4 includes descriptions of the four focal students and two teachers as well as examples of transliteracy that illustrate some processes of constructing meaning. Chapter 5 offers a view of literacy from a transliteracy perspective, and Chapter 6 discusses implications for thinking about transliteracy in school contexts.

Chapter 4: Transliteracy Findings

“Transliteracy,” suggested Megawalu (2014), is “holistic in nature and to become transliterate is to have the ability to engage in meaningful and purposeful consumption of information using past, present, and future knowledge networks and knowledge repositories” (p. 381). She also claimed that for others to learn about transliteracy, real examples must be shared. This next section begins with descriptions of the focal students and teachers, the school descriptions, and then results from a transliteracy survey anonymously completed by all the students in the class, and descriptions of routines and activities in the classroom. Following those descriptions are specific examples of transliteracy practices I observed in the classroom.

Focal Student Profiles

The following is a brief description of each of the focal students. This information was gleaned from observations as well as learned directly from student-researcher conversations and interviews. They are introduced here so that readers can come to know better the focal participants in the following descriptions of transliteracy practices in subsequent parts of this dissertation.

Andrew

Andrew stood out as a technology leader in the classroom. He showed confidence in his computer skills by often helping those around him. He was part of the technology team in the class, as was responsible for technology troubleshooting in that role. He seemed comfortable around adults and was quick to engage in conversation with me. He saw himself as a leader with many friends. He did not achieve top grades but was quite competent using technology compared to the other grade three students in the class. His knowledge of computers and helpful nature drew others to him. I would describe Andrew as a kind and caring individual who wants to do

well in school. He demonstrated his care for others by helping to move chairs for others, by smiling at people, by inviting others to join in games, and he often greeted me with a hug and a verbal greeting, such as, “I’m glad that you are back” or “It is nice to see you”. He had access to a computer at home and played on it with his parents. He also had a television and was occasionally allowed to use his parents’ smartphones.

Much of his experiences with school computer programs came from using them in grade two; for example, he learned how to create Google slideshows for a class project in grade two and still had it saved in his Google drive. When he showed me his grade two presentation, he adequately described how he added details to make it more interesting, such as changing the fonts and background. As he talked with me about why he made certain choices in this presentation, he went back to the window with his current presentation and decided to make some changes to what he was working on. His reflection on his past work was helpful to his current growth. There were a few occasions when Mrs. Carpenter asked Andrew to teach the class how to do something on her computer, which was projected on the SMART Board. To do this, he sat in her desk and used the mouse and her desktop computer to walk his classmates through an activity, usually related to the Google slides and docs, on the SMART Board.

I noticed that Andrew had some challenges with language arts and relied on technology supports for composition and reading. Early in the year, I noticed that he often wore his headphones while working on the computer. The following is our discussion about wearing headphones during literacy centres. At the time, he was doing a Mathletics activity (<https://ca.mathletics.com/>) that involved a question and answer format for math facts. Andrew was expected to select from multiple choice answers to a simple math equation.

Jacqueline: Why are you wearing headphones?

Andrew: I put them on my ears so I could listen to the question being read

Jacqueline: Do you need to listen?

Andrew: No, I just wear them just in case something unexpected is said.

Jacqueline: Does that happen often?

Andrew: If I can't read it, then I can click on the question, and it just reads it to me.

He wore his headphones most of the time he was on a Chromebook, even when he was working with a partner. He relied on the Google Read & Write toolbar and watched videos for content when he was working. He was able to access higher levels of text when it was read to him from the screen than he would have been reading on his own. This technique suggests that he drew on oral language to support his reading as the oral text helped scaffold when needed.

He also struggled with spelling, even high-frequency grade level words, and either Googled the word using his best guess or invented spelling or used the autocorrect in the Google programs to assist. He explained to me that when the word is underlined with a squiggly line that it means there is a spelling mistake. This showed me that he understood some of the built-in features or spelling monitoring available for typing using Google documents. I believe that Andrew was a student who might fall under the radar in terms of his literacy development, as, at a glance, he seemed to be getting his work done. He worked quietly and successfully participated in language-based activities online but had learned to use technology tools to help him get by. The strategies he used for reading and spelling are connected more to the digital tools built into the programs than reading strategies connected to using his language cueing systems for word identification and comprehension. The built-in digital tools did help Andrew to get the assignments completed. In my overall observations, it appeared that Andrew was a student that could benefit from transliteracy practices that also involve traditional methods of learning off the

computer where he is expected to draw upon his own knowledge instead of pressing a button to read the text when he is stuck.

Emily

Emily was a very quiet student who strived to get her work done and tended to have more girls than boys as friends. She was able to move freely among all students in the class and appeared to be liked and respected by her peers. It took me some time to notice her, as she did not draw a lot of attention to herself. What made me notice her as a potential focal student was that she often had a unique way of articulating her thinking about the topics or questions discussed in the class, and she constantly made personal connections to topics. For example, during a social studies discussion when the class was talking about life in India and viewing photographs of apartment housing there, she commented, “I would like to live on the top floor”. Her ability to regularly make text-to-self connections helped her as she constructed meaning although she did not always have the correct background knowledge. During that discussion, when they were talking about the temperature in India, she also brought up her cousin who lives in Amsterdam, in what seemed like an attempt to draw from her personal knowledge of the world and geography. In her comments, she said that the winter temperature was 40 degrees Celsius. When Mrs. Rayne disagreed with her and suggested that 40 degrees is quite hot, Emily started to argue. Mrs. Rayne was able to quickly diffuse Emily’s growing agitation by suggesting that they Google the temperature. Emily was content with that response, and the class resumed. As Emily’s transliteracy shifted, and continues to shift, to using more digital and online texts, she may benefit from improving her connections to other texts and bigger ideas about the world by looking up material on the internet. This may help her to learn to cross check what she is learning with more than just what she currently knows about a topic.

Emily demonstrated her shift to becoming more transliterate through the following example. Emily relied on using information from a variety of sources to engage in learning and representing her learning outside of school through a self-motivated project on the Olympics. The class spent a lot of time focused on researching the Olympics, and one day, Emily came to school wearing a t-shirt on which she had drawn the Olympic circles. She was proud to share it with her classmates, and it showed that she cared about, and was interested in, the topic from school. She also mentioned that she watched the Olympics at home with her family and made the shirt to represent her support. Clothing is a part of how children represent themselves, and she received a lot of positive encouragement from her teachers and classmates for this initiative. This transliterate practice was also an example of using other media to represent learning and construction of meaning.

Emily exhibited transliterate literacy practices and relied on using both analog and digital technology to construct meaning. For Emily, the computer and iPads were for playing until she had an opportunity to research an Olympic topic of her interest. She demonstrated that she recognized the potential of using the internet to learn about topics when she needed it and when there were no books available.

Kwento

The classroom teacher, Mrs. Carpenter, pointed out Kwento as a potential focal student within the first week of data collection. He was very interested in the internet, particularly YouTube, and relied on digital tools as accommodations for his learning in school. Kwento was Autistic, but was high functioning; his oral communication was similar to the other grade three students in the class. He did visit the school sensory room regularly, or when he felt he needed to, and had limited support from an educational assistant to help him with classwork. He did not

have a regular support person in the classroom, aside from his regular classroom teachers, but did have an Individualized Education Plan that included the use of technology as a learning support. Mrs. Carpenter, and the other students in the class, were aware of Kwento's academic and social needs and provided him with patience and support.

Like Andrew, Kwento relied heavily on the Google Read and Write toolbar for Google documents. He dictated a lot of his work and was becoming good at correcting errors using the built-in underlining of words for spelling and grammar mistakes. The students that sat next to him at the table did not seem distracted by him using speech-to-text and would help him if they overheard him make a mistake. He sometimes used a headset with a microphone but more often used the built-in microphone on the Chromebooks. He also used the iPad for dictation and was proficient in navigating the internet and using the pre-loaded apps. His transliterate learning drew my attention when I asked him about some drawings he had on a small piece of paper at his place at the table. He explained to me that they were weapons from a game that he knew about online called Undertale. This game is an American created downloadable role-playing game in which players' objective is the escape from an underground world. The character, who is a child, meets monsters along the way and can choose to either kill the monster, befriend it, or flee the scene. The output and longevity of play are impacted by the player's choice of action in situations. Players learn that acting in non-violent ways increases their likelihood to clear the game. Players that choose more violent responses to monsters encounter more difficult challenges as they progress, making the game much harder to play.

Kwento told me that he was "more of a watcher than a player." By that, he suggested that he watches people play the game on YouTube and does not actually play the game himself. Video walk-throughs, or tutorials, are common types of video on YouTube, and many are aimed

at children or young adults to teach them how to play specific online or computer games. A video walk-through involves the player screen recording themselves and commentating as they play a game. Kwento enjoyed watching people play and then drawing about it at school. At home, he had his own iPad that he used to watch the videos, and he had a PlayStation, television, and family computer. He said that his parents both had smartphones that he sometimes used. I wondered if there were few restrictions placed on what the children in the house were able to interact with online or watch on television, as he often talked about material that had a PG13 rating or higher. He was not able to articulate why something might not be appropriate or discuss ratings when asked about them.

Kwento often was tired and would put his head down and sleep at his table at school. Sometimes he said he was tired because he stayed up late the night before watching videos or television. When he was writing or drawing, he often connected it to something from a television show, movie, or video game. He was eager to talk about what he watched or played at home in conversation with me, the teacher, or other students.

Spelling was a big struggle for Kwento; his spelling was far below grade level and could be difficult to interpret. Although English was his first and only language, he appeared to struggle with phonological awareness and making the connections between the phonemes and graphemes in the words he tried to spell. He needed to have the spelling test given to him individually so he could have more time and attention. If that was not possible, he sat next to the teacher, and she gave him his spelling words slowly while the others worked on their tests. Beyond using spell check on a device when it was available, Kwento did not use other supports for spelling when doing paper/pencil writing. His writing and ideas were creative and interesting,

so without the support of dictation and spell check, he would be very frustrated with writing activities in the classroom.

Benson

I selected to focus on Benson, and his learning, because he showed himself to be a very flexible learner who might experience success with or without technology. He used technology well when he was asked but also sought out many traditional forms of literacy, like paper books. When he was on the computer, he preferred the centre activities that were game-oriented instead of task-oriented. He, like many of the students, spent a lot of time creating and adjusting his avatar or game character and less time on the activity itself.

Benson expressed that he preferred using a device such as a Chromebook at school because he likes to print information from the screen instead of copying it down, but observations revealed that he seemed more productive when doing paper and pencil work. I often observed him getting distracted online when he was researching and then falling behind on completing his assignments.

Benson explained in an interview that he had access to a number of electronic devices at home. He mentioned that his family of four had one tablet, two computers (one laptop, one desktop), and five iPhones. He also told me that he was given his dad's old iPod Touch and used it to listen to music or to explore Google Maps. He also explained that at home, he could watch Netflix using the Apple TV device and had a kids account that he knows how to access. When asked about restrictions to content on devices or television, Benson did not seem to think there were any restrictions placed by his parents. He mentioned that he looks for movies or television shows in the kids' setting on Netflix because of his interest in what was available more so than because of a requirement or restriction placed on him by his parents.

Benson was articulate in his descriptions of his learning processes, which helped me to understand more about how he constructed meaning among and across the devices and technologies he used to learn. In a conversation we had about researching information in school, Benson said, “Let’s say the teacher wanted us to research that and probably let us go to the library and get some books about that or something like that or let’s say she has books about that. We’d probably get to read them, and she’d probably do a little bit of internet searching and probably print a few pages for us. And eventually halfway through our unit, we would search on the Chromebooks”. In response to a question about how children learn, he commented, “Technology is one of the bigger parts, because it helps people to discover things, and they post on the internet and it lets kids see that okay that’s something that I am going to check on another website and if it’s the same that probably means it is true. And books do help a lot for getting your reading muscle up. I love reading. Sometimes, I’m just like, where is something I can read in the library that will take me a while?”

Classroom Teacher Profiles

The following are descriptions of the two teachers assigned to teaching this grade three class. Observations, field notes, informal conversations, and a formal written interview contributed to these profiles.

Denise Carpenter

Denise Carpenter has been a teacher for 28 years. She has worked in three divisions in the province, one in a southern region in a small village, a private school that transitioned to public during her tenure there, and a large public division, where she currently works. She has been at her current school for four years now and served as both a grade three teacher and a Leveled Literacy Instructor, where she worked with small groups of students school-wide on

their literacy development using the program Leveled Literacy Intervention (LLI) (Fountas & Pinnell, 2009). Her formal education included a Bachelor of Education as well as training as a Leader in Me facilitator, an LLI instructor, Friendology 101, Lindamood, and Visualizing and Verbalizing Program for Cognitive Development, Comprehension, and Thinking.

When I asked her what she likes about teaching, she started with, “I’ve always felt that my purpose in life was to be an advocate for children, so teaching was a natural choice.” She felt that there is never a dull moment teaching and that every day is different. She mentioned that she has learned to expect the unexpected. Her teaching style and flexibility showed in her actions and responses to the unexpected in the classroom, as she handled teaching with ease and genuine care. She had even developed tasks for students to teach themselves to resolve issues on their own through her creation of a troubleshooting checklist and list of independent options to try.

She was an extremely organized teacher. She made thoughtful choices about both the space and the people interacting there. She explained to me that prior to moving into that classroom, it was used as a storage room, so she was able to be involved in ordering furniture and setting up the space as a classroom. She advocated for tables that could be rearranged into different student groupings. She was the only one in the classroom with a desk, yet that space, too, was often used by the students. Her desk was where the desktop computer sat, along with the document camera (an elevated camera on a stand that displays images on the SMART Board), and where she worked with students individually. The space was open to students if they needed to retrieve items in that area, such as the materials for the class money system, to answer the phone, or to control the computer or document camera. In her desk area, she also had lists and forms hanging on a bulletin board as well as a duotang with network and other login passwords for the students.

Denise was adept at using technology and was comfortable using it in her teaching. At school, the devices she used were a desktop computer (with two screens so she could drag work to the SMART Board and still use her computer at the same time), iPads, wired landline phone, and her personal iPhone. At home, she used a personal laptop, iPad, camera, and iPhone. Her family also used smartphones, and they communicated with each other using Short Message Service (SMS)/texting.

In the classroom, Denise offered daily opportunities for the students to use individual Chromebooks as well as six iPads. Both the iPads and Chromebooks were shared with another class. She coordinated with the other teacher and set up a schedule to book the devices when they were needed. She had daily activities, such as literacy centres, in which the students used the Chromebooks, so typically, they stayed in the classroom for the morning. Two students would come to the class to retrieve the cart when it is the other class's turn. The iPads were also kept in a charging storage container and were kept with a set of bumper balls that were placed on the corners of the iPads to prevent damage if they were dropped. The students knew how to put on and remove the balls, as some activities and games require that they be removed to fit properly in required holders or cases, such as the Ozmo games.

Mrs. Carpenter engaged in thoughtful planning for her class and tried to create cross-disciplinary activities. I observed her connecting to the subjects taught by Mrs. Rayne even though she did not teach them nor was in the room when the students were learning them. She had a thorough understanding of the curricula for grade three and recognized the importance of cross-curricular connections. In responding to my question about how she makes decisions about what to teach given the number of choices in resources and tools, she responded, "I try to keep things simple and [think about] what activities/lessons will give me the biggest bang for my

buck. There is so much to cover and not enough time, so I try to cover as many outcomes as I can using cross-curricular ties.” She noted that she starts her planning with the curriculum along with the needs of the group of students she has in her classroom. She created her lessons over time and tweaked or refined them each time she did them. I did observe Denise changing plans in the moment based on the interests and needs of the students. She did not use any student textbooks in her teaching but used a variety of resources both from online and from paper teacher resource books.

Mrs. Carpenter’s professional development reflected her transliterate teaching style—she drew from both online sources as well as face to face interactions. She told me that she learns about new teaching ideas and resources through conversations with colleagues, professional literature, district and local professional development sessions, Twitter, Facebook, Pinterest, and blogs.

Around nine years ago, a SMART Board was installed in her classroom when the school district strived to put a SMART Board in every classroom. She used hers extensively at the beginning, especially when she taught kindergarten five years ago. She commented that currently she uses the SMART Board more as a projector and does not often rely on its touch capacities. In comparison, she used her document camera more often, as she said that there always seem to be issues with configuring the SMART Board and alignment, and she “basically threw in the towel.” The technical issues with configuration have evidently impacted her use of the SMART Board as a smart device. Additionally, Denise raised concerns about her recent loss of privilege to download apps onto the iPads, as the new process involves paperwork and an official request that must be made to the school district. Individual teachers can no longer download apps on their own, so now both the approval process and the need for someone to physically download

the apps have halted her ability to try new apps with the children or be able to download an appropriate app in the moment for a learning activity. She also lost access to apps she previously used and paid for, such as the Lego stop motion app, that is not approved by the board. Despite challenges and tension that she has experienced with technology, Mrs. Carpenter regularly brought experiences with different devices into her teaching and learning experiences.

Denise believed that children learn when they can take risks in an environment that is safe and where they feel they belong. She felt experience is the best life lesson, so drawing on students' background knowledge and creating shared experiences was extremely important to her. As reflected by her classroom roles and jobs, she saw her students as learning to be leaders and believed that they need to be encouraged to discover their unique gifts and talents. She expressed that children need to be allowed to explore, discover, share, and communicate about their learning with others. Denise said, "drawing on students' interests and passions help to make learning 'easy.'" Just as Denise drew upon and used many resources in her teaching and her own learning, she believed it was critical for students to use many different ways to show what they know.

Mila Rayne

Mila Rayne is the other teacher that interacted every day with the students. Her primary areas of instruction for the class were Social Studies and Science. When she was not teaching the grade threes, she also taught French as a second language to students in grades four to six. Mila has been a teacher for 10 years. She has taught a wide variety of grades, students, and subjects. She started teaching with the English Montreal school board, where she also completed all her teacher internships and then accepted a permanent position with a Quebec school board. Later, her husband was offered a job in the city where she currently resides and then worked there as an

educational assistant until she was offered a teaching position, which she has had for the last six years. When I asked her what she likes about teaching, she replied,

Every day is different. Never a dull moment. I get to meet students of all ages and build a relationship with them. I learn from them as much, and sometimes more, than I think they learn from me. I love putting my lessons together and seeing my students progress and improve with time. I love learning new ways to improve my teaching methods and what I have to offer to my kids. I love the energy in a school and knowing that in some very small way my teaching is helping a child know a little more about expressing themselves, know a little more about the world, know a little more about themselves and their environment and how their ideas matter, their actions, words and thoughts make a difference.

Mrs. Rayne started her planning for teaching with the program of studies alongside using resources provided from the school board, resources found at the library, through speaking with colleagues, using ideas gleaned from professional development sessions she attended, and through searching for lesson plans or activities on the internet. She also considered what was most important for students to learn and what they needed to know, and why, as she planned for student learning. She accessed news from the teaching district, did her own reading on the internet, attended professional development, and worked with colleagues to learn about new teaching ideas and resources.

When asked what is challenging about teaching, Mrs. Rayne replied, “Each student is so unique. Making sure my lesson and teaching methods meet all my students and their needs can be challenging. Finding time to give each student independent one-on-one help can also be challenging. Behaviours could be a challenge, but at [this school], I haven’t had any real

behaviour problems. It can also be challenging if you know one of your students needs special support, but for whatever reason, they are unable to receive it.”

At both home and school, she relied on using computers with internet access, iPads, and phones. She also used the SMART Board and the document camera at school. Mila believed that children learn when they feel safe, happy, and excited about what they are doing. She felt that modeling so that the children see and hear is an important aspect of learning but that they learn best by doing and when they have an opportunity to voice their ideas and thoughts and can experiment with the subject or lesson.

School Description

At the time of data collection, there were 331 students enrolled and 28 staff members in Eagle Peak Elementary. According to the school district data, it had a 16.5% English as a second language population and a 17.1% special needs population the year of this study. Many of the students are local students who walk or are driven to school, but some are bussed for the special education programming. The school hosts regular programming and a program for students with Autistic Spectrum disorders from grades one to six. As part of meeting needs of the students with autism, the school has a sensory room available that has a variety of sensory implements, including balls, trampolines, and foam mats. Students in either program are able to use the sensory room if needed and with supervision. The school also has a library, a gym, a music room, an art room, and a staff room with a full kitchen. There was also a room designated for the Leveled Literacy Intervention program run in the school, but the room was also used for professional development sessions, lunchtime activity programs, and was the holding place for classroom resources, such as maker space materials (Burke, 2014) and other manipulatives, for teachers to use. This room had a SMART Board as well as tables that were adjustable and could

be written on using whiteboard markers. The school offered extracurricular activities and clubs such as knitting club, chess club, 3D printing club, library leaders, school patrols, cheer club, choir, and running club, and students in grades four to six take French-as-a-second-language classes.

The interior of the school had a welcoming, child-friendly feeling. The walls were full of photos, student-created work, and bright colours. Each day as I arrived, I was met with a door buzzer at the locked main doors of the school. The buzzer system included an intercom connected to the school office. The front door was the only one available for people without keys to use during the school day, and all visitors, parents, and students arriving late were expected to use it. This security measure is common in this district, as well as most schools I have been in in this city. The school office windows overlooked the front door, and over time, the administrative assistant, who could see me through the window, would buzz me in as I approached the door, and I no longer needed to ring the bell and identify myself.

After coming in the door, as all visitors, I needed to remove or clean my footwear and then sign in at the office in the visitors' log. I also needed to sign out as I left. I discussed with the principal how to describe my visits so that others using the visitors' log did not see that I was regularly researching in that classroom. We decided that the word volunteer was enough to record my presence. Often, I arrived during morning announcements and the singing of our national anthem, O Canada. Sometimes students would read the announcements, sometimes the curriculum coordinator, and most often, the principal. One day I arrived to everyone in the office doing guided yoga over the intercom for the students.

Leaving the school office, I was greeted with posters expressing hello/welcome in many languages as well as a wall with a superhero theme that described each teacher and staff

members' "superpower." I then walked into the library, which was not a contained room, but an open space filled with child-height bookshelves, fish tanks, plants, a hands-on Lego building area, a SMART Board and computer stations for signing out books, and many different soft chairs, pillows, couches, and seats for the students. There were also a number of books in bins and boxes on the floor, bookshelves full to capacity, books on display on top of any flat space, as well as rotating or moving carts filled with books. Beyond the SMART Board and the book sign out computer, there were no electronic devices or computers for personal or school use.

The library was both literally and figuratively the hub of the school, as four hallways branched off from it to other parts of the school. Because there were many ways in and out of the library, which students and teachers referred to as the Learning Commons, it was a space that many people passed through in their daily travels through the school. Occasionally there were adults working with small groups of students or individual students at a small table or students huddled around the SMART Board using Skype to connect with classes in other geographic areas. Each class had a scheduled library time, but it seemed to be used often for many purposes beyond what looks like a typical library class or book check-in/out time.

The exterior of the school included a large field with soccer goalposts, playground equipment for climbing and sliding, a paved tarmac area with faded lines of old games spaces like four square, and a staff parking lot that was closed off from students with a single chain. The students had designated doors to use to come in and out of the school for recesses, but all the exterior doors remained locked throughout the day.

Classroom Description

The main location of this study was in one grade three classroom. There were two parts to the school: the main building and portables. The portables, which were attached to the school

through hallway, housed six classrooms and boot rooms for students to enter and leave that part of the school. From the inside of the school, the portable area seemed to be a seamless addition. The grade three classroom was in the portable section but was also near the boot room and main part of the school. It was a large space with one wall of windows with shelves underneath and an exterior door. The students had coat hooks and shelves for their belongings on another wall, and then the other two walls had bulletin boards and magnetic whiteboards. There was a SMART Board hanging in between two of the whiteboards, but not all the students were facing the direction of the boards when sitting in their chairs. The students were often called to an open space on the floor in front of the SMART Board when a teacher wanted to give them instruction, for whole-class teaching, or when she was using the boards or document camera. In my observations, I noted that Mrs. Carpenter asked the students to come sit on the floor in front of the SMART Board daily, and Mrs. Rayne only occasionally.

The classroom had tables set up in one full circle, one half circle, and one wavy line; therefore, the students sat in three large groups (see Figure 3.0). There were no individual desks apart from one near the back of the room set between two camping chairs in a designated area, called the Cozy Corner. This was an area for children to take some personal space and time if needed. There were objects there, like fidget toys and teddy bears, and comfortable camping chairs. Students were expected to use that space as they felt it was needed. Throughout my study, I occasionally saw students use the chairs, but because I used the desk for typing on my laptop while I was in the room, the desk was not used often throughout my visits.

Transliteracy Survey

As part of data collection, I created an anonymous online survey with the students using the website, surveyplanet.com. My goal was to find another way to understand what the students

know about technology, their access to devices, and their perspectives on learning. I created the questions and asked students seven multiple-choice and nine short answer questions. The questions involved their use of and access to digital devices, the differences between literacy practices at home and school, and how they view learning. The students completed the online survey as a class as the teacher read each question and possible response aloud and gave time for each student to respond individually on their own Chromebook. The teacher used the survey to model how to complete it, but I removed her responses from the results. Mrs. Carpenter only modeled how to select a response and to fill in a field and I do not believe that this modeling influenced the students' responses. All 25 students completed it and submitted responses. No identifying information about the students was collected at any time.

The students' answers reflected that they had access to multiple devices at home, and at school, they saw literacy activities, such as reading and writing, as a part of other literacy development, such as spelling. They generally thought that learning is hard but also fun, or as they wrote it, phun, which was an in-class joke in response to a chapter book (*The World According to Humphrey* by Birney) that they were reading as a class. The main character always suggested things are fun-fun-fun and there is a moment in the book where it discusses the spelling of the word. The students' survey results also suggested they look to Google to find information, but some students see books, their teacher, and friends as other sources of information. In terms of writing, 40% of students said they write on a computer, 20% said on paper, and 40% said both. Many of the students recognized that they learned to use a computer before grade three, and all feel they know how to use a computer. The students enjoyed completing the survey, and they did it while I was not in the classroom. Mrs. Carpenter said she read each question aloud as they worked through it together to ensure that the students knew

what they were responding to. The students had previous experience with creating and answering online surveys; therefore, I was not concerned that lack of experience was a factor in the results. The survey results were very useful in understanding the classroom culture and students' experience with technology. The results also helped me to reflect on what they were doing and how they were constructing meaning in the classroom as it provided some insight into some of their perspectives on technology use and it informed me of their experience with different devices. A chart outlining all the compiled data from the surveys can be found in Appendix G.

Classroom Structures

A Typical Day in Grade Three

Each day, Mrs. Carpenter posted the daily schedule using magnets on the whiteboard. Some days, she read through the daily plans, but as the year progressed, she only read it to the students when there was something different happening that day. Typically, all the days began in the same way, with agenda writing time and independent reading. After greeting each other and then hanging up outdoor clothing and backpacks on the hooks in the classroom, the students retrieved their agendas from their bags and brought them to their workspaces. Most days, Mrs. Carpenter, who was the teacher in the classroom all mornings except Thursdays, would already have the morning message projected on the screen for students to copy (see below for more description on the morning message and agenda writing). Once everyone seemed settled, Mrs. Carpenter would stop the students to talk about any announcements or details they needed to know. If there were letters that needed to go home in the agendas, Mrs. Carpenter would invite a student from the team responsible for handing items out to make sure each student received one. Then, after the students had their agendas signed by the teacher, they would return them to their backpacks and grab a book or magazine for independent reading. The books were kept in a

central location at the back of the room in a red plastic bin. Even in October, the students were familiar with the morning routine and needed only a few reminders.

Literacy centres often followed independent reading time. Although centres and the morning routine are described in greater detail in the examples below, other routines existed within the transition periods throughout the morning. For example, to begin centre time the Technology Team was asked to (or did so on their own) to go stand by the Chromebook cart (see Figure 4.0) to assist in handing out Chromebooks. They were the only students permitted to remove the Chromebooks or to put them back. The other students were asked to line up to be handed their designated device when it was their turn. While this was happening, Mrs. Carpenter moved the morning agenda message from the SMART Board and replaced it with the literacy centres chart from a Google Document. Students who were scheduled for guided reading were then invited to come to the table at the front of the classroom instead of line up for their Chromebook. Once everyone was settled, either with Mrs. Carpenter or at their own seat with their own Chromebook, the room became quite quiet as they worked on their tasks. If students were visiting a site with noise, such as music or a read-aloud, then they wore their headphones. These three activities, agendas, independent reading, and literacy centres, happened each day. Sometimes literacy centres were moved to a later part of the day, but most often they were a daily activity. On Thursdays, when Mrs. Rayne started in the classroom because Mrs. Carpenter was scheduled for Leveled Literacy Intervention, Mrs. Rayne maintained the agendas and reading routine but moved into social studies or science time directly afterwards.

Figure 4.0

Chromebook Storage Cart



The rest of the days included a shifting, although regular, schedule. Because the other subjects were not taught daily, and Mrs. Rayne had other classroom schedules to negotiate, the rest of the daily schedule looked different each day. Each day had two fifteen-minute recesses, one in the mid-morning and one mid-afternoon, and then one hour in the middle of the day to eat lunch and play outside. If the weather was cold or rainy, the students stayed inside for their recesses but had free time to play, dance, or do other activities in the classroom. Some students were invited to go to the sensory room with the students with autism. Typically, the school day ran from 8:35 am until 3:30 pm. Thursdays were a shorter day, and students were dismissed around 2:30 pm and did not have afternoon recess.

Other subjects that were taught throughout the week included social studies, science, math, physical education, health, music, art, and library time. There were also many literacy activities included on the daily schedule: read aloud (called novel), buddy reading, writing,

research, and spelling. These were not daily blocks, but some or all of these literacy activities appeared on the schedule each day. The students also occasionally had field trips, guest speakers, extra activities, or time for clubs. On Friday afternoon, Mrs. Carpenter would ask the students to run the classroom store, which meant they could use their play money earned throughout the week, or saved, to purchase items (see Figure 2.2). The store only happened once a week. Within class times, there were also flexible periods where students had some freedom to choose what to do or to catch up on outstanding work. Mrs. Carpenter called this “Ketchup” time and often drew a picture of a ketchup bottle on the board. She also used the name magnets to help the students determine what they wanted to do during this time.

There were other times during the day when the students went to the bins to grab a book, such as when they were finished their classwork. Students did not need to ask the teacher to choose a book, but there were multiple occasions in which I observed either Mrs. Carpenter or Mrs. Rayne asking students to put away their reading books because they were reading during a time designated for a different subject. Because the students did not have storage space at their tables, they needed to return the books to the bin. Overall, although the daily schedule appeared to be broken into small or shorter blocks, unless an activity or block required that the students leave the classroom to go to another class, such as music or physical education in the gymnasium, there was a lot of flexibility in how much time was spent on each subject. Mrs. Carpenter and Mrs. Rayne were good at managing their time and typically finished lessons as expected, but both allowed for the teachable moment or to pursue a research interest or question, or to learn a new skill, particularly one related to digital transliteracies. They also let activities spill into the next block of time if students were highly engaged in what they were doing or if not enough time yet had been spent on what they were doing. I observed that using a flexible

schedule contributed to the students' transliteracy as it showed a recognition that content areas, topics, or critical or digital transliteracies are not segregated acts but merge, twist, overlap, and seep into other areas in the classroom. Although Mrs. Carpenter used a short blocks model for planning her daily schedule, which is a common practice in many classrooms, her transliteracy tendencies might be better reflected in a schedule with larger blocks of time, or less rigidity that involves naming specific activities as specific times in the day. That type of open and flexible schedule might also help students to see the intersections in their learning and promote more transference of ideas and meaning-making across the school day.

Mrs. Carpenter's Class Money System

Although this was not a significant aspect of my observations in the classroom, the money system used was a part of many interactions between the students and the teachers. Mrs. Carpenter explained that she established it in September as a classroom management strategy: the students were paid play money for meeting behaviour and responsibility expectations. Different behaviours were awarded different amounts of money, with some being regular, daily activities like bringing their agendas back to school, and some being spontaneous activities, like offering to clean up a mess or to take something to the office. There were students responsible for delivering payment to the recipients, and they took that job very seriously. It also allowed students on the Money Team to go into the teacher's space to get the cash box. They knew they needed to be honest and responsible. The Money Team were also the students who set up the Friday store and who dealt with accepting payments and giving change. Money transfers could go in both directions: students earned money for expected behaviour but also might have to pay money for not following expectations. Mrs. Rayne asked for money back more often than Mrs. Carpenter, and it was often related to behaviours such as interrupting or calling out, whereas

Mrs. Carpenter often made students pay for forgetting forms or books at home or for not caring for their belongings.

Figure 4.1

Images of Classroom Store Set-Up



There was a lot of math involved in counting and purchasing both during store time and as students planned out their purchases throughout the week. Some students chose to save their money to buy something more valuable, and others made weekly purchases. The items ranged from small school supplies, trinkets, hair supplies, to larger items like books or puzzles (see Figure 4.1). Other benefits that I observed resulting from the classroom money system were that it allowed for students to take on an important responsibility, and for some, it influenced their behaviour, but also it involved children who often do not have money of their own to consider the implications of saving versus spending and what it takes to earn money to purchase something you want. This is a social benefit to using a money system at school. Learning the

names of the coins, their value, and how to do math functions using money are also a part of the grade three math curriculum, which is an academic benefit. Both teachers participated in using the money and, although Mrs. Rayne had slightly different expectations, the students adapted easily to each teacher's methods. I personally was skeptical about using a management system as it initially felt like the teacher was paying the students to behave, but once I started to think more deeply about the transliteracy involved in it, I could see that the students learned a lot more than just expected classroom behaviour.

The Leader in Me – Leadership Groups in Grade Three

Mrs. Carpenter was trained in a program called The Leader in Me, stemming from the book, "The Leader In Me – How Schools and Parents Around the World Are Inspiring Greatness, One Child at a Time," written by Stephen Covey in 2009. It is based on the seven habits of highly effective people (Covey, 1989), but the program, which is sometimes touted as a philosophy, is geared towards school contexts from elementary school to university. Mrs. Carpenter's school district paid for her training along with a few others in the school. The program includes ways to encourage students to set and carry out goals and take on leadership roles.

I saw influences of "The Leader in Me" program around the school, such as at the front of the school where there was a display of each teacher's head cut and pasted on a superhero body and then a list of their superpowers (strengths) and interests. I also observed the principal using language related to being a good leader and community member in the school in her daily announcements and saw posters around the school referring to being a good leader and superhero (be brave, protect, be kind to everyone and everything, your most important power is love, do your best, be strong, be extraordinary). The biggest impact of Mrs. Carpenter's training in The

Leader in Me program was materialized in the groups she used to organize classroom responsibilities (see Table 2). She explained to me that in September, she had a class conversation with the students about tasks and other responsibilities in the classroom to which everyone can contribute. From there, she and the students categorized the tasks into groups of activities that were similar to each other. She then asked the students to select which activities each student would like to be responsible for and then allowed them to meet as small groups and choose a name and write out their specific tasks and responsibilities on a piece of paper. Mrs. Carpenter then took a picture of each group and used their note-taking paper to type up each group's responsibilities and posted them on the bulletin board. From then on, she called the groups by their chosen names and made sure that when there was something to do, she selected the group responsible for that task. The students appeared to take their tasks and responsibilities seriously, and they corrected the teacher when she asked someone outside of the group responsible to do a task, for example, to hand out papers or answer the phone. Some groups had two members, and others had up to four and students could be in more than one group if they wanted but had to choose at least one. The groups and responsibilities changed after the winter break, and students then had an opportunity to try something new and to discuss what they felt were important tasks for their classrooms. Table 2 is a sample of some of the groups and some of their responsibilities.

Table 2

Leadership Groups in Grade Three

Group Name (created by the students)	Responsibilities (determined by the class and recorded by each small group)
Super Floor Cleaners (4 members)	Pick up the garbage from the floor at the end of the day, be responsible, put left behind items on the purple table, be a role model to others in the class
Tables (2 members)	Always keep the tables clean, use the washcloth properly, don't wash nametags, only spray the tables
Master Librarians (2 members)	Check for library books every day, scan the books in, put the books in the return bin, bring the bin back to the class, be responsible
The Technology Smarties (4 members)	Help others in the class, handle technology with care, carefully hand out Chromebooks and iPads and put them away, troubleshoot when needed, turn the SMART Board and document camera on and off when needed, change the batteries in the FM system
The Golden Phone (2 members)	Answer the phone when it rings, use your manners, speak in a clear voice, take turns, be polite and responsible, take a message when needed
The Terrific Chairs	Stack chairs up at the end of the day, count the chairs per table, get chairs when needed, be safe
Mad Money Machines (4 members)	Hand out morning money respectfully, be responsible and honest, pick money up off the floor and return it to Mrs. C's desk, make change or trade in money, set up, manage and clean up store
Super Star Gym Helpers	Take equipment out of the storage room that Mrs. C. needs, return equipment to its proper place in the storage room, return keys to Mrs. C., be a leader with equipment, take turns with the key, be responsible and trustworthy
The B.A.D. Heros	Help others when they are hurt, stay with the hurt person until they are feeling better, get a band-aid when needed, walk sick or hurt students to the office, get ice from the office, go to get help when needed.
Sun Life	Will turn the lights on when needed, will turn the lights off when needed

Within the students' descriptions of their tasks is language associated with developing culture and leadership in the classroom, which are two of three areas Covey claims his program develops (the third is academics). Phrases such as *be responsible and honest, use your manners, be helpful, or work together* focus more on interpersonal and personal attributes than on duties and tasks.

When the students determined their responsibilities, they included those interpersonal attributes as well as saw them as part of their role. In talking with Benson about the groups at the beginning of the year, he told me the groups help everyone in the classroom to have a job and to know how to treat each other. The students often referenced the bulletin board where the photos and responsibilities of the groups were posted, especially when the students had questions or debates about particular tasks in the classroom.

Mrs. Carpenter explained that she does not follow the program as intensely as it was laid out to her but that the big ideas of the program have influenced how she thinks about classroom management and interactions. She also said that she draws a lot from the URStrong program that deals with personal relationships and conflict resolution. I observed many health lessons related to the URStong program, particularly about self-regulation of emotions and how to deal with friendship fires (conflicts).

Transliteracy Examples

The following are examples of transliteracy observed in the grade three classroom that require students to draw holistically from their funds of knowledge (Moll et al., 1992). Some are larger, pedagogical examples whereby the teachers made instructional decisions that foster transliteracy, and some are episodic, in which the students naturally constructed meaning in transliterate ways through the choices they made when working on their own or in small groups.

Example 1: Daily Morning Routines: Agendas, Schedule, and Literacy Centres

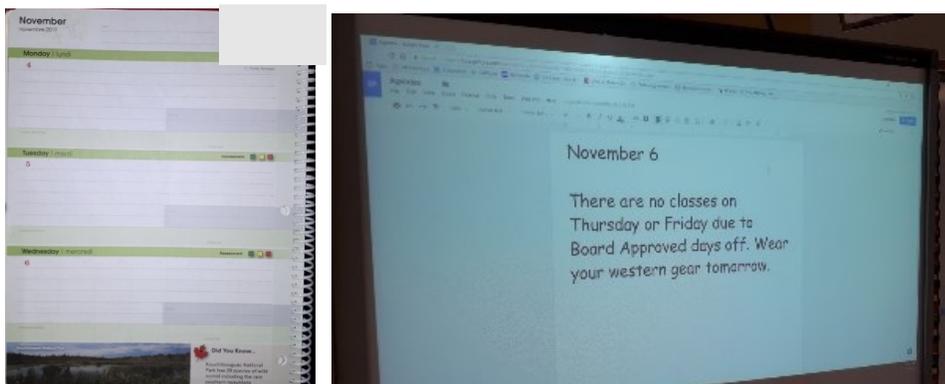
Agenda Writing

On a typical morning, I arrived to students doing various different literacy activities as part of their morning routine. Two common activities involved writing an agenda message and independent reading. Those students who were reading were those who had completed their writing and typically were reading trade books at their table on their own or with a friend. During this independent reading time, students were offered choice in what they wanted to read, but often their choices came from two bins of books that sat at the back of the room. Only paper books were permitted at this time, but there was a variety of both fiction and nonfiction texts available. Students not reading were still engaged in the daily writing activity.

An important part of the daily routine involved copying the morning message into a paper agenda provided by the school (see sample in Figure 4.2). Writing the agenda message required students to copy it from a Google document posted on the SMART Board. At times, the teacher verbally announced the message, but most often it was written down, as this was also a time for her to check in with students for any notes from home, to see if they returned any required forms or homework, or if there were any messages from the students' family that she needed to know.

Figure 4.2

Sample Agenda Page and Message Projected on the SMART Board



Each student was expected to write the daily message in their agenda to go home at the end of the day. The agenda served as a mode of communication between the students' families and the teachers. Once students wrote the message, they were then required to ask the teacher to sign the agenda, check for communication from home, and check the message was written properly. At times, a student would help the teacher check agendas by putting a sticker on those that were done and did not require anything from the teacher. Typically, a line up would happen at the teacher's desk, but it moved quickly.

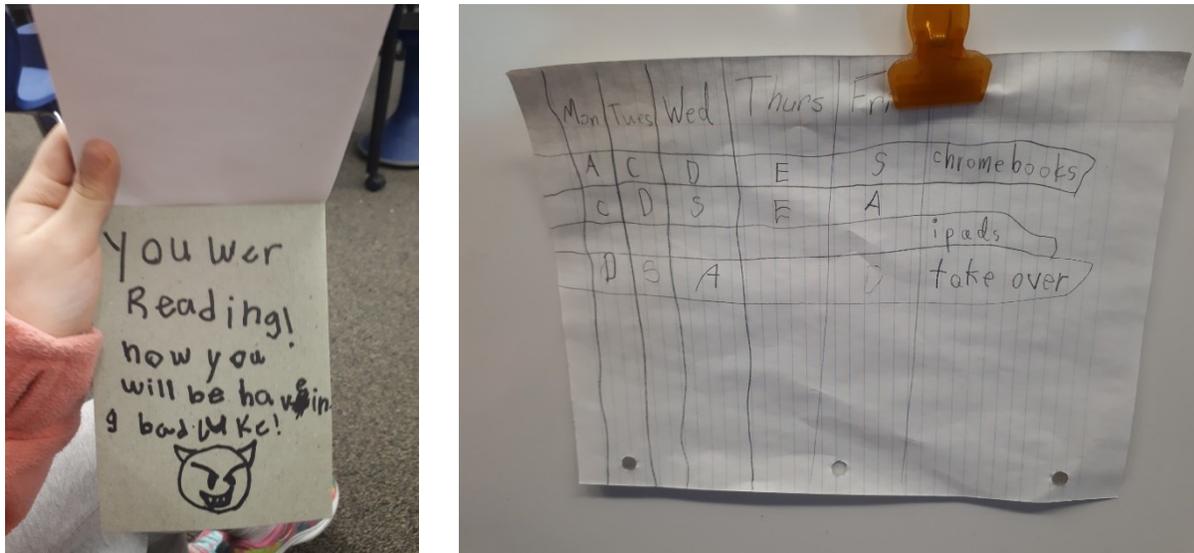
Taking less than ten minutes for most students to complete their agenda as part of their morning routine, students were expected to use multiple modes of communication and types of text concurrently, independently, and efficiently. Students lacking organizational skills or the ability to read the text, or copy it quickly, often required teacher or peer support and were usually the last ones to finish the task. Completion of their agenda was expected before independent reading time, which they could transition to on their own. Consequently, the students who may have benefited most from more independent reading time in the morning were those who spent most of their time copying the message and waiting for the teacher to read and sign their agenda. Nonetheless, the daily agenda activity itself involved using both digital technology and analog methods for reading and writing, as well as the expectation that they practice multiliteracies as they read, wrote, talked, and listened to learn about any important news that needed to be shared at home. Additionally, students practiced different modes of communication through using transliteracy to get the job done. At times, students were given paper letters to bring home in the front pocket of their agenda or wrote a message to their caregivers to check an online communication source, such as the school districts' website communication platform. As is the case with communicating important information in many settings, like workplaces or community

groups, at school, there are options in how information is shared with others outside the classroom. The students in grade three were developing an understanding of the importance of communication by daily practice using a paper agenda. Within the agenda writing, they were developing reading and writing skills but also, as a result of the information shared, further sought information through online sources like the school website, email, face to face, or phone call requests, or links to websites students could use at home. The agenda also served as an option for parents or families to send messages to the teachers, such as student appointments, in addition to the option for email or phone call communication.

There was also evidence that students transferred communicative writing in how they used handwritten text to communicate with each other, or as in Figure 4.1, with unknown others who might read their work. Early in the year, the students on the Technology Team felt the need to better organize themselves to carry out some of their responsibilities and, therefore, created a chart to indicate who would do which job on each day of the week. They then posted the chart (see Figure 4.3) on the whiteboard to communicate the roles with each other and their classmates.

Figure 4.3

Samples of Student Purposeful Writing



Translation: “You were reading! Now you will be having bad luck!”

Daily Schedule

Another daily routine involved posting and reviewing a schedule of the day’s subjects and events. Mrs. Carpenter updated the daily schedule using a printout of the typical activities, her email communication from the school, and her own digital records in her phone. It was always posted on the left side of the whiteboard at the front of the room using magnets with a subject handwritten on each one so that they could be easily rearranged for each day. At times, in a space between the magnets, the teacher would write in a special activity if there is going to be something different happening that day or an unknown plan, such as knowing that it was Mrs. Rayne’s period but not her plans for the time. For example, one day *School Assembly* was written directly on the board, and many times, Mrs. R. was written in the space instead of Social Studies or Science, which are the subjects Mrs. Rayne taught (see Figure 4.4).

Figure 4.4

Example of a Daily Schedule



After agendas and independent reading, the teacher, whether it was Mrs. Carpenter or Mrs. Rayne, welcomed the students and transitioned them to the next activity on the posted schedule. At times, the daily schedule was reviewed but, more often than not, was simply posted and referenced if necessary. The students knew that if Mrs. Rayne was in the room, it was time for science or social studies, but if Mrs. Carpenter was there, it was likely time for language arts centres. The schedule served as a reference throughout the day by both students and teachers but was controlled by Mrs. Carpenter. The left side of the board was a reserved space, and I did not see it removed for any reason throughout the whole year. It was best presented as text that could be permanently displayed but easily changed, thus making the wipe-off magnets an effective

choice. The regular use and reliance of the schedule, along with the paper agenda, suggests there is still a strong need for analog texts that can easily be displayed and shared, even if digital texts were used to create them.

Literacy Centres

The following is a description of a typical daily experience preparing for and using the Chromebooks for literacy centres. To begin the transition to daily literacy centres, Mrs. Carpenter called up the Technology Team to get started handing out Chromebooks. She had the centre list and groups prepared and displayed a rotation chart on the SMART Board once the screen was available after agendas. With the cue that it was time for literacy centres, most students quickly put away their reading and would line up by the Chromebook cart. A few students would lag behind because they had not yet finished writing their agenda message, which they knew must be completed before centers. Because there was only one screen with which to display digital text and it was now needed to display the centres rotation chart, those students not finished agenda writing were now responsible for finding another way to get the message into their agendas. Some continued to write what they knew, and others needed to find a paper copy, such as a classmate's agenda.

As Chromebooks were handed out, Mrs. Carpenter moved from her position at her desk to the horseshoe-shaped table at the front of the room. Each day she called the names of three or four of the students who would be doing guided reading with her that day. Guided reading is a small group reading activity in which students with similar reading strengths meet to read the same text with the teacher available to support their reading and provide specific feedback and skills and strategies as needed. As the guided reading group was joining Mrs. Carpenter at the table, the other students were settling into their individual center activities back at their tables on

the Chromebooks. Students were largely responsible for reading the posted rotation list, knowing which group they were in, and for retrieving their device, signing in and getting started.

Some students chose to retrieve their headphones and/or mouse from their baskets at the back of the room while others just worked on the Chromebook without accessories. There was a quiet hum of students whispering to each other about what they are seeing or doing on their computers and often the quiet conversation of Mrs. Carpenter talking with the children about the book they were reading together. The transition was smooth, the students knew what they were expected to do, and they were eager to get a chance to play some literacy and math games on the computer. Mrs. Carpenter later explained that the students were comfortable with this routine as she spent a lot of September preparing the students to work independently at centre time. This involved teaching them to read the rotation list, learn their groups, learn to sign into their Chromebooks and other sites using passwords, and to navigate Google Chrome to be able to find the list of approved websites for centre time. Because Mrs. Carpenter wanted uninterrupted time for guided reading, she put troubleshooting into the hands of the students by creating teams of students to take care of technology and device dispersal as well as posting paper copy lists of troubleshooting methods for students to try before soliciting help from someone else. She also printed off copies of all the students' passwords and kept them in an accessible duotang on the board behind her desk that students could use if needed. The team organization structure is further described in this document in Table 2, Leadership Groups in Grade Three.

The daily morning routines in the classroom both promoted transliteracy and relied on students' transliteracy knowledge and skills. Although aspects of the routines were controlled by the teacher, such as posting schedules and announcements, students needed to be able to smoothly transition from one technology to another and even to use multiple technologies at

once. There were also clear expectations and roles during this time, and because Mrs. Carpenter's role often involved more one-on-one time with students, the rest of the class needed to know how to get their morning jobs done on their own and to know what to do when things went awry or time ran out. Also, because the students were responsible for themselves or for leading as part of a team, they were learning that there was often more than one way to solve a problem or to work through a challenge. Practicing and discussing troubleshooting and other options for solving problems, having printed texts to reference, and working slowly together to learn when required, allowed the students to feel more prepared when they were working independently and putting their transliteracy to use.

Example 2: Using Google Drive and Slides (Andrew)

Early in the year, Mrs. Carpenter helped the students to reorganize their Google Drives. She asked Andrew to sign in on her desktop so his Drive would be projected on the SMART Board. She invited Andrew because she knew he had been using Drive since grade one and would offer, through talking and thinking aloud, some of his experience as he modeled his reorganization. The task was to create folders for each grade. As Andrew opened his Drive, we could see a list of documents and one folder for an ocean animal project. The following discussion of Andrew, Mrs. Carpenter, and the class illustrates how he also learned to effectively use Google Drive folders through discussing his processes and questions as organized his documents.

Mrs. Carpenter: Andrew, did you do the ocean animals in Grade 2?

Andrew: The ocean animals? Yes, we did it in Grade 2.

Mrs. Carpenter: (addressing the class) So, he can take that folder and put it in Grade 2.

Andrew: I can't put folders in other folders.

Mrs. Carpenter: Yes, you can.

Andrew: Do I want to?

Mrs. Carpenter: Yes, and then he can do the scorpion research. So whichever one... Do you want to put any of the other ones in there?

Andrew: No, I'm going to leave these now.

Mrs. Carpenter: So, if he clicks on Grade 2 now, there are all of his Grade 2 documents.

Andrew: I can keep folders separated from these, so if I click on this, I have these still. (Shows his classmates by clicking on the digital folder projected on the SMART Board.)

Mrs. Carpenter: Yes, exactly. You have a folder inside a folder.

James: You can have a folder inside a folder, inside a folder, inside a folder...

Mrs. Carpenter: Yes, sometimes. So, what do you think? Now that Andrew has all his Grade 2 items in his Grade 2 file, what do you think his next step is going to be?

The next step was to create a folder for grade three work. Having more knowledge now, Andrew walked his classmates through creating one. Allowing a student to take over the mouse and to use their real Google Drive as an example, brought forth questions from the students that may not have emerged had it been the teacher doing the talking and demonstrating. Also, because the students were in mostly in the same grade one and grade two classrooms, their Drives and experiences were like Andrew's. Mrs. Carpenter encouraged all the students to look through their Drive and at others' past work. With the students' permission, she shared a few more examples on the SMART Board and then allowed them to do some exploration on their own.

Andrew was keen to develop and share his knowledge of Google Slides with me and his classmates. He explained that he has been using Google Slides and Docs since grade one and

was able to open and share his past work saved in Google Drive with me. As we looked at his previous work, he commented on how much more he now knows since the last time he used Slides. This review of work was an excellent self-reflective practice for Andrew, as he was reminded of the scope of his abilities, the parameters of the program, and how much he has learned. For example, as he walked through his past projects with me, he commented, “Oh, I forgot you could change the colour” and then laughed a little at his colour choices from one of his grade two projects.

Being able to quickly look back at his early work allowed Andrew to see his own personal growth but also afforded an opportunity to learn the skill of sorting and organizing digital information in a commonly used cloud-based system. Transliteracy involves the ability to use diverse technologies to collaborate, communicate, and participate in many social networks, and using platforms such as Google Drive and its applications prepares for and engages students in online social collaboration.

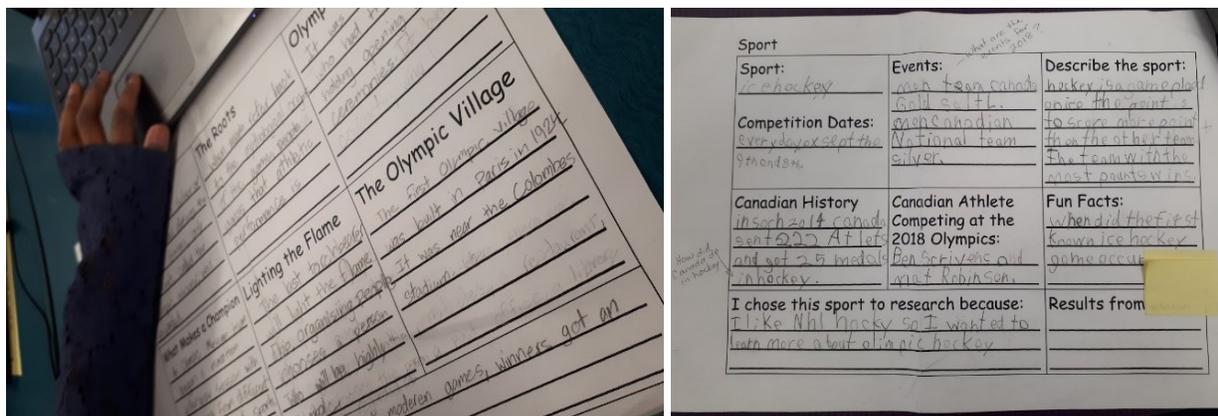
Mrs. Carpenter’s purpose for teaching the students to organize their Drives was twofold: to learn the skill of digital organization and to prepare an easy to access digital folder for their upcoming grade three work on the Olympics. The unit on the Olympics, specifically the winter Olympics occurring at the time, involved selecting a current athlete or sport, researching and following the athlete or sport online and in the media, and then reporting through the use of Google Docs or Slides. The entire process required transliteracy throughout and is often referenced in this document; however, the following is an account of how Andrew created, revised, and presented his Google Slides for this project.

Andrew decided very early on that he wanted to research ice hockey in the Olympics. It was one of his favourite sports, and he felt confident in his current knowledge of hockey prior to

his research. He participated in reading online websites about the Olympics, watching online videos, engaging in class discussions, and viewing digital news and updates. To help the students to record the information they were gathering on their individually selected topics, Mrs. Carpenter created three different graphic organizers, which she called retrieval sheets, for either an athlete, sport, or the history of the Olympics (see Figure 4.5). The graphic organizers were separate sheets printed on 11x17 inch paper. Adding an additional organizer for the history of the Olympics was an afterthought in response to a small group of students who asked if they could study how the Olympics came to be.

Figure 4.5

Examples of Graphic Organizers used by the Students for their Olympics Research



Andrew relied on the paper retrieval sheet throughout his research phase to collect and record information on his topic as well as to create his presentation. He started his presentation by creating one slide per heading on the organizer. The paper organizer appeared helpful to him, as it provided a structure and organizational system he could transfer to his slides. I am not confident Andrew had the organizational skills to sort his research data into such categories nor be able to develop an outline for presenting what he learned. The graphic organizer forced Andrew to work with both analog and digital text in a reciprocal way. He searched and read

online text but needed the organizer to help focus on the information he was seeking online and then to pull out the main ideas and record them on the paper. He then used the organizer to create a presentation of his findings in Google Slides.

If Andrew was required to use a digital organizer, as opposed to the paper copy, he would have struggled. Given his experience, along with the small size of the Chromebook screen, he may not have been able to easily switch between the internet browser screen and the digital organizer screen and then type fast enough to work within his short term memory capabilities. The paper copy allowed him to keep the online information in front of him while he handprinted his notes. I also wonder, if he had been using a digital copy of an organizer, whether he would have simply copied and pasted the text from one screen to another. In doing that, he would have missed the opportunity to construct meaning by being forced to summarize the digital text to make it fit in the box of the paper organizer. He only had room for key points and ideas and could not copy full lines of text; thus, he needed to engage in constructing meaning instead of simply copying. According to Stevens, Park, and Vaughn (2019), who reviewed studies from 1978-2016 of summarizing and main idea work in grades three through 12, research continues to support summarizing and main idea intervention as an effective practice for improving reading comprehension. Although copying and pasting text involves digital literacy skills, it does not involve higher levels of thinking and limits comprehension and meaning construction.

When he felt he had sufficient information collected on hockey, he was asked to hand in his organizer to Mrs. Carpenter. She then checked his work and, as you can see in Figure 4.5, made handwritten comments and asked questions to improve his focus on the connection to Canada and Olympic hockey. The next step involved creating a new Slides document, nesting it in his grade three Drive folder, then planning his slideshow.

Andrew began with the title slide: “ice hockey By Andrew.” Because the program automatically includes a template beginning with a title slide, this was an easy start for him - he clicked and typed where “Click to add title” was written. He was explaining his process to me as he worked and explained that following adding his title, he now needed a picture. He easily found the add image icon in the toolbar, clicked the option to search the web and typed in hockey. He found an image he liked and then added it to his slides. As I watched Andrew’s proficiency with Google Slides, it became clear that digital literacy skills were an important factor in his success getting started and finding the images he needed to enhance his work. Throughout this project, he even added short video clips (with some guidance from his teacher, me, and a Google how-to page) and created an interactive slide that asked a question with the answer revealed by clicking on a box covering it. He created the idea to ask a question and then reveal the answer using sticky notes on his paper but needed some guidance replicating it in slides. The following is my conversation with Andrew about his strategy for creating his answer reveal design.

Jacqueline: Why do you have the sticky note on your paper? (Referring to the paper graphic organizer.)

Andrew: Because it has a question. “When did the first known hockey game occur?”

Jacqueline: Is the answer underneath this? (Lifts the edge of the sticky note.)

Andrew: If you just do one, you can see it, so I did two to cover up the answer. What do you think? (see Figure 4)

Jacqueline: I think that’s pretty cool. How are you going to do that on your slides? Do you have an idea yet? If you can’t figure it out, I have an idea. That’s really cool. I like that.

Andrew: You can help me do it. I can tell you how.

Jacqueline: Okay, when you are at that stage, let me know.

He had a creative idea but needed someone with more experience using Slides to help him. I suspect, though, that if I was not there to assist, he would have tried to find support using the help feature in Google, as he had to rely on it later in the project while he was trying to figure out how to put videos into his slides. It is also relevant to note that Andrew was not working through his slides in sequential order. When he came up with the idea to ask a question with the answer hidden, he quickly switched to his Fun Facts planning but realized that he might need to come back to this slide as it required using features of Slides with which he was still unfamiliar. With his creative idea, a little support from me, and a lot more experience using textbox and image manipulation in the previous slides, Andrew successfully put his paper plan into digital form later in the slides. He was especially proud of this slide (Figure 4.6) when he shared his Ice Hockey presentation with the class on the SMART Board.

Figure 4.6

Andrew's Google Slides Presentation



Note: Teacher comments read: Check for your use of capital letters on this slide. The “hide and reveal” feature on this slide is very interesting.

Other students lacking in digital literacy knowledge and experience struggled more to get started but used their resources to get help: demonstrations from the teacher, asking or watching a peer, using Google or the help function in Slides, and free exploration. When she recognized many students had similar questions about creating their slides, Mrs. Carpenter would ask students to stop what they were doing and focus their attention on the SMART Board, where she would quickly guide them through how to add, move, or manipulate text and images or how to embed a video using a YouTube uniform resource locator (URL). She did this work as needed and in response to the current questions from the students. Alongside Mrs. Carpenter’s whole-class instruction, she gave individual support. The students also engaged in helping one another to work with Slides by giving direct support and by showing each other something they discovered on their own. The peer modeling and sharing was effective in getting the students excited about trying something new, and often someone’s new discovery spread quickly through the class.

Creating a Google Slide presentation required many transliterate capabilities. Even though the students started with a paper graphic organizer of their research, the flow of work was not sequential. As they created their slides, they used various resources (Google images, online video clips, links to websites), worked with multiple modes (paper, digital text, image, video, hyperlinks), and moved back and forth between the acts of reading online, recording information onto their paper organizer, and then creating their slides. Often, throughout the process of creating their presentations, I observed students returning to the websites from which they sourced information for clarification or for more information. Students relied on their

transliteracy by drawing upon their digital literacy skills as well as their multiliteracies knowledge to carry out this project. They were also required to use their creativity, to work collaboratively with each other and online sources, to curate and construct knowledge from multiple sources, and then structure the information into a presentation to share digitally and face-to-face.

Leu et al. (2004) suggested that in schools, the most essential new literacies to focus on are those connected to the internet. They wrote, “It becomes essential to prepare students for these new literacies because they are central to the use of information and acquisition of knowledge” (p. 1575). Although written over fifteen years ago, this belief still holds true. For students to be able to collect and share information, they must be able to know how to use the internet, even in primary school. More recent work by Leu et al. (2017) supports that although literacy is continuously changing due to social forces, “what seems certain is that Internet resources will increase, not decrease, the central role teachers play in orchestrating learning experiences for students as literacy instruction converges with Internet technologies” (p. 12).

Example 3: Remembrance Day

The whole school planned and participated in a Remembrance Day ceremony. In Canada, Remembrance Day is observed on November 11. Remembrance Day marks the signing of the peace treaty, the armistice, marking the end of World War I. It continues to be an occasion to honour the men and women who served and continue to serve in times of war and peacekeeping. Because all Alberta schools are closed on Remembrance Day, many schools will have a ceremony on the closest school day. Eagle Peak School held their ceremony on November 8 and invited family members and the local community to attend. As guests arrived, they were handed a paper program outlining the sequence of activities. Classes were assigned seating designated by

a paper sign taped to a stick in a pylon. The students, informed of the seriousness of this event, entered quietly and respectfully and were helped by older students in grade six designated to be ushers. The reason for outlining the Remembrance Day assembly as an example of transliteracy is because the multimodal nature of this experience brought both observers and participants through a transliterate construction of meaning to understand better what Remembrance Day means for Canadians.

Prior to the ceremony, each class was tasked with creating artwork or poetry to display around the gym. Each class was given a large cardboard piece for display, around three metres high by one metre wide. One of the boys from the grade three classroom was invited to be a Master of Ceremony (MC) along with a girl from another class. They were asked to prepare and practice what they would say throughout the assembly. They were guided by the music teacher but largely wrote their lines on their own. Over half of the other grade threes were in the choir and, they too spent recess time practicing the songs arranged by the music teacher. Other students in the school worked with teachers to create a slideshow, a video presentation, and appropriate Remembrance Day music to play. There were also three students assigned to running the technology who were situated behind a table with a laptop, external screen, and projector. The students were proficient in dragging the information being shared onto the external screen, which was being projected on the back wall of the gym. They used the laptop to prepare the next item to be projected on the screen, as some of it required using YouTube videos, slideshows, or documents. The student MCs began the ceremony with an acknowledgement of the Indigenous land and treaties of the province, and then the principal spoke of her own connections to Remembrance Day and of the importance of the ceremony that day.

The following (Table 3) describes how the six strands of language arts are present in the transliteracy practices carried out at the Remembrance Day ceremony. Being transliterate requires students to draw from their multiliteracies knowledge, which includes all of the six strands of language arts. In preparing the ceremony, whether intentional or not, each of the strands was evident as well as many multimodal experiences that included more than one strand at a time, making the constructing meaning powerful and emotional. There were many ways to connect with the material and presentations, but it was in learning across them all that offered the opportunity to create a deep understanding of war, peace, and honour.

Table 3

The Six Language Arts in the Remembrance Day Ceremony

Strand of LA	Example from Remembrance Day Ceremony
Reading	<ul style="list-style-type: none"> • In the slideshow, a copy of the poem, In Flanders Field, was displayed for students to read along as it was read by a small group of students. • Students in the choir had a music sheet to follow along with as they sang. • Reading the program and schedule of events. • Reading the poetry on the display boards.
Writing	<ul style="list-style-type: none"> • Text in slideshow. • Writing was used to type the program handed out to guests. • Writing poetry and adding text to artwork. • Writing lines for MCs.
Speaking	<ul style="list-style-type: none"> • The student MCs, the principal, assistant principal, and music teacher all addressed the assembly live.
Listening	<ul style="list-style-type: none"> • The audience listened to the speakers, music, and videos. • They also listened to songs and sounds specific to Remembrance Day ceremonies such as the bagpipes (Flowers of the Forest), national anthem (O Canada), and the bugle (The Last Post).
Representing	<ul style="list-style-type: none"> • Artwork from each grade posted on large 250 cm high x 120 cm wide cardboard signs. • Video played of Remembrance Day from YouTube. Video playing O Canada and showing images of Canada throughout. • Images of war and soldiers pasted into the slideshow and displayed during songs.

- Elements such as poppies included around text.
 - Showing respect through silence and still bodies.
- Viewing
- Watching videos.
 - Viewing artwork and poetry.
 - Viewing images on screen.
-

Clearly, this was a multimodal experience drawing from multiliteracies and language arts. Seeing it as transliterate comes into how each piece came together to represent an idea and how we, the audience, used the pieces together to represent a sense of what Remembrance Day is to Canadians. The music and videos made it multisensory, in that, feelings were heightened by drawing upon more than just spoken or read words. Those who prepared the ceremony moved the audience through and among different literacies and did so in ways that made sense with the flow of activities, experiences, and information they wanted to share. They needed to use their information literacy, digital literacy, and critical literacy knowledge to locate the appropriate information, select the items best suited to the audience, check the material for correctness and appropriateness, and then put it all together and present it. The modes of literacy were not isolated but used in conjunction with each other, such as the poem *In Flanders Field* being displayed as the grade six students read it aloud. Transliteracy is defined by movement across and among texts, and the audience and students experienced that in how the Remembrance Day ceremony was prepared and presented.

Example 4: Dance Unit Final Project

The following example is of transliteracy in a physical education dance unit project. It is offered as a way of acknowledging that literacy and transliteracy extend beyond the language arts classroom, and into many other school disciplines. The teacher modeled transliterate

learning alongside the students initiating their own transliterate practices to suit their needs for carrying out the project.

For a few weeks, the students had been working on a dance unit as part of their physical education. Led by the teacher, they participated in various folk and traditional dances in addition to other fun dances such as the chicken dance, bunny hop, and macarena. Often dance classes ended with free dancing in which the teacher played popular songs off her personal smartphone by connecting it to a large speaker in the gym.

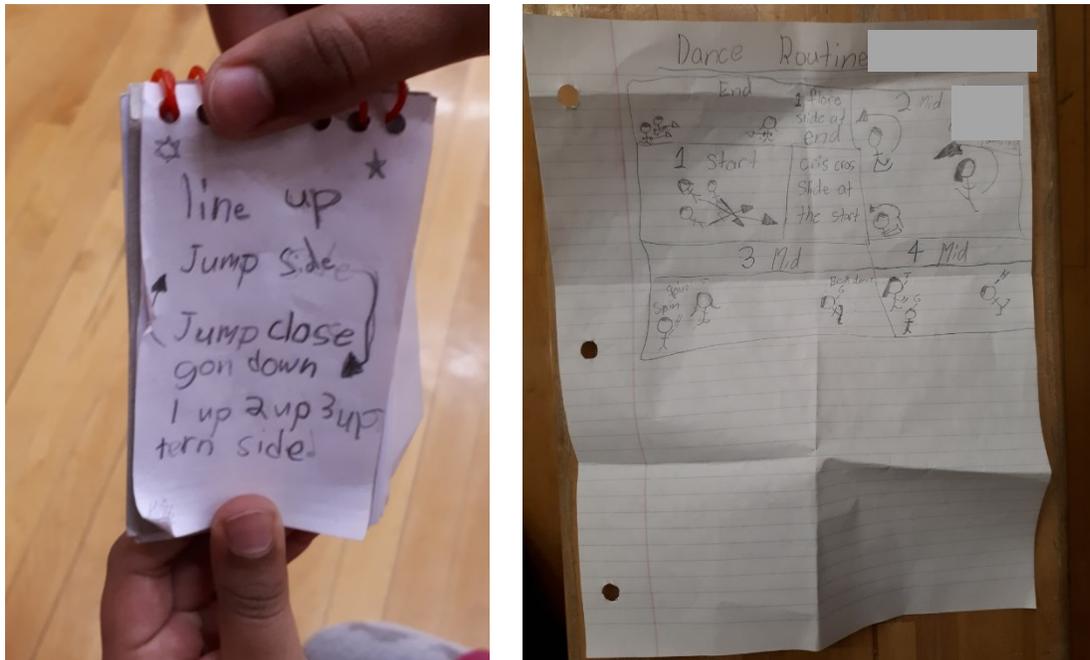
The final project for the grade three's dance unit was to create and carry out a dance routine in a small group. For this activity, the teacher allowed the students to select their own groups of four or five members. The dance project was first outlined in the classroom by Mrs. Carpenter. Using the SMART Board, she shared the criteria she had previously typed into a Google Doc. She worked with the students to modify the criteria based on their input by typing directly into the document from her desktop computer. This was a common practice in the classroom and, although most times Mrs. Carpenter did the editing, students would be asked or volunteer to do the typing. That day, Mrs. Carpenter brought over the wireless keyboard and worked near the SMART Board to make the agreed-upon changes to the dance routine criteria. Together, the students and teacher selected two songs from which they could choose for their routine by listening to a few selections from Mrs. Carpenter's phone. As part of preparing the students for this assignment, she also shared a video of previous students doing the dance routines they had completed for this assignment. Mrs. Carpenter explained to me that sharing the dance files poses a challenge with this project, as she discovered last year that she needed to find a way to send the files from the iPads they used to record them to a device that could share them on the SMART Board. Although they tried holding the iPad under the document camera, they discovered that the

quality and sound were not great, and they worried that the files might be wiped by other students in the school using the shared iPads. Since the iPads did not have the capacity to use an external drive to save files, such as on a memory stick, nor could students use a cloud system to save files since they used the Google suite, which was not supported by an Apple IOS operating system, Mrs. Carpenter deduced that the best way to save and quickly share the videos was to upload them her personal YouTube channel. From there, she could log into YouTube on her desktop and share the videos on the SMART Board. .

As the current class learned about the project, they used transliteracy to make sense of what was expected and to begin their own planning. So far, they had listened to the teacher explain it, read and modified the project criteria, listened to popular songs from the teacher's personal collection and selected two from which they could choose, and watched examples of previous students shared on YouTube. Next, with the criteria on the board and the music playing in the background, the students began their planning in the classroom. Some chose to write out the steps in a numbered way on a piece of paper, some drew their steps, much like a comic strip sequence, and others used their bodies to try out movements they wanted to include (see examples in Figure 4.7). The students were able to use the iPads to listen to the songs or listen to the music as the teacher played them from her phone or from YouTube on her computer. The students moved back and forth from their planning on paper, their actual movements, and the music.

Figure 4.7

Examples of Student Planning for Dance Routines



When the students had the opportunity to practice in the gym, they brought along their own notes and drawings of their plans. When the time came to present their routines, students were given an area to stay within and were recorded by the teacher using an app on an iPad that played the music as the students danced. Back in the classroom, students were then taught how to apply filters and introduction screens that listed their names. The students liked applying the transitions built into the app, as it made the dance video seem more professional. The teacher then posted the completed videos to her YouTube channel, and the class viewed them together on the SMART Board.

Bringing digital technology into this project enhanced the students' transliteracy and engagement, which allowed the grade threes to create a more sophisticated product. The recording and use of the app, along with YouTube, allowed it to be kept and shared beyond the time in the gym. The students also drew upon their available knowledge and resources in their

constructions of the routines. Not all students prepared in the same way or felt compelled to do this assignment like everyone else. They contributed to creating the criteria and selecting the music, but after that, they drew from their own experiences, their creativity, their personal abilities as dancers, and their preferences for literacies. Again, there was movement across literacies in how their dance came to fruition as they moved back and forth among their paper planning, physical practice, and viewing and listening to music and others' dances. They even used dance moves they saw their classmates using and adapted them. This project was transliterate; it was multimodal, required guided practice, involved many platforms for learning, and brought together digital and analog literacy experiences.

Example 5: Social Studies Activities: Transliterate Learning Through Research

Throughout the year in social studies, the students were asked to research Tunisia, Peru, Ukraine, and India to learn about specific cultural aspects such as food, housing, famous landmarks, popular sports, and other cultural activities. Some of the main goals of these units involved learning about what life is like in other countries and how the people in the communities they studied are like them. They explored people and traditions in other countries to gain an understanding of the global community and Canada's role within it (Alberta Education, 2015).

As part of the learning materials, Mrs. Rayne, the social studies teacher, provided students with a grade three textbook and printed worksheets to put into their social studies duotang. The textbook was used as a resource, as were YouTube videos, Google images, various websites, and paper maps and atlases. Mrs. Rayne began each unit by providing some general information about each country by reading selections of the textbook and asking questions that required students to draw upon their funds of knowledge. Mrs. Rayne used transliteracy to help

students construct meaning by often pulling up images in Google search to find pictorial or visual representations of what she was verbally sharing or a video of people engaging in everyday life in the country they were studying. This was an effective way of building background knowledge and often prompted further discussion or exploration on other linked websites. I frequently observed students clicking on the Google image search option when they were researching independently or viewing videos related to their search terms. They appeared to benefit from the images and videos when Mrs. Rayne used them and, thus, did it independently in their own research.

The following are examples of mini activities the students did in social studies to learn about each place and its cultural ceremonies and famous landmarks, followed by an exercise that involved searching for locations on a map and finding general demographics.

Tunisian Ceremonies Across Resources

In learning about Tunisia, students were tasked to use the internet and other available resources to identify a celebration or event. After modeling how to use the Google search bar and how to add appropriate keywords, students were offered options in how they could seek the answer to written questions about specific celebrations and to draw a picture of an event they discovered that was appealing to them (see Figure 4.8). All the students choose to use a Chromebook and closely followed Mrs. Rayne's modeling of how to find information online. The students were required to use the paper worksheet to seek specific information online and then use the information to fill out the sheet. There was reciprocity in how the analog and digital texts were used to search for details and then record them (see Figure 4.8). It can be assumed that the information in the worksheet could be presented and recorded digitally, but the paper copy made it easy for the students to extract and record ideas from a digital text and then use their

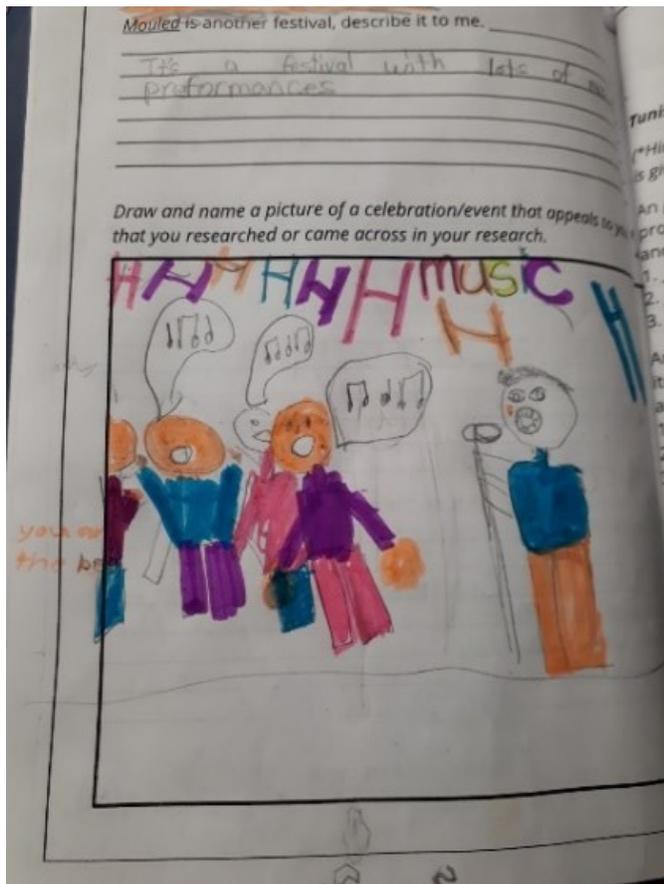
writing and drawing skills to further represent their learning. Drawing from McLuhan and Fiore's notion that the medium is the message and that media are an extension of man (McLuhan, 1967), Logan (2020) believed that

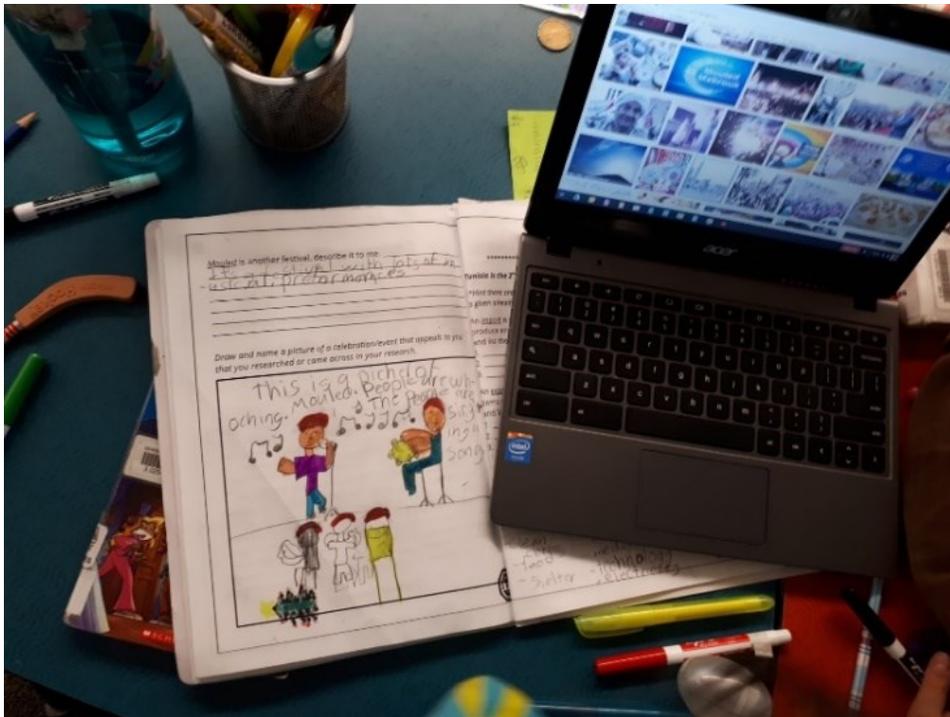
not only are digital media an extension of the psyche of the user, as is the case with oral, written, and electric media, but it is also the case that the user actually becomes an extension of this digital technology. (p. 5)

He suggests a reciprocity in learning, as was demonstrated by the grade threes as they used paper texts with digital programs to learn and represent their knowledge, in that the user is the content of what is created, whether digitally or not.

Figure 4.8

Samples of Student Work (using Google to complete assignments)





Famous Landmarks. To begin the lesson on researching India, Mrs. Rayne asked the students responsible for distributing materials to hand each person a worksheet. The teacher had the questions printed out on a sheet of paper and asked the students to put the paper in their Social Studies duotang. They then used the iPads or Chromebooks to access Google to seek information. They were left to find the correct keywords to answer the questions and write them using their pencils on the paper sheet. Occasionally, Mrs. Rayne would stop the class to discuss the process of researching or to discuss what they were discovering. The following is an account of a class discussion about how to find a famous landmark in India online.

Mrs. Rayne: Can you read the question?

Mary: Find a famous landmark in India.

Mrs. Rayne: Landmarks in India. What did we have? I right click, open up a few in new tabs, I use two fingers on my mouse pad. All right, and then I check and see what are the common names that seem to come up. I check who actually wrote all this stuff down. Is

there a name attached or a company, a travel site maybe or a travel company? Maybe it was made by the government or a university. So, then I check that out. Who would like to volunteer a couple of names? What did you have? Mary?

Mary: I had Taj Mahal and Amber Palace.

Mrs. Rayne: Ok. Good. James?

James: Red Fort

Mrs. Rayne: Peter?

Peter: I have the same one as James.

Mrs. Rayne: Josh?

Josh: I can't find it.

Mrs. Rayne: I can come back to you, Josh. Anne?

Anne: The Bahai Temple.

Mrs. Rayne: The Bahai Temple, quite beautiful. Definitely, if you ever go to India, you have to go there. It's called the Lotus Temple. It's beautiful.

Len: How do you say this again? Taj Mahal?

Josh: The Golden Temple

Mrs. Rayne: Was that yours? You didn't have your hand up! I am waiting to come back to you when you are ready. Put up your hand to indicate to me that you are ready. Hanny and then Mary? They have quite a few sites. Red Fort. Did you get that Mary? The Ganges?

Mrs. Rayne preceded the class discussion by explaining to the students that one way you can find out what is famous is by exploring how popular common names are in search sites and by looking at how often other people are talking about it online. She followed that by pulling up

a number of tabs that were suggestions to her search of Famous Landmarks in India. From there, she surveyed the class to see which landmarks they found on their own and whether or not other classmates were finding the same ones. Embedded in her activity and discussion was also the beginning of a later discussion on checking the reliability of a source by exploring who created the website. Knowing who is talking about famous landmarks and which they are promoting is related to critical reading as motivation can impact the notion of famous to an unknowing reader. In discussions, they talked about whether the author of the source affected whether they believed something to be famous or if perhaps it was an advertising gimmick. Transliteracy is connected to critical literacy, as sometimes the context and purpose behind a text impact how it is used and why text users today feel compelled to draw from multiple sources to determine text reliability.

Choosing from Many Sources to Learn About Peru

Mrs. Rayne had a series of centres set up to help the students learn about Peru. Within each centre was more than one way to find the answer to a series of questions printed on a folder, with both analog and digital sources available. Observing the students select the tools to achieve their purpose and then talking about their choices afterwards provided some insight into which sources the students felt would be most effective. I also discovered that the students used multiple sources to cross-check the information they found questionable, and it usually involved using Google to check information contained in printed text. The following are two discussions with different small groups tasked with answering the following questions at a map station:

- Where is Peru located? (Locate Peru on the map and the globe.)
- What is the name of the ocean on Peru's coast?
- Is Peru bigger, smaller, or the same size as Canada?
- The capital city is called _____.

- * Challenge Question: Search Peru on Google Earth. Explore areas in Peru using the Drop Man tool.

Group 1:

Josh: We are searching up what is the name of the ocean.

Jacqueline: Okay. How are you finding it? What have you got?

Josh: We got Google Search, and we are writing down and searching it. (Spells as she types in the Google search bar) O - C - E...

Hanny: (spoken to Jacqueline while pointing to a paper map) Right here in Santiago.

Jacqueline: What's there?

Hanny: I was born there.

Jacqueline: Oh, you were born there. That's exciting! Can I ask you a question once you are done typing? So, you have a computer, a map, and an atlas. How are you going to use all of these to find your answers?

Reece: For this, we have to read what the question is, and if we can't find it on here, (referencing the map) what it's called, we usually Google it.

Jacqueline: Is that what you had to do for some of the questions already?

Reece: Yeah.

Jacqueline: Which one couldn't you find on the map, so you had to use Google?

Reece: This one.

Jacqueline: Did you make that decision to look on the map first and then Google, or did Mrs. Rayne ask you to do it that way? I am just curious.

Hanny: She searched it, and then we wrote it down.

Jacqueline: But you tried the map first before Google?

Hanny: Yes.

Group 2:

Mrs. Rayne: How are you doing? Good? Did you try the map before you checked it online? Yes? Have you located Peru? And then did you locate the name of the ocean right next to Peru?

Len: Yes.

Mrs. Rayne: Look at all the different names, it is usually in bold. So, you've got this one on this side, the South Atlantic Ocean. So, what's on the other side? So, you just read the South Pacific Ocean. It's all you need, right? We did this at the very beginning of the year. Does this one have a key? This one is more tricky than the other map. Maybe we just borrow that one. Look at this legend, this is very obvious. We have Peru here, take a look at the legend. It will tell you which one is the capital city. You need to look at the key and figure out which symbol will indicate to you which one is the capital city. Where is the symbol? So, we don't see any symbols here, what about over here? Do you see symbols? Which one is a capital city? It's a star and a circle, so look for stars and circles. So, what is the word? Very close. Lima. Yes, good job. Excellent.

(Mrs. Rayne walks away, leaving Jacqueline still with the group who were in the process of using Google to answer the question about which ocean is on Peru's coast.)

Jacqueline: Just push enter and see if you are right. Were you correct? *(Students realize that there are many links and no clear response to the question What is the name of the ocean on Peru's coast? that they typed in the search bar.)* How do you figure out what the answer is? Is there a map on the screen or any information here? No? So maybe can you

scroll down? So, in this case, was it easier to use Google or was it easier to look at the map?

Rose: The map.

Jacqueline: On the map, right? Can you go up for a minute? Do you see the answer right away?

Len: No

Jacqueline: Not really. In this case, it seems like the map made it a little easier even though you had to try a few maps when you were looking for the capital city. Did you look in the atlas? The book of maps? Is the information here as well? Did this experience teach you anything about finding information?

Rose: The map is better to use

Jacqueline: Do you think it is always better?

Rose: No

The discussions illustrate that within acts of locating information, whether using analog or digital technologies, questions still arise about the best mode of doing something. Transliteracy theory purports that there is no best way, that in fact, there are many ways of finding the answers to questions. How we get there may not be a result of a better path but be related to funds of knowledge, experience with tools, one source offering better support (such as when the teacher compared the legends on various maps), or even availability of technologies to get the job done. Interestingly, however, the grade three students found it important to check results for reliability across sources, even if one is a published map, and the other is a result of a Google search.

Example 6: Transliteracy Across the Curriculum

Table 4 illustrates brief examples of transliteracy across subject areas and the school day. Transliteracy is not limited to literacy skills, strategies, or practices, but is a part of how knowledge is constructed within and among multiple learning experiences. Within the class, I observed transliteracy in all areas and aspects of the students' learning.

Table 4

Transliteracy Across the Curriculum

Subject	Transliteracy Examples
Math	<ul style="list-style-type: none">• learning math language by playing place value Yahtzee and recording results from dice throwing on paper• watching YouTube videos about how to solve mathematical problems or equations
School Office	<ul style="list-style-type: none">• daily play an audio recording of O Canada over the intercom• students speak (for example, one student with autism spoke of famous people who also have autism)• yoga with the assistant principal (she described the moves and worked through them over the intercom)• students read their work (such as grade ones reading poems they wrote)
Science	<ul style="list-style-type: none">• View Google images of straw and tape structures (whole class on SMART Board as well as available to small groups later as they plan their own structures.• Observed Mrs. Rayne connecting two straws using tape under the document camera that was projected on the SMART Board• Students tasked to draw their tower on a piece of paper before constructing it (they moved back and forth between their experimentation, help from the teacher, and Google Images on the iPads or SMART Board in their designs)
Social Studies	<ul style="list-style-type: none">• Watch YouTube videos of children in India (video produced for educational purposes)• Examined images of culture in India (food, landmarks) both on the SMART Board as a whole class and individually on Chromebooks or iPads

- Used maps, atlases, textbooks, videos, digital photographs/images (Google images), iPads/Chromebooks, printed worksheets to learn about the culture and to answer printed questions/activities
- Art
- Students are free to do corking, or spool knitting, in their free time. Some students looked up how-to pages on the internet or viewed Google images to determine a knitting project. There was also a knitting club that met at recess in the library.
 - Artist in residence came to the classroom to show the students how to make a Chinese dough art dog in honour of the year of the dog for Chinese New Year. He modeled step by step how to create the dog using the document camera. The students also watched a video on Chinese New Year and participated in many other activities related to Chinese New Year throughout the week (Chinese paper cutting, traditional games and dances, Chinese Tai Chi, and making Chinese knots)
 - Researched artist Georges Seurat and viewed images of his piece on the Eiffel Tower to learn about pointillism as well as Wassily Kandinsky for the upcoming art project. Mrs. Carpenter also shared Google images of pointillism art completed by children as well as watched a YouTube video on how to create pointillism art.
- Writing Journals
- Journals include photographs that the students can write about or add captions to
-

The next chapter explores the findings from this study alongside current conceptions of literacy and begins to outline how a transliteracy mindset can change how teachers plan for, offer, and use multiple devices and resources in their classrooms.

Chapter 5: Discussion

A Transliteracy Mindset

To keep pedagogy and curriculum current and relevant in today's classrooms, educators can adopt a transliteracy mindset. A transliteracy mindset does not require a shift to thinking about how to incorporate new digital tools, resources, or applications for learning, nor a move away from current and effective traditional literacy practices. A transliteracy mindset means thinking about how changes in the ways people socialize, collaborate, and interact with one another (and their ideas) might influence how meaning is constructed within 21st-century literacy opportunities. It is a time of transition when digital and analog literacies reside together in learning experiences. Transliteracy pedagogies seem to bridge a space of hybridity because they invite literacy learning and practices of all kinds.

Transliteracy describes the construction of meaning across multiple spaces, times, subjects, content, devices, learning platforms, and technologies. Transliteracy, according to Sukovic (2017), is a literacy of hybridity; "it is a mindset" she claimed, "which holds the understanding that there is a time and place for separation, for mindful cross-fertilization, and for abundant merging and mixing" (p. 147). There is a growing trend towards seeing literacy as a hybridity explored in areas such as in posthuman theory (see Lotherington, 2018), conceptions such as a baroque approach (see Burnett & Merchant, 2016), and research informed by complexity theory (see Laidlaw & Wong, 2016). It is time to again widen understandings of literacy. For the last 20 years, researchers have been working from an understanding of multiliteracies that developed as a result of tensions around unsuitable and narrow definitions of literacy within the current context (the late 1990s). How people engage and interact with literacy has significantly changed again, and the idea of *multiliteracies* needs to be reconsidered as

transliterations to reflect better the fluidity of meaning-making observed in this study and others (Ipri, 2010; Jaeger, 2011; Liquète, 2012; Liu, 2005, 2009; Mackey & Jacobson, 2011; Megwalu, 2014; Sukovic, 2014, 2015, 2017; Thomas et al., 2007; Thomas, 2013).

Transliteracy—seamlessly mapping meaning across different contexts and available resources—is not about developing new literacies concerned with particular media or topics, and it is not a type of new literacy. It is best described as a set of practices carried out within social, cultural, situational, and technological contexts. Multiple insights and understandings of how students construct meaning within transliteracy practices emerged through my analysis. As I worked with the data to find ways to represent my findings, Sukovic’s idea of transliteracy as a mindset persisted. Rowsell, (2013) in her book, *Working with Multimodality: Rethinking Literacy in a Digital Age*, wrote, “the complicated nature of shifting from a twentieth-century to a twenty-first-century mindset is that we do not know how to translate the twenty-first-century world into pedagogy and curriculum” (p. 148). When I read Rowsell’s statement that it is challenging to imagine how changes in the 21st-century world might translate into pedagogy and curriculum, I recognized that what I have described in this study will provide deeper meaning and increased clarity to the conversation of transliterations. There is a clear need to rethink present ideas of literacy, to disrupt linear ideas of what it means to be literate, and to start talking about the different ways in which people engage in literacy practices because of changes in sociocultural landscapes.

Humans have always engaged in using multiple literacies to construct meaning. Twenty-first-century influences have contributed a flurry of new and significantly more socially situated literacy practices. As well, the internet has created extremely wide access to information through various multimedia and multimodal texts that transcend time and space boundaries. Anyone can

be an author or creator online and can consume information at the click of a button. We are bombarded with the sounds, sights, and words of others, and can select content to view on as many devices as desired at any given time.

This analysis draws upon more than eight months of collected data, including field notes: transcripts of conversations, interviews, and student talk; photographs and video; observations; and textual analysis. The findings are presented as a shift in mindset to describe ways to see transliteracy articulated through current understandings of literacy and multiliteracies. The following themes, critical transliteracy, digital transliteracy, social transliteracy, and content area transliteracy, are superimposed with what is already known about literacy. They illustrate how constructing meaning occurs across and within multiple sources and platforms, and that literacy is not a linear act that happens at one time, place, or within a singular text.

In this chapter, I present additional considerations of already-established beliefs of literacy and literacy development through transliteracy examples and observations. There are multiple intersections and commonalities across the transliteracy practices presented throughout discussions of the themes. Although they are described separately, it is not intended to suggest the themes are distinct or stand-alone ideas of transliteracy. The categorization in which they are offered should not imply exclusive separation but simply as an effective way to organize and represent the findings of this study.

Critical Transliteracy

In their comprehensive study on critical literacy, Lewison et al. (2002) surveyed over 30 years of definitions in academic literature as well as teacher-author accounts of critical literacy. They synthesized their findings into four dimensions of critical literacy: disrupting the commonplace, interrogating multiple viewpoints, focusing on sociopolitical issues, and taking

action and promoting social justice. These dimensions are interrelated but convey the varied ways critical literacy is still discussed in education-related research and critical literacy pedagogy. Although critical literacy has various iterations, its purpose remains the same: that students learn to question what they read, see, and listen to with a discerning eye and to avoid regarding all texts or experiences as true. Critical literacy involves the awareness that texts are purposeful and are written by humans who may have specific perspectives or intentions. Particularly in a digital climate, critical literacy is an important aspect of literacy teaching and learning as all students must be prepared to approach texts with a critical lens and to recognize that texts, and literacy as such, hold power in how they are situated in social, cultural, and political contexts (Burnett & Merchant, 2019).

Students today are subjected to a plethora of different texts, and they must be prepared to think critically about what the text is conveying and what might be taken for granted within it or by its nature. The students in the grade three classroom in this study were often coached by their teachers and practiced critical literacy and thinking. Their experiences, questions, and wonderings suggest that critical literacy must also be taught across and within different platforms, modes, and genres, and not simply within a single text. If students are motivated to use multiple sources and platforms to access information, then teaching students to be critically literate must also be taught across and within those sources. Students using many resources must learn to examine their many inputs of information together as well as separately. Taking a critical standpoint, or lens, to constructing meaning across and within many texts and resources can be viewed as critical transliteracy.

The grade three students, in their actions and words, demonstrated their growing awareness of how critical transliteracy can also involve transferable understandings. The

following are examples of when the students thought critically about a text they were reading or an activity in which they were engaging online. The examples demonstrate how the students were beginning to approach constructing meaning and learning from using a critical transliteracy lens.

Awareness of Cheating and Monitoring by Outside Sources

During data collection, I often wandered around the classroom, listening quietly to conversations students were having as they played literacy games on their Chromebooks for literacy centre time. I overheard two boys discussing why they need to be careful about what they look at on the computer. I did not get the impression they were considering doing something they knew to be wrong but were simply chatting as they typed URLs into their web browsers. As I engaged them in further conversation about the topic, one of the boys very seriously told me there are people downtown that watch what ‘kids’ are doing on the computer, and they know when kids are on a site on which they are not allowed. He believed there was some type of technology that allowed ‘downtown,’ as he put it, to watch what they use and visit on their Chromebooks. When I asked him why he thought that might happen, he replied, “To make sure we are doing what we are supposed to be doing and stuff.” He also mentioned to me that his aunt was a teacher and that she had told him and his brother that this was true. Consequently, this student’s choices about which sites to visit were guided by his belief that someone outside of his class was monitoring him.

Although most teachers hope that students make wise choices about accessing websites because of intrinsic values and morals, there is truth in the idea that web activity is continually monitored by outside sources. Unless I actively place adware, malware, and cookies blockers into my browsers, my web activity is actually tracked. Sometimes, it results in a more tailored

searching experience, but it also results in my details being sold and shared with advertisers or worse, such as trolls or thieves. This is something young people need to be aware of and manage, especially as they get older or use their own personal devices. In terms of critical transliteracy, it suggests that students need to learn to also question who is tracking their internet use, what it means, and even how they can prevent it if it is unwanted. Schools do have firewalls and filters in place to help prevent trackers and access to some sites, but it is not enough for young users who likely do not even know this is happening. Because tracking often happens in the background unnoticed, unless this aspect of critical transliteracy is intentionally and specifically taught, students may not learn about the importance of attending to tracking sites and devices. Current discussions of critical literacy have not yet explored the question of “who is paying attention to what I am doing online, and why,” but perhaps this needs to be included in teaching and learning about accessing multiple digital and online resources and whether or not what the user is seeing is a result of tracking or monitoring systems.

The above example also illustrates that students need to be aware of, or at least question, whether someone is paying attention to what they are looking at online or are controlling their access. The grade three students believed they needed to be cautious about the sites they visit so as to not get in trouble or lose access to the devices they use, but there are other implications connected to tracking that relate to the information that becomes available or highlighted first when using the internet and search engines and whether that information was strategically placed in the order or space it appeared. Logan (2020) wrote,

the field of captology has the aim of studying directly how computers are used to manipulate our behavior by making use of what they learn about us. We have always been manipulated by media through advertising with newspapers, magazines, radio, and

television, but not to the same degree as is the case with digital media, search engines, and social media (p. 8).

Logan cautioned that, because what is inputted into computers, even data such as browsing history, are extensions of who people are, users need be aware of such invasions of privacy by companies that could use that information to manipulate or control online behaviour.

Lastly, the student in the above example was genuinely concerned and took this perceived threat very seriously. It impacted his decisions when selecting online sites, particularly when given the freedom to use his Chromebook unsupervised by his classroom teacher. Perhaps this cautious awareness helped him to make age-appropriate choices and in the future can contribute to an intrinsic desire to avoid sites that may contain information that may not be appropriate for a child (or the task at hand) once the extrinsic threat, which may or may not be true, is removed. Critical transliteracy can also involve discussing monitoring as a safe practice or as a threat of privacy, independence, or choice.

Choosing Texts and Material

In addition to caution about the tracking and behind-the-scenes activity on the internet, the knowledge to choose appropriate texts and materials amongst the overwhelming number of sources available is also vital. Students, even as young as eight or nine years old, feel the struggle of selecting from the endless choices they now have at their fingertips, whether digital, analog, or both. To determine the reliability and validity of information gained across sources and platforms for learning, students need support in choosing texts and materials and then in how to evaluate both the sources and the information. A critical transliteracy perspective encourages students to ask questions such as,

- Who created this text and for what purpose?

- Who else holds this view or perspective? Are there other perspectives shared or available in different sources?
- Does this text marginalize a group or exclude any voices? What do other sources or texts share about this topic and from which group's perspective?
- What are the similarities or differences between information learned across various texts?
- How does the content in print texts differ from digital or online texts?
- Where else does this information exist?
- Who else is talking about this?
- Is there a reason I am reading or viewing this particular information? Is my access restricted or controlled in any way?

Critical transliteracy encourages cross-checking of information but, more importantly, encourages users to question aspects of text composition or construction by seeing differing perspectives on issues, beliefs, information, and purposes in terms of power and justice. Finding different views, or takes, on the same topic are easily accessible through using the internet, and if the internet is the preferred or prevalent means of accessing information, then conversations of reliability and considerations of perspective and authorship need to exist in classrooms that use it regularly. Students today need to question or think critically about both digital and analog texts because both can be biased. Using them together to determine the reliability of content or information can be one effective means of helping students choose texts and materials in school learning.

Critical transliteracy was evident in a discussion I had with a student regarding the reliability of some sources of information she was using to research aspects of culture in India. She needed some guidance in knowing which websites might be more reliable than others. She

was able to find an appropriate method to search more accurately for information by using a question as her search term, but after receiving the list of search results, she did not know which to click.

Jacqueline: How did you get to this page (referring to a list of Google search results they were viewing on a shared iPad)?

Emily: We just basically typed India's... no, fruit in India, and it shows this (points to screen on iPad).

Jacqueline: Where did you type it into? Into the top address bar?

Emily: Yeah.

Jacqueline: And you are looking at pictures? Images?

Emily: I searched up what types of fruit grow in India.

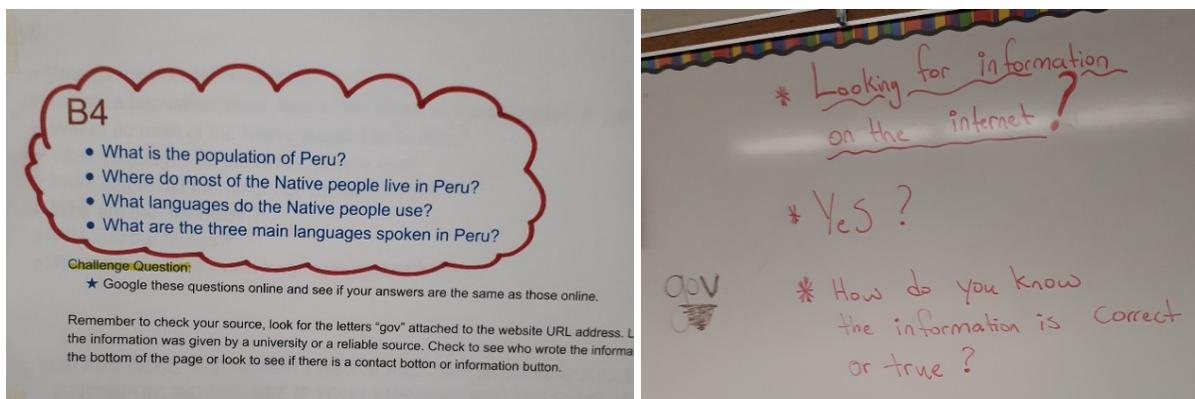
Jacqueline: So, you typed that question, what types of fruit grow in India? That's smart. Are the images giving you the information you need? How do you know if these are just pictures of fruit or are of ones that grown in India? (The student then clicked back on the tab that retrieved the list of websites as a result of her search. The student scrolled down to the bottom of the page and hovered over the section that offered different suggestions for similar or related searches.)

Generally, the students in the class were effective at using search terms to find information, as they learned that they could type in the question posed on their worksheets, but they struggled with knowing which sites they should visit. Mrs. Rayne attempted to model how to use the copyright information at the bottom of the site to judge credibility, but that is difficult if students do not hold the background knowledge to know which institutions or publishing companies are credible, and thus, likely contain reliable information. I did see the students

scrolling to the bottom of the website when prompted to do so by the teacher, but they often did not know what to do with that information or how to think critically about what it meant in terms of reliability. Mrs. Rayne encouraged the students to question validity by exploring multiple links to see if they contained similar information. I observed the students engage in this practice when reminded (see Figure 5.0).

Figure 5.0

Examples of Encouraging Critical Transliteracy in the Classroom



The students' common practice was to visit the links in order of how they appeared in the results list from an online search instead of using critical transliteracy to think about the validity and reliability of information. The teachers modeled think aloud, and direct instruction on how to choose a link was an important steppingstone for the students in coming to think more deeply from a critical transliteracy perspective. Additionally, discussing the information contained in the URL appearing in the search results provided the students with valuable information. For example, in social studies, Mrs. Rayne was searching for landmarks in India using the Google search engine projected on the SMART Board. She discussed how she determined her search terms and verbalized why she would click on some links and not others. She mentioned how she was not going to click on the Wikipedia page, as that is a site that anyone can write on and is not appropriate for this type of social studies research. Instead, she was looking for a popular

encyclopedia page such as Britannica or the Canadian Encyclopedia. In her modeling, she also discussed how travel websites could be helpful in discovering famous landmarks, as people expect information on a travel website to be true. She modeled how to use both information from encyclopedia websites and travel websites to determine a list of places that were significant landmarks in India. Another important piece of information that she modelled that many students gained from was that there are multiple pages of results beyond the first one that appears, and you can move back and forth between result pages, images, and links to help narrow results.

Critically Evaluating the Appropriateness of Information

Students were often in scenarios where they were required to critically evaluate the appropriateness of information they were finding online and in books or other paper texts. In social studies one day, a conversation about archeology sparked Benson's interest. The class was discussing what archeologists do and how they provide important historical information. The class watched a YouTube video on "Solving Mysteries with Archaeologists," then discussed what they knew about archaeology. Mrs. Rayne wrote definitions for keywords on the board and then encouraged the students to find more information. Given the opportunity to do research, Benson selected a Chromebook and typed in the search term: human remains. As evidenced by the below transcript excerpt, Benson had in mind that archeology sometimes involves discovering bones or other artifacts and so he thought using the term "human remains" would bring him to sites on archeology. The following exchange is an example of how sometimes children's construction of meaning of a topic and what they believe to be the right search phrase may result in inappropriate results. Children use what they know to make sense of new understandings, which is limited by their maturity, age, or exposure to more adult-appropriate knowledge. Benson's search experience reflects his limited knowledge of the gory or gruesome

search results that can appear from an innocent search effort. Students can benefit from learning to critically evaluate whether they should explore websites or sources that contain inappropriate material and what might be considered inappropriate content for school. It is unreasonable to expect firewalls or search term filters to protect children from all inappropriate material on the internet; it is better to teach critical transliteracy, so they learn to monitor content for themselves. In the following exchange, Benson expresses concern when encountering inappropriate material online.

Jacqueline: Benson, how did you get to human remains—that search term?

Benson: Human remains.

Jacqueline: I didn't quite mean how did you get it typed on the screen; I mean why are you searching human remains?

Benson: So, I know how to spell those two words.

Jacqueline: Just to know how to spell them? What do human remains have to do with your learning about archaeology?

Benson: Because I am saying an archaeological site is where an archaeologist would look for human remains and kinds of stuff like that.

Jacqueline: So, you are just using this for spelling? You are not going look at any of these sites? They might not be very good for kids to look at, right?

Benson: Yeah, there's lots of pictures of human remains.

Jacqueline: That's what happens on the internet sometimes. You search for one thing and you get something you weren't looking for.

Benson: I didn't do that on purpose, it was just random. I don't want to be this kid that gets in trouble by accidently searching up human remains.

Jacqueline: Do you think that this (pointing to the Chromebook) knows whether you are a kid or not?

Benson: No

Jacqueline: No, because you probably don't have a filter on there that blocks things that kids shouldn't see. I don't know though. Maybe Mrs. Carpenter put one on, but it didn't filter out pictures of human remains.

Benson: I didn't look at many pictures. For most parts, there is nothing that's very inappropriate for kids.

Jacqueline: Did you click on the pictures?

Benson: No. Who told you that?

Jacqueline: I am just curious. So, you typed it into Google, you got the spelling, and now you are writing it on your paper?

It is noted that in our conversation that Benson is aware of how he might be perceived by others based on what he is searching for or looking at online. He is starting to evaluate the suitability or appropriateness of what appeared on the screen and was worried that he might be in trouble for viewing it. He decided that instead of using the results to learn more about archeology, because they did not meet his goal for that information, he might then use the search results to help him spell in his social studies workbook. Benson appeared defensive about being accused of viewing inappropriate material online. It raises the question, then, of how to protect students from unintended search results that sneak through limited filters. Critically transliteracy can include thinking about whether the material is appropriate and if they should be viewing or reading it, even if it is a result of an innocent search. Critical transliteracy can help students to learn to think about safe search terms, firewalls, filters, and online safety.

Using Transliteracy to Discuss Critical Topics from Media

In the following example, Mrs. Carpenter was outlining how to find the number of medals each country had received to date in the winter Olympics. The students were going to use the medal counts found online to graph the number of medals per country. As the students were searching the page with the medal counts, they came across a group called OAR (Olympic Athletes from Russia). One of the students noted that he had heard his parents talking about Russia's ban from the Olympics. The students became curious about why these athletes seemed to be from Russia if they were supposed to be banned. Although the intention of using the website was to develop graphing skills in math, it sparked some critical thinking around patriotism and what it means to represent your country in the Olympics.

Mrs. Carpenter: OAR means Olympic Athletes from Russia.

Kwento: The Russians aren't allowed to be in the Olympics because they were taking drugs.

Mrs. Carpenter: Yes, some athletes were taking drugs. Some of the Russian athletes were taking them because their country was encouraging them to take performance drugs, to make them bigger, stronger, and bulk up their muscles. Initially, the Olympic community banned all the Russian athletes from attending the 2018 games, but then they found that is not fair because there were some athletes who weren't [taking drugs]. So, they are not allowed to participate or compete for Russia, and their medal standings are not allowed to go to the record book for Russia. They are not allowed to fly their flag and they are not allowed to hear their national anthem. It looks like they've won two medals so far. It will be interesting to see what happens when they win gold, because what

happens when you win gold? Does anyone know what it looks like when you are presented with your gold medal? Benson, do you know what that looks like?

Benson: Their anthem gets sung?

Mrs. Carpenter: Yes, their national anthem is played. So, when a team or an athlete, an Olympic athlete from Russia wins gold, I am curious to see what they are going to play or do.

Peter: They have uniforms that just have a black thing with their name on.

Mrs. Carpenter: Yes, their uniforms are very plain. Some of the newspaper articles said that they [Russian Olympic athletes] were really told to cheat, and once people figured out what was going on, they just said that they were not allowed at the Olympics...

Emily?

Emily: Do they care that they can't say they're for Russia?

Mrs. Carpenter: You know that's a huge thing. Look at me. Am I an Olympic athlete? What am I proud to be today? I am proud to be part of Canada. And I can't even walk around the block, but I am still proud to be part of Canada of our Canadian athletes. So, to wear your country's colours and wear your team outfit and have your flag is a huge part of winning the Olympics.

Isabella: They shouldn't be allowed at all.

Mrs. Carpenter: You know what, I agree with you, and I disagree with you.

In the above exchange between the students and Mrs. Carpenter, critical transliteracy occurred through discussion triggered from what was unintentionally discovered by examining online material. The discussion referenced the students' and teacher's understanding from their current funds of knowledge, newspaper articles, and what they saw on television and online. The

students' knowledge of the Russian athletes and their role in the Olympics was constructed across sources but how they felt about the situation in terms of bigger issues of equity and loyalty to one's country were further developed through the class discussion.

I strongly believe that for critical literacy to be an effective component of students' literacy learning that it is taught from a transliteracy standpoint and viewed across and within many texts and media. The amount of information available to students across many contexts and platforms requires that they think critically across many resources as they formulate their opinions. As the above example illustrated, development of critical transliteracy for young children also required the help of a teacher who encouraged the students to think deeply about the messages they were getting across sources and not just about the content in terms of validity or reliability. Thinking critically about texts as separate entities will not help students when they are using multiple texts together in their learning. When they are using both analog and digital texts, they also need to be able to handle information that may unintentionally cross their paths to make judgements on what they are seeing or learning and how what is included or excluded from their sources says something bigger about the world.

Digital Transliteracy

Alongside thinking about the importance of critical transliteracy is thinking about the role of digital transliteracy in constructing meaning. Thinking critically about what to view online, which links are safe to click on, and how to judge the suitability of information across, through, and within sites, is related to critical transliteracy but also includes skills, strategies, and processes related to digital transliteracy such as how to navigate different texts, media, and digital sources of information. It is valuable to learn about the role digital literacy practices take in terms of prominence in the literacy development of young children. To reiterate how I see

digital literacy, and as commonly defined, I adhere to Hague and Payton's (2010) definition, which states

digital literacy involves critically engaging with technology and developing a social awareness of how a number of factors including commercial agendas and cultural understandings can shape the ways in which technology is used to convey information and meaning. It means to be able to communicate and represent knowledge in different contexts and to different audiences. This involves finding and selecting relevant information, critically evaluating and recontextualising knowledge and is underpinned by an understanding of the cultural and social contexts in which this takes place. (p. 1)

Digital transliteracy also invites the perspective that using websites and other online texts, such as apps, to find content can present challenges, as users need to attend to more than the content or information they contain. Current websites contain many additional features, both hidden and visible, that are often not even related to the information one is seeking on the site itself. There are advertisements, pop-ups, cookies that download, and nefarious links that students need to learn to manage and attend to as they use multiple sources of information.

The transliteracy perspective on digital literacy is that some of this learning needs to be across different sources and platforms and that learners can use and test out their understandings in similar experiences. Just as book knowledge, like directionality or where to start reading on the page, are important steppingstones for becoming a reader (Owocki & Goodman, 2002), so is digital transliteracy knowledge. What becomes important, however, is that digital skills and strategies for using online, web-based, or other electronic sources when constructing meaning is that learning needs to extend beyond single resources to see similarities and differences across and within many multiliteracies. Additionally, digital transliteracy involves employing

appropriate skills and strategies to navigate digital texts to construct meaning. This section on digital transliteracy includes a discussion of learning skills and practices and then specifically addresses digital transliteracy practices such as using text-to-voice programs and editing tools and how digital transliteracy relates to troubleshooting and problem-solving in the classroom.

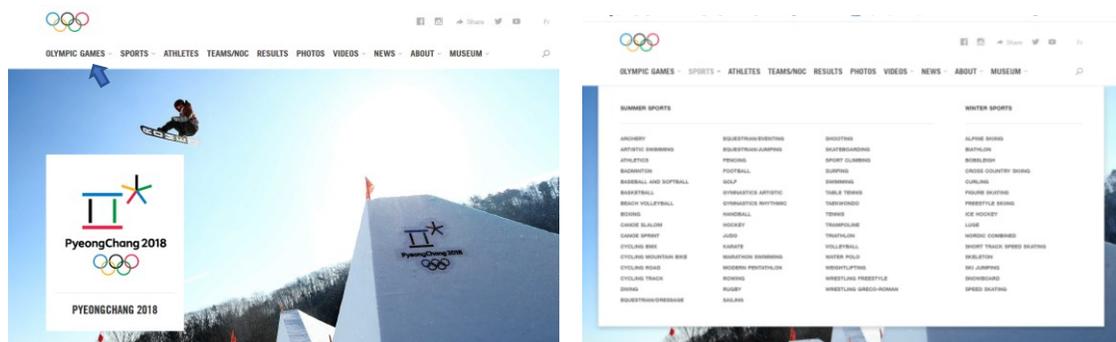
Directly Learning Digital Transliteracy Skills and Practices

Along with the above-described definition of digital literacy and its connection to critical literacy are common definitions that include a skills and strategy connection to digital literacy. One example is the American Library Association (ALA) (2013), which describes digital literacy as “the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills” (ALA, 2013, para. 1). In the grade three classroom, when the students were learning to do research for their Olympics project, they needed to learn a bit about the particular website that Mrs. Carpenter expected them to use. The teacher initially opened the website projected on the SMART Board to show them some of the information they could find there but soon realized that some teaching about how to use the website was required prior to the students exploring the content. Reflecting on what she was doing in the moment to find and open areas on the webpage, Mrs. Carpenter quickly discovered that the students needed to know the importance of hovering over links and titles on this page to navigate to other pages in the site (see Figure 5.1). There were no clearly defined tab sets that are often found on other websites they regularly used in class. To begin this incidental, in-the-moment teaching, she began by asking the students, “What do you think will happen if I hover over this part?” as she moved the mouse over a heading at the top of the page. From there, Mrs. Carpenter invited Clarinda to take over the mouse at the teacher’s desk and test out some ideas with the class. In their shared discovery and discussion, the students came to learn about

how to navigate this site better so that they could use it effectively on their own. In the following excerpt from their discussion, it is clear that this one piece of information, that is that users need to hover over the titles or headings to reveal drop-down menus, was not enough, as each linked page in the series that made up the Olympics webpage had small differences or intricacies in how it was used to find information. This conversation lasted just over five minutes but was invaluable in helping the students to use this website on their own and in furthering their digital transliteracy development.

Figure 5.1

Example of Layout on olympic.org Website



Note: Images from <https://www.olympic.org/pyeongchang-2018>

Mrs. Carpenter: When she puts the cursor over top of Canada, there is a line that comes up underneath it. What do you think that tells us? Let's see what happens. So, Clarinda, just click on Canada and see what happens. So, that just takes us...so, if you scroll down a little bit it's going to tell us...no go back up...so, this is another graph showing us what sport we won each of those levels in. Snowboarding we won 3, 2 silver and 1 bronze. So, this time I want you to turn to someone else. What can you learn from this information? Talk to someone else if you can.

Students: discussing topic

Once students knew how to get to the information they were seeking, only then could they begin to explore the information contained in the site, which, in the continued example, involved reading charts and making a summative graph.

Mrs. Carpenter: All right. So, what have you learned from this information? What's going on here? What did we figure out? Sunny?

Sunny: We found skating and figure skating won one gold.

Mrs. Carpenter: In figure skating we have a gold. What do we have in speed skating? We have one medal, but it is a bronze. If you go like this (showing how to move the mouse cursor) speed skating and... go across to here... you can see that they didn't win a gold, Sunny, they didn't win a gold, but they won a bronze. Oh, free style skating, yes, they won a gold and skating has won a gold. What else? Haley?

Haley: Snowboarding got the most.

Mrs. Carpenter: So far, we've been rocking it out in the snowboarding, right? We've got two silver and one bronze.

Andrew: I've noticed something. Why there is no gold any time top of the gold?

Mrs. Carpenter: Come and show me Andrew. What are you talking about?

Andrew: These two have gold, but that one has no gold.

Mrs. Carpenter: Why do you think it is? Look at the data. Why do you think it's the first sport listed? Andrew, hold on for a second.

Andrew: Maybe the silver and the bronze maybe equals one gold?

Mrs. Carpenter: When we looked at the other data, countries were ranked by how many gold medals they have. This one just gives us different information. John, what do you think?

John: By the black number.

Mrs. Carpenter: By the black number.

John: Total.

Mrs. Carpenter: Go by the total. Yes, could be. They have the most medals. Any other thoughts about that? Benson?

Benson: Snowboarding was one of the first events?

Mrs. Carpenter: Maybe snowboarding was one of the first events. Now Clarinda, when you put the cursor on any of those, can we get more information, or we don't? What about over on the side by the numbers? There is a little blue arrow pointing down. Click on that and see what happens. So, what does this tell us now? Jane?

Jane: Who won the medals.

Mrs. Carpenter: Who exactly from Canada won the medals. That's right. So, we know that Mikael Kingsbury won for the men's mogul, and Justine Dufour-Lapointe won for the women. Why don't you try the figure skating, go over to the blue arrow going down, scroll down. Team figure skating is a little bit different. Look how many people were on that team. Patrick Chan. There were seven people who won gold for Canada in the team figure skating. Now it's interesting because now each of these people gets to compete in their teams not in an individual sport. Patrick Chan now is going to compete with all the other men. Scott Moir and Tessa Virtue compete together in dance. They are going to compete as a team. I don't know how long the dance competition has been around. I know there was one in Sochi in 2014, anyway, just more information, so, if you are curious how Canada is doing on our medal standing this is a good place for you to go. We have to create our graph now we have information.

Many different aspects of learning happened in the above exploration of the website of the teacher and students. They learned digital transliteracy practices by participating in looking for information. They used and learned words related to using a webpage, such as scroll down, hover, and cursor, through authentic use and learned to read online and hyperlinked charts. The activity of creating a graph that followed the above discussion involved creating a graph on the whiteboard using dry erase markers, magnets, and printing. This also showed the students the effective relationship between print and digital resources to construct meaning and to learn to identify which team was winning the most gold medals. The website, because it was updated daily, was discussed as the best source to stay current on the medal winnings, but they decided to record what they were learning using a more traditional analog method of writing on the board. Digital transliteracy involves learning how to read online and hyperlinked texts, but it also involves learning to use what is found online for other online or offline purposes.

Searching for images and videos was a significant way that the grade three students found information. They often typed a word into the search bar or field and then immediately clicked to the images tab to search through the linked images. Younger students can be overwhelmed with the amount of text that is retrieved during a typical search or unable to read at the level in which it is displayed. They may be more successful at constructing meaning when illustrations or images are present (Cook, 2006). Aukerman and Chambers Schuldt (2016) studied changes across time in grade two students' references to images during text discussions. Although they discovered that over the course of the school year, students became less reliant on images as their reading improved, they concluded that students who were less fluent readers continued to be reliant on images as resources for meaning-making. They found that despite being able to read the text, students still engaged in "interesting, vibrant text discussions while relying on general

and image related hypotheses” (p. 285). In contrast to their observations, I observed that the grade three students continued to consistently use Google images as much at the end of the year as at the beginning, as it became a quick and easy way to narrow their search findings.

In grade three, the students who did not utilize the image tab—or in situations for which finding an image was not effective—often just randomly selected a webpage. Some students indicated that they did not know what the words said, either because the text was too complex or because it was written as a URL, meaning they could not rely on the appropriate spacing between words to help identify them. Although they were aware that they just picked a search result, they could not justify why they selected that particular one until a whole-class discussion on search results enlightened them. They discussed how search results are displayed and why, in most cases, the order of results carries information such as the time and date of posting, relevance to keywords, or the popularity of links. In addition to these reasons (but not addressed in the grade three classroom) is the nature of paid advertisements. It can be helpful to understand what appears at the top of the result list, especially those results labelled as “Ads”, and how to sort the results by changing the time or relevance filter.

The following discussion is an example of teaching and learning digital transliteracy practices in a whole-class exploration of a web search and quest for more information. This interaction occurred on Groundhog Day and was a spontaneous response to the interest in finding out what a real groundhog looks like. One of the students on the technology team, Emily, was asked to lead the class by using the mouse on the computer projected on the SMART Board.

Mrs. Carpenter: So, what can we do, Rose?

Rose: Look it up!

Mrs. Carpenter: Look it up. What do you mean?

Isabella: Look it up on the computer, not this kind of look it up. (Looks toward the ceiling.)

Mrs. Carpenter: I want Rose to use her voice. Okay, I want someone to go over to the computer and look it up. Where are my tech people today? Andrew? No, let's have Emily. Do you want to go over and open a new tab? Type in groundhog. See if we can find a video maybe, or some images of what an actual groundhog looks like. If we see more stories, like the one we already heard, we can see how accurate they are.

Andrew: I believe in the groundhog legend; I think it's real.

Mrs. Carpenter: Come join us, Jane and John. So, she's got groundhog. Just hit enter. What we want to look at is just the images. Where would we go? Emily? Yes, we can just click on the word images at the top. Oh, I think she was right. They are like a beaver, look at his head. Do you want to scroll down a little bit? A woodchuck? Now go back up, choose a video. Let's just see. There are videos at the bottom. There is the one I watched this morning. So, we are getting all these Groundhog Day videos. What could be in our search that is making it show these things? We want to find stuff on a real groundhog, not a made-up or cartoon groundhog. What could Emily put in her search? Or should she just keep looking?

Peter: In real life?

Mrs. Carpenter: Okay, in real life. Mrs. Filipek?

Jacqueline: I just wanted to mention something. Why do you think the Groundhog Day videos are showing up today? If we looked maybe tomorrow, do you think there might be different things showing up?

Teacher: So, why would it be today?

Sunny: Because today is Groundhog Day.

Jacqueline: And the things that show up are the things that other people are looking at. They are the most popular things found around groundhogs right now and today. You can see how long ago these items were posted or put on the web.

Mrs. Carpenter: (looking back to the search results) Punxsutawney Phil, he became very famous when there was a movie made about Groundhog Day with Bill Murray, and he is the one, that's the one, that comes up that lots of people talk about on Groundhog Day. And that is in the States. In the northern part of the States, I think. Will Emily add that, or should we just keep looking. Do you want to keep looking for a video? Let's see if she can find us one. I don't think I've ever seen one in real life. I am not sure if I have or not.

The above part of the discussion is addressing digital transliteracy as the teacher explained the multiple ways to find information but added that there needs to be thoughtful consideration of which search terms to use and which multimodal representation to select. She is presenting the modes and media of displaying information as a choice and is modeling her transliteracy thinking process as she works through this with the students. The conversation continues below as the students learn how search results are organized and displayed.

Andrew: Try Groundhog Day.

Mrs. Carpenter: Oh, you are looking at 10 hours ago. What does that tell you, Daksh? You just said that was 10 hours ago. So that was 10 hours ago that the video was uploaded. What are you going to do, Emily?

Emily: Go on to the second chart.

Mrs. Carpenter: Sure.

Jacqueline: So, it is kind of popularity or what fits best... and time, maybe? What is listed first?

Mrs. Carpenter: Still lots about Groundhog Day. Look at all the websites coming up about Groundhog Day. So, she could keep looking this way. What do you think, Emily? What can we do to find a video of an actual groundhog?

Emily: Search, like, as a real groundhog?

Mrs. Carpenter: Sure, try it.

Emily: Real groundhog.

Mrs. Carpenter: Do groundhogs exist after Groundhog Day? Yes? So, it doesn't necessarily have to be on Groundhog Day. There we go. Try the Groundhog Day, that one. That's the one I looked at this morning.

(video playing, music)

Hanny: That's a real groundhog!

Mrs. Carpenter: Can we just watch? There he is. He is deciding whether to come out or not. It has big teeth. Can you tell that it has big teeth? Well, it's definitely spring there. Look at his little ears. I am not sure what that is.

Isabella: Is he coming out?

This example of authentic learning includes both content about Groundhog Day and digital transliteracy learning about how to use a search engine tool. There are common aspects to most search result lists, specifically in Google, of which students should be aware. One of the first items that appear after a search is potentially the line called "Showing results of ..." which suggests that the search engine retrieved results for something different than what was written in the search field either because of a spelling error or lack of relevant hits. If this is the case, under

it will often be a line and link that suggests “Search instead for...” which, if clicked, will show the results for exactly what was written in the search field. On the search results page, there are also tabs to navigate, search settings that can filter in various ways, including by creative commons licencing, and related searches at the bottom of the page. More recent image results are identified near the beginning of the search results list with a limited number of images displayed and a quick link to more images. Typically, results are text-based or URLs. The students demonstrated their inclination to use the image tab to find relevant results. This was a common practice in the classroom and appeared connected to the teachers’ direct instruction on searching and using the Google search engine. Instruction highlighted how to effectively select search results, acknowledged that spelling impacts results, and modeled how to find images, links, and other features such as videos, maps, or news links. Teaching digital transliteracy practices related to using online search engines can be beneficial to students’ overall transliteracy but also improves their ability to more accurately retrieve information across the many sources available from an internet search.

Learning about Usernames, Passwords, and Storage Methods

Teaching using computers with young students can pose some challenges connected to using usernames and passwords. Part of the concern is that time is often wasted because they are still learning to type, and often usernames and passwords can have upper and lowercase letters in unusual places; they may include special characters that require using the shift function or have numbers. Young children often have difficulty remembering both their username and password, especially if they have different ones for different logins. Mrs. Carpenter used effective strategies to help her grade three students to use sites that require login information and to encourage them to be able to be more independent in finding the information needed. Using both analog and

digital texts to store password information was important, and the students needed to use the transliteracy practice of looking up their own information in the password duotang, copying it from the board, or retrieving it from a posted list (e.g., the literacy centres rotation sheet). The password duotang, which listed the students' names in alphabetical order and their various usernames and passwords, was most helpful for them, as they could physically bring the book beside their Chromebook. In addition to storing and retrieving the record of usernames and passwords, was the digital transliteracy practice of learning how to use passwords and why certain usernames were the same for the whole class or individual, given the website they were using. Mrs. Carpenter engaged in direct instruction using the SMART Board projection strategy and the whiteboard to draw and label the necessary fields students would need to log onto websites. In the following encounter between Mrs. Carpenter and Clarinda, it appears as if Clarinda is trying to understand the complexities of usernames. She pauses for a moment as she reflects on her name and username alongside thinking about the idea that her parents share the same name and also have school login information that looks similar.

Mrs. Carpenter: Your first name is?

Clarinda: Is my email Clarinda? I am not sure...

Mrs. Carpenter: Should be Clarinda. Will or c.will?

Clarinda: That is my parents

Mrs. Carpenter: Go back...(referring to returning to the login screen).

Clarinda: I'm supposed to go back and supposed to do my parents'? (long pause)

Mrs. Carpenter: See how here it already gives you your @school.ca, you just need to put in c.will...do you have a number after your name? Do you remember? Where can we look if we don't know?

Clarinda: Password book

Mrs. Carpenter: Yes. Find the password duotang. Clarinda, do you know where the password duotang is? Go grab it. In here we have a list of our email addresses. Where do you see your name? (Clarinda points.) Okay, so this is for your Chromebook number, but over here is where it gives you your network information, so where is your name on this list? These are the names down here. There is Tammy and Daksh and Andrew. Your last name starts with a W so you would be closer to the bottom. There you are, so if you follow this over, it says that you are c.will25, so let's give that a try.

Clarinda: c.will25

Mrs. Carpenter: and then just hit enter.

Clarinda: Enter your password for your Chromebook (she types it in). And then the same thing that you did.

After observing the encounter, I did ask Clarinda about how she logs on to the computer at home, and she explained that her mom helps her but that her mom's username also has Will in it, so she was confused for a moment. She said that she does not use her own login at home and so did not know what to do today. It is also important to note that the following conversation happened in the spring. Up to this point, the students had regularly logged onto their Chromebooks, so the episode was a little surprising. Although on the surface, usernames and passwords can seem simple, they, in fact, can include some complex understandings and require some specific strategies to manage, especially when they do not work correctly and when they are managed by a higher authority such as a technology support team at the school board level. Knowing what to do when you cannot find or remember your password, or the one you are sure about is not working, can be frustrating for many people. Children, on top of that, already

struggle with finding the right keys on the keyboard, moving their eyes back and forth from a paper it is written on to a screen, and dealing with hidden characters as they type. This suggests that direct instruction in using usernames and passwords is imperative for young learners and that they need additional support in using them as they learn the complexities of logging in. I was also attuned to the extra time required for logging on to both devices and websites and felt that because of the time it took, for both instruction and actually doing it each time, that allocating time in lesson planning for this is important. I also recognized that it is important to remember to be patient, to provide support and instruction, and to give students resources to help. The Technology Team also acted as supports for one another and were advised to “keep their hands in their pockets” when helping to discourage them from taking someone’s mouse and just doing it for them. They were asked to help by guiding with their words. The password duotang and writing the information on the board also proved to be effective and was something that almost all of the students relied on at one point or another throughout the year.

The most effective way students learned about digital transliteracy, and that digital skills, strategies, and practices are required across platforms, resources, and tools was through authentic experiences that included some direct instruction. There was movement back and forth between teacher instruction, modeling, and guided practice using both analog and digital resources despite computers being used (or seen) as the primary resource.

Mrs. Rayne: Hold on! Can I ask you to put your screens down a bit? You have four questions to research. When you are looking for the information, you want to scroll down to the bottom of your screen and make sure you figure out who you are getting the information from. Ideally, do not use Wikipedia. Try to scroll down, so if you are researching the fruits, scroll down and check and see who wrote that piece of

information. Is it something that you can believe? Is it true? If you are typing in “fruits” or “different kinds of fruits,” you are getting something like this. Then you click on your website, go down to the bottom of the website and see who produced that website. Read that right there. So when you click on the information when you are researching, go to the bottom of the website and take a look and see if there is a name of a company, a name of a person, if there is someone right there that shows that the information is reliable. Don’t just pick it up from Wikipedia. Anyone can type anything on Wikipedia. So, click on the piece of information you want to read about and then go down to the bottom and check and see who wrote that piece of information. You might see that person or group has an award, like an education award winner, if you look down here you can see when it was published, which country, rights reserved... If it seems okay, then you can watch videos on those or read more information.

In the short digital transliteracy teaching described above, Mrs. Rayne addressed both critical and digital transliteracy as she further explained how the students can answer a series of questions through written response in their notebooks. She recognized in the moment that the students needed support in scrolling but also in checking the credibility of the source they were using, therefore paused them to address the whole class. When a teacher asked the students to “put their screens down,” it meant they needed to lower their screens toward the keyboard but not close the laptop. It also meant that they needed to attend to the speaker, and their eyes and attention needed to shift for a moment.

Text-to-Voice, Voice-to-Text

Transliteracy involves recognizing we construct meaning across and within a variety of texts and often use multimodal texts and multiliteracies seamlessly and simultaneously.

Transliteracy theory helps to make sense of why learners might choose or engage in specific literacies as choice, preference, ability, and availability greatly factor into learning experiences. The shift to multiliteracies theory generated discussions of oral language texts and how they relate to notions of literacy. Many theories emerged regarding multimodal texts and even kinesthetic or physical literacies (e.g., Kress, 2010; Taylor & Leung, 2020; Serafini, 2015). Most importantly, it moved thinking away from seeing literacy as just written text and encompassed recognizing literacy as a set of practices involving auditory, visual, and kinesthetic texts of all kinds. Current multiliteracies practices involve using multimodal texts such as video and images in meaning-making. Media and audio texts are recognized as relevant literacies and are becoming more prevalent as teaching resources in school. Every single visit to the grade three classroom, with the exception of the day the internet was unavailable, involved at least one video or digital oral text either viewed or listened to by the whole class or individually.

Most grade three students are still learning to use a keyboard and mouse, and some of their learning at school does involve practice using such tools. Grade three students also have increased expectations around writing and reading, so there is negotiation around learning literacy practices related to new digital devices; however, that should not be at the expense of reading, writing, and creating grade-appropriate texts. I found it very interesting to observe how students used the Google Read and Write toolbar to mitigate the need to get ideas down quickly when composing written text when they are not yet able to type as fast as they could write using a pencil. The toolbar offers the options of voice-to-text and text-to-voice. When I asked Kwento, who relied on the toolbar daily, why he uses voice-to-text so often, he responded, “Because I can’t write the words fast and then I don’t need to stop to ask Mrs. Carpenter how to spell them.”

This illustrates how he sees the tool as a way to get his ideas down and also sees the added benefit of the built-in spell-checking feature.

Mrs. Carpenter explained to me that the school board paid to have the Google Read and Write toolbars added on to Google Docs and the other programs that involve written text, like Slides, in all their elementary schools. When it was added, she participated in a professional development session to learn how to use this tool but felt she did not know as much as she needed to fully utilize all of the tools available in the add-on and believed that the session came too early. She described that if she had spent more time with the tool before the professional development to explore how it worked, she might have learned some of its more complex features over just the basics. Despite her limited understanding of it, she did encourage the students to use the dictation and read-aloud features as much as possible.

Using the read-aloud feature, which reads any text highlighted on the screen, allows the students access to text on websites or in other documents that they might not be able to read independently. The highlighting feature allows users to have just a portion of the text read, or even just one word. The dictation feature was useful to students when they were doing writing but also when they were trying to import information into Google search engines or slides for presentations. The students sometimes had some fun with the dictation features because they noticed that some microphones worked better than others, and often their computer would pick up other people's voices sitting next to them. Most of the time, the students were adaptable, not upset, when this happened and would try to come up with solutions to prevent it from happening. Despite some giggles and silliness that would happen when the computer would start typing someone else's voice within another person's text, the students use the experience to do some thinking on how to alleviate the problem. Sometimes it involved finding a different headset with

a microphone that they could speak into directly or simply moving their computer to a different part of the room. Using tools such as Google Read and Write with other literacy activities improved the students' independence, quality, and quantity of work.

Editing Tools

Editing tools were an important part of the students' literacy practices and text construction experiences. Editing was a transliterate activity, especially after students were taught to use a few online and digital editing tools. During writing, students relied on spell-check and Google to edit their writing and to spell words correctly. This classroom did not have a word wall or visible word lists, so the students relied on their computers or iPads to spell difficult words. The students also used the prediction services built into the Google search engine to help spell by either using their invented spelling to produce suggested words or by writing the word "spell" and then their invented spelling.

During one class, I wandered over to Andrew to see what he was working on, as they were expected to be learning how to use Google slides through some free exploration. He had previously asked me to join him because he wanted to show me his grade two presentation on cheetahs. As I sat down next to him, I noticed that he was on the Google search page and not on Slides. When I asked him why he was on Google, he replied, "I'm trying to spell *enemies* (e n a m y s). I know it's wrong on the presentation, but it doesn't tell me how to spell it when I click on the spelling button." He had discovered that his usual way of correcting misspelling was not working because his invented spelling did not yield any suggestions. As I watched him on Google, I saw that he started to type *enamy* into Google. Once he reached the 'y' he noticed that the prediction feature offered enemy as the first suggestion. He knew he wanted to spell *enemies*, so he typed *enemys* into the Google search bar again, and it offered the correct spelling, enemies.

He simply said, “There. I got it.” and went back and forth between the Google window and his slideshow until he had copied it correctly. Andrew proved that sometimes when we are editing, we need to be a little more transliterate to get the job done and not just rely on built-in tools in programs because they do not always work. For students who struggle with spelling, like Andrew, the built-in spell checker that he often used was not helping him, and he knew, in the case of his slideshow, that spelling mattered. He found a useful way to find what he needed to edit his work and to do it on his own, instead of simply asking the teacher. He probably could have used a paper dictionary, but it may have taken even longer since the third letter in his invented spelling would have put his dictionary search on the wrong pages.

Throughout the year, and with the help of direct instruction, peer support, and self-exploration, the students learned what different coloured lines under words meant in their word processing documents, and they learned how to use the toolbars, each other, and other websites or written texts to help them edit their work. These built-in features for grammar and spelling helped the students to learn about the errors they made and to make a correction selection, and if nothing else, it allowed them to see that there was something wrong with what was written and they needed to find out how to fix it.

In addition to the computer programs offering spelling and grammar suggestions, the students gave and received a variety of different types of feedback. The feedback processes in the classroom offered great examples of the importance of transliteracy in constructing meaning across texts and contexts. The teacher used a variety of verbal and written feedback that helped the students to develop their writing beyond mechanics. The feedback was related to the medium used, idea development, and writing strategies. For example, when the students used Google Slides or Docs to write, the teacher provided feedback using the comment feature built into the

program. In addition to that feedback, she also invited them for individual writing conferences her desk for students to explain their writing, thinking, and creating processes out loud as well as time for feedback and conversation about their work. Research supports writing conferences in elementary school (Anderson, 2019); Mrs. Carpenter demonstrated how writing conferences can be very effective when using digital tools with built-in comment features as well as in face-to-face conversations. She still saw the value in the one-on-one time to orally discuss, as it allowed her to learn about the students writing process and not just have access to the product that was created and shared via Google Drive. Mrs. Carpenter also used sticky notes, wrote directly on their papers, did group conferences, and had individual conversations with students regularly as they worked on writing and creating projects. Feedback was given both online and face-to-face, and it was both written and verbal. Often more than one assessment tool was used to provide feedback to students and was most effective when feedback spanned borders of tasks and of style.

Effective feedback also included information or questioning about the use of an online tool and of how the resources students used impacted their work. Learning transliteracy practices in the classroom also involve understandings of how they are constructing meaning by making choices about what they do and how they choose to do it. This was clear through the following discussion between Mrs. Carpenter and a small group of students. Their task was to create a stop motion video as a group (see transliteracy examples in Figure 5.2). Part of the processes of creating the video involved planning and deciding on a topic, writing a script, creating physical props and a background, and then recording the scenes. Following the creation of the stop motion video also involved editing the video by adjusting the timing and exposure of individual

shots and adding extras such as title screens, credits, or music. Students also participated in planning how to share their video with the class and discussed their process of creation.

Mrs. Carpenter: Where is your script?

Hanny: Our script is different.

Mrs. Carpenter: So, you are not using the written script?

Hanny: Because our script is so very different.

Mrs. Carpenter: Okay. Can you grab a stool, I want to sit and talk with you guys? Can you play it for me? I'd like to see it.

Alexandra: We went through all this stuff, but I feel we should just say it even though the pictures are different.

Mrs. Carpenter: I think the first thing I need to do is just to see it right from the beginning. Can I hold it so I can hear it, too? So, we have quite a few pauses. Do you remember how to go in and change the pausing?

Hanny: It didn't really work out well.

Mrs. Carpenter: I love how the elephant is a carnival elephant. Devon, come and tell me what you were thinking about this. Do you want to come and talk with us?

Hanny: So, when we come to the ending, the movie is so short, it's only 32 seconds long.

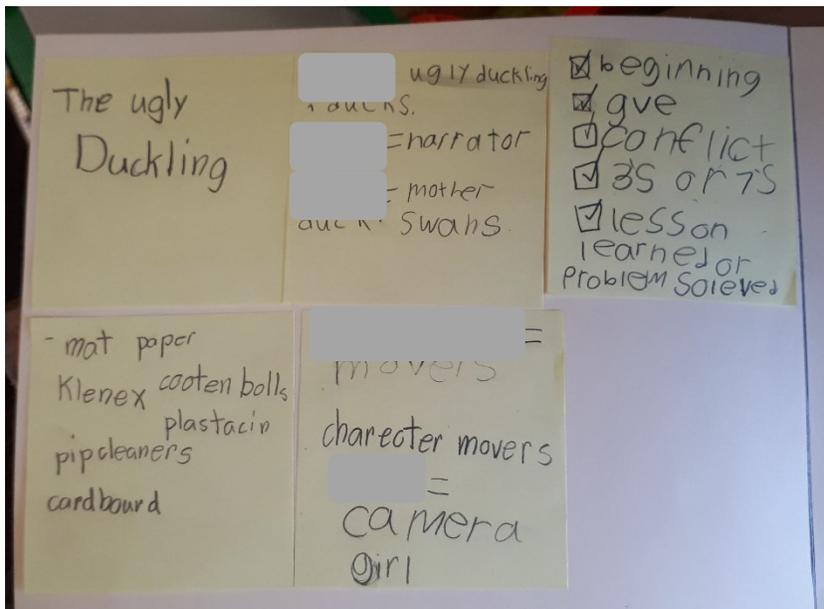
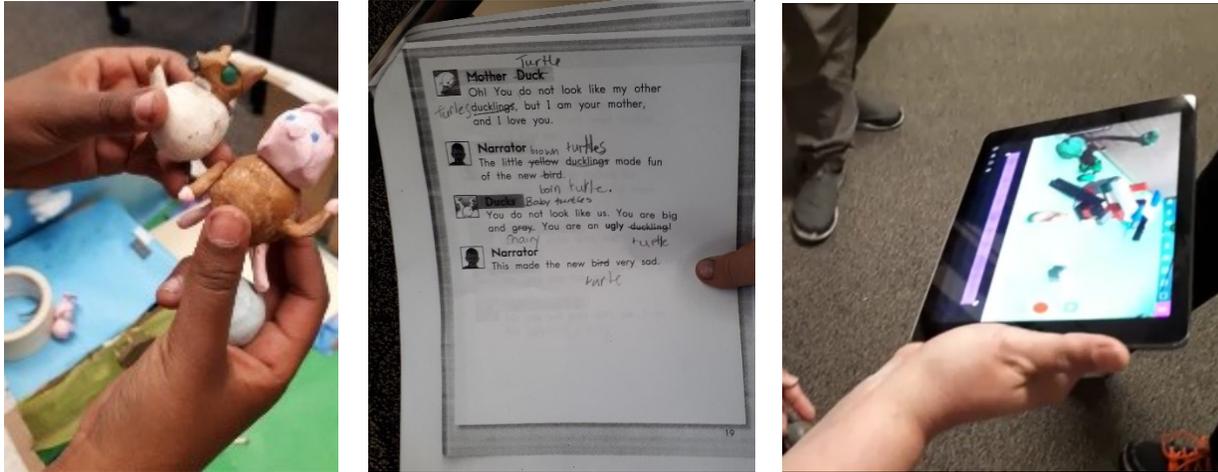
When we come to here, it takes forever to do this part. It takes too long.

Alexandra: Yes, but I feel we should have just said it all the way instead of doing it when the pictures are paused, because then we have more space.

Mrs. Carpenter: Let's listen to this clip and see what it is. Do you remember how we did that when we were editing together? We have to tap the purple square, and then that editing screen comes up. Now we want to go to audio and then play.

Figure 5.2

Images of Creating Stop Motion Videos



The conversation about the app they were using helped them to work out some of the issues they were having with the length and flow of their video. They also came to recognize that having a written script to follow along with as they manipulated their props for the images for the stop motion video would have improved the product, as they were unhappy with how it was turning out. Grade three students are capable of creating videos such as stop motion, but they required planning, a script written on paper or another device separate from the one they were

using, and face-to-face conversations about the process of creation, in terms of both using the app and of the genre of scriptwriting. In a classroom, they can talk with the teacher or each other. Out of the classroom, they might need to look to online discussion forums to find answers or opinions about what they are doing if they run into challenges. If Mrs. Carpenter only gave feedback on the final stop motion video itself, the students would have missed out on learning connected to using digital tools to create different representations beyond just using written language. Writing and oral language were both goals in this project, as was learning to create stop motion video. The students can take this learning about the process of creating a video to other large projects that require appropriate planning and preparation strategies.

Digital tools help students to read and write more independently, as they often have built-in support systems and help features. Both classroom teachers took the time to teach the students how to use those supports and did so through individual, small group, and whole-class instruction. Students also taught each other as they observed their classmates working alongside them on their Chromebooks and as they engaged in short conversations about what they learned or discovered while working.

Transliteracy for Troubleshooting and Problem Solving

An important aspect of digital transliteracy is seeing how literacy practices can help troubleshoot and solve problems. Troubleshooting is a common computer-related word and is connected to various programs that can be run in a computer to identify problems and look for potential solutions. Because some students volunteered to be a part of the Technology Team responsible for helping with troubleshooting, students knew that they could call upon one of those group members to help if needed. The students became accustomed to asking a team member for help before asking the teacher. If students went directly to the teacher first, she often

responded by asking if they read the troubleshooting chart first or asked someone from the Technology Team for help.

I observed the Technology Team use transliteracy practices to solve problems on many occasions. Although they were assigned to oversee the technology, they continued to recognize and rely on analog literacy practices to carry out their roles. There was a period when they struggled within their small group of four members around equity and distribution of responsibility. Some members felt that other members got to hand out the Chromebooks and iPads more than others. Mrs. Carpenter invited the Technology Team to a conversation to talk about their feelings around fairness and what they could do to solve the problems they felt they were having. Each student had an opportunity to voice their concerns, and together they decided that a schedule would help them to more equally share the Technology Team responsibilities of handing out and collecting the devices. Mrs. Carpenter allowed them to figure out what a schedule could look like and left them to create it. The students took some paper and tried to map out different types of schedules and eventually decided to create a chart that showed who would take on which responsibilities for each day of the week. They then wrote out the schedule and pinned it on the bulletin board. They were able to easily refer to it each day. I followed up on the effectiveness of their handwritten schedule, and they all felt it solved the problem of sharing responsibilities. They also created a row in the chart to show who will take over responsibilities if a team member is away from school that day. The transliteracy aspects of this literacy practice, using literacy to solve problems, involved using oral language to discuss a problem occurring in the team and then finding a medium for writing and displaying the solution in a way that was accessible and effective. Transliteracy involves examining available resources and then choosing a way to communicate constructed meaning using the best or most appropriate means of

expression. Transliteracy also includes the collaborative nature of constructing meaning in social experiences.

Throughout the study, I heard both classroom teachers, as well as the assistant principal, acknowledge that working with technology can be frustrating and can bring challenges even for those with extensive experience and knowledge. I believe students benefited from hearing this message, but they also needed to know that they can learn ways of solving technology problems to help reduce or resolve issues. For the students in the class, these solutions included direct instruction, the implementation of a trained Technology Team, a printed poster of what to do when they encounter a problem, and the freedom to help one another (with their hands in their pockets) to solve problems. They learned to use help features in online programs and to use Google to search more widely. Below are some of the effective troubleshooting prompts the students were given:

- Check your password or ID for spelling
- Ask someone who sits near you
- Shutdown and restart your Chromebook
- Ask a tech leader or problem solver leader
- Ask 3 before me
- When the internet won't connect or your Chromebook is taking forever to load, take it for a walkabout
- IF YOU HAVE TRIED ALL OF THESE STEPS – TAKE A DEEP BREATH, PUT YOUR CHROMEBOOK AWAY AND BUDDY UP WITH SOMEONE ELSE

In addition to spelling being an editing concern, I discovered that often the students were not finding what they were searching for online because their invented spelling was very far from the

expected spelling, and they could not get search results they anticipated. There is some danger in this outcome, as the results could yield unexpected or inappropriate links and did cause some students some frustration. Students in grade three are still learning a lot about spelling and often still spell words phonetically or use familiar spelling patterns that may or may not be correct.

The following discussion, which was among the whole class, was about problem-solving related to using prediction services in the Google search bar to improve the accuracy of searches by having a closer spelling approximation. I observed Benson searching for his topic of interest, the Paralympics, for his writing assignment on the teacher-designated webpage for the Olympics. Each time he tried to type Paralympics into the website search bar, he received a notice saying there were no results. This was very frustrating for Benson because he knew there were sections on the Paralympics on that website because he had accessed them previously, but the search tool was not yielding results. Benson and I discussed possible reasons as to why it was not retrieving results, and he wondered if he had made a spelling error. This was one of the first times that Benson experienced no results on a web search. Through discussion, he decided to try to search it first in Google to see how Paralympics is spelled and if that was the reason for the failed search. He decided to try adding the word, spell, in front of his word to see if it would offer the correct spelling. It was then that Mrs. Carpenter wandered over to see what we were working on. She felt that Benson's problem solving was worth sharing with the rest of the grade three students and invited the class to learn from his problem-solving strategy.

Mrs. Carpenter: Why did you put "spell" in front of it?

Benson: Because if you just said Paralympics, I don't think it would find the spelling.

Mrs. Carpenter: Let's go back to why you needed to know the spelling. (addressing the whole class) So, first he wanted to know how to spell it for the Olympics webpage. So then what happened?

Benson: I didn't spell it, because I didn't know how to spell it. But I spelled it P A R O... on the Olympic webpage in the corner.

Mrs. Carpenter: So, you put an O? And then what happened when you put an O?

Benson: It didn't work. There was nothing. Then I went to Google because I thought maybe the spelling was wrong.

Mrs. Carpenter: Okay, so let's go back and just spell it the way you did at the first time. So, he typed paro...Just let him show us what he did. Okay, then push enter. Then it spelled it for him and put it properly in the search bar. How cool is that? If you don't know how to spell something, you can just ask Google, and it will help you out, give you suggestions. Very cool.

Mrs. Carpenter: And what did you do after that? (Benson showed the class on the SMART Board how he went to the other website and started to type it in the website search bar.) So, he went to Google, it said how to spell Paralympics, he figured that out, and he came back to the Olympic journey website and then spelled it correctly. Spelling does matter in this case, right? So, what could you do now? You figured out how to spell it, so you can go back here P A R A L and put it in again. And then it will take you to... Let me put it in for you P A R A L Y M P I C S, is that right?

Benson: And there it was.

Mrs. Carpenter: How cool is that? It's a great opportunity for us this morning to learn about when you are searching and spelling. Sometimes when you make a mistake, Google will help you. Sometimes how you spell something really matters.

Being transliterate involves being good at problem-solving and knowing that there is often more than one way to accomplish tasks. This, perhaps, is related to learning to be resilient and to trying different methods when one way fails. It is valuable that students know that not all tasks are best solved using technology, although technology can be useful and sometimes less time consuming, but that adaptability and willingness to try something new is important. Multiliteracies account for what students learn, and digital transliteracies describes how they learn. Having multiple resources for students to use simultaneously contributes to constructing meaning, but so does varying the types of available resources. This study revealed the importance of teacher modeling in influencing the tools that the students chose when given the opportunity to select on their own. The teachers' think aloud and direct instruction in areas of digital literacy helped students to learn the language associated with the particular resource and taught the students the skills and strategies required for the task at hand. It is simply not enough to have resources available, especially within primary grades; teachers must engage in teaching how, why, and when to use them.

Social Transliteracy

Digital technology is deeply infused in daily life and human communication. Social media and wider access to the internet has opened doors into others' lives and experiences. It has also brought forth many avenues for collaboration and sharing as well as for expressing oneself. Throughout this paper, I have stated that literacy is situated within social practices. It is within these social practices that we can better understand the role that literacy plays in people's lives

and how literacy can connect people with one another. Researchers distinguishing between literacy events and literacy practices (Barton, 1994, Barton et al., 2000; Heath, 1983; Taylor, 1983) contributed to the understanding that literacy is socially and culturally situated (Gee, 1996, 2007; Purcell-Gates, 2007; Street, 1984, 2001, 2013). Social transliteracy also acknowledges that literacies must be situated and are described by their sociocultural context. The internet allows users to traverse boundaries of time and location, making the context in which to understand transliteracy practices sometimes blurred; consequently, recognizing that the context in which interactions occur must be acknowledged as a part of meaning-making. Different language, attitudes, and beliefs can be associated with literacy and ways of communicating in other social and cultural contexts available in online communities.

The internet also offers spaces for new social experiences that can extend worldwide. Social media apps, such as Instagram and Facebook, allow users to share visual images, videos, texts, and links within both personal and public networks. They have interactive features that involve reacting to posts with icons such as emojis, using “like” buttons, posting comments, or sharing information with new circles of people. Other collaboration apps, like Google Docs or wikis, can offer opportunities to co-construct texts with others who do not need to be in the same location. There are also mimicking apps, like TikTok or pearltrees, that allow users to copy what others have created to either use or view it or to use as a template to create their own. There are many ways for people to socially interact online, both synchronously and asynchronously, using text, images, video, music, or a multimodal combination. Social media apps, such as Instagram and Snapchat offer alternatives for using photos and media to connect with others. Gee (2007) suggests that people can find affinity groups that share similar ways of “thinking, acting, valuing, and believing” who engage in similar social practices within online spaces (p. 28). Beyond the

internet are other ways that literacies can connect people socially and mediate their interactions, such as face-to-face conversations, reading and writing, and viewing or listening to others speak or act.

I observed many instances of social transliteracies in the grade three classroom, particularly because I was there for extended periods of time and observed the students both in and outside of the classroom. When I observed the students' social literacy practices, I could see how their literacy practices were related to how they constructed meaning across many other experiences that were not necessarily related to what was happening at the moment.

Transliteracy transcends time and space, meaning a transliteracy practice may be influenced by past or present experiences from many contexts and situations.

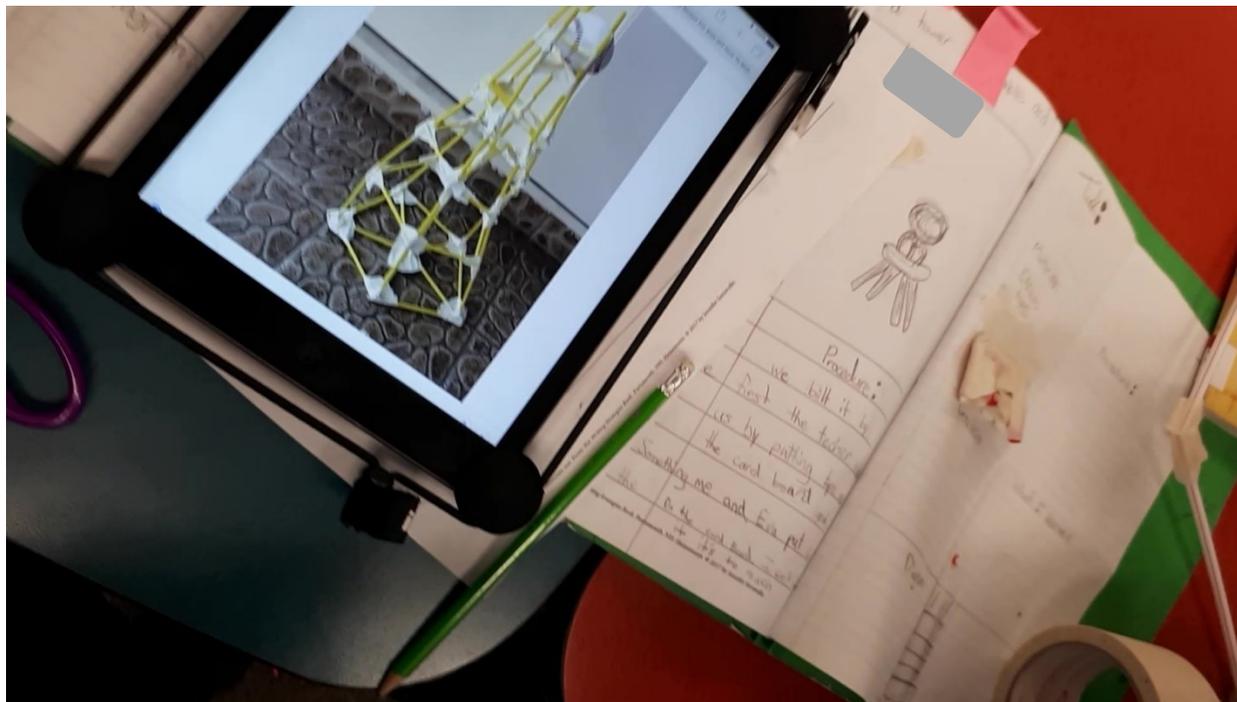
Although many of the grade three students did not use social media such as Instagram or Facebook, they did engage in socially created texts and in learning to use online surveys and feedback. The Google suite, with its sharing options, allowed students to co-create texts and provide comments to each other from their own devices. Physically sharing a device and taking turns using it also contributed to social transliteracy. For example, when students were recording their stop motion videos, they each tried to take the still photos and, with heads together, manipulated the pauses and timing together. Social networks, especially those that involve tagging, comments, or open-source aspects, allow any user to contribute to the social construction of meaning on a particular text or media and thus challenge the idea of the "online expert." Mrs. Carpenter created a task involving teaching the students to create an online survey so that they could see a means of collecting information that was interesting and relevant to their needs. The students then used the information they collected from their surveys to make adjustments. Within the school library, it was possible to find student-created texts that had

barcodes and could be signed out by the students. This is another example of how the notion of the literacy expert is changing, and that student-created texts can and should be valued.

In science, the students accessed other students' images and descriptions of structures they had built to help them to plan for their own (see Figure 5.3). They did not choose to seek expert knowledge but sought the work of those most similar to them. Ipri (2010) suggested that “the social aspects of transliteracy can enhance the workplace by creating robust systems of knowledge sharing and can enhance user experience by granting them a role in the construction of information” (p. 567).

Figure 5.3

Using an iPad to Build Structures in Science



The students were aware of social media and occasionally referenced things they saw on their parents' or siblings' devices, but most of them did not have their own accounts. They were most familiar with YouTube and accessing and reading comments on videos. Although the

students did not use apps such as Twitter on their own, experiences similar to tweeting or commenting seeped into learning experiences, and they were familiar with and used phrases associated with SMS language or slang often used with text messaging or internet communication. The whole school engaged in writing paper tweets to others, which were tacked onto a wall in the library and were expected to follow an SMS or twitter style. To do this, the students and teachers explored what a tweet was and how it differed from other types of texts. The whole-school activity was about “Tweeting others with kindness,” and although it involved the style of tweeting, it was more about building others up through kind language and words. The students practiced their tweets by engaging in a whole-class discussion around the parameters of Twitter and language used, then they used a personal whiteboard to try out a few while working alongside people, and then finally used a sticky note to write the tweet they individually decided upon so they could have it checked by others and the teacher. They then wrote their tweets in a final copy on a heart and stapled them to the bulletin board in the library (see Figure 5.4). The premise of Twitter involves using a limited number of characters (maximum 280), using the @ symbol (for mentioning), the # (hashtag for common themes), or URLs, and engaging in the processes of retweeting or liking tweets. Typically, Twitter is an online activity, but the school used the idea of tweeting and merged it into an offline activity to promote literacy development as well as support positive relationships. A side benefit of the offline learning of Twitter was that the students had an opportunity to experience and learn about tweeting in a controlled manner and still learn the practices around this popular and useful social media experience. In reference to the sociocultural aspects of new literacies, Serafini (2014) acknowledged that “the evolutionary trajectories of multimodality and new literacies go beyond the technical aspects of digital environments and hypertexts to incorporate new ways of participating and collaborating

Internet games inspiring traditional literacy

Research on the effects of gaming in schools remains controversial (McTigue & Uppstad, 2019). This controversy is somewhat due to the variety of games available, age of users, how they are used, the duration of the games, and the device or platform used to play them (e.g., gaming console, computer, smartphone, or tablet) (see Mayer, 2019). Other controversy stems from questions of how violence or competitiveness in games is connected to aggressive behaviours (see Dowsett & Jackson, 2019; Hoong et al., 2020; Kumarasuriar, et. al, 2011). Other research supports gaming in the classroom. For example, Beavis et al. (2017) explored students' thoughts on using digital games in school and wrote that gaming in school can be successful when there is a clearly defined learning focus and series of tasks, there is choice in games that are interesting, and when game play is balanced with other pedagogical practices (p. 34).

What I learned from the students in grade three is that, even though some games may include violence or seem less educational to adults, they can inspire a number of transliteracy practices that improve students' motivation and development of more traditional literacy experiences, like reading and writing at school. To many, the squiggles and shapes in Figure 5.5 might seem random or meaningless. To Kwento, they represent a whole world of transliteracy practices related to something he cares deeply about, thinks about often, and chooses to write or discuss whenever given the opportunity. As previously mentioned, Kwento likes to watch YouTubers play the internet game, Undertale. Although it is much more than simply viewing for him, it inspired multiple transliteracy practices that emerge both in school, on the playground, and at home. Kwento has learned to search for YouTube videos about the game, but in doing so, has refined his interest by learning which YouTubers create content he likes better than others. He also talked about what people wrote in the comments on the videos and whether he agreed or

disagreed with what was written. He has learned to subscribe to YouTubers' channels to have quick access to their updated material. Because of watching others play so often, he learned and memorized the opening credits and introduction to the game. I did observe him trying to type it out in a word document one day. He can easily orally repeat the opening sequence and uses appropriate prosody to create an ominous and mysterious tone.

Figure 5.5

Examples of Kwento's Drawings Related to Undertale



Another literacy practice that his Undertale game viewing has inspired is drawing what he sees as parts of the game and explaining his drawings to those who ask. Mostly due to his accommodations as a person with autism but also because of his personality, Mrs. Carpenter explained that she allowed Kwento to doodle whenever he liked, especially when he felt agitated or overstimulated. She believed that doodling did improve his focus, and more often than not, he doodled about Undertale and repeatedly drew the weapons and attributes of the game on his doodle pad. He also brought Undertale episodes into his narrative writing and researched about it if given the chance. I do not have a clear picture of why he does not actually play the game, only that he told me that he prefers to watch and draw about it. Perhaps Kwento had found an affinity

space (Gee, 2007) online with others who share a similar passion for Undertale without actually wanting to play himself.

It was encouraging to see an interest in an online game inspire so many transliterate practices that were developed both in and out of school. He read, wrote, listened, spoke, viewed, and represented details all related to the game. I believe that when given the opportunity to draw on his interest in Undertale that he wrote more and had more appropriate and engaging oral conversations because of it.

Undertale also inspired Kwento to find books with related content in the school library and brought him to a series about Dragon Masters that he explained might be similar to what he likes about the adventures in Undertale. Drawing about the game also acted as a calming experience for him in school to help him focus and stay on task. This literacy practice was important for Kwento, as it not only showed connections between his in-school and out-of-school literacies, but it also helped him to control and regulate his emotions at school simply by having something that he was interested in to draw or write about. In his study on gaming literacies connected to the game Dungeons and Dragons (D&D), Garcia (2020) identified three primary spaces in which gaming literacies were developed and sustained: in the game, at the table, and beyond the table (p. 16). Although D&D is an analog tabletop roleplaying game and Undertale is a digital roleplaying game, there were consistencies in how interests stemming from in the game or at the table literacies, inspired a range of transliteracy extensions of the play. The literacy practices labeled as beyond the D&D table in Garcia's study included painting, podcasting, producing/writing, mapmaking, attending conventions, posting in online forums and blogs, making and watching multimodal texts (e.g., tutorials), crowdfunding, and consuming fantasy-based books, books, films, and other media. Garcia presented these three gaming

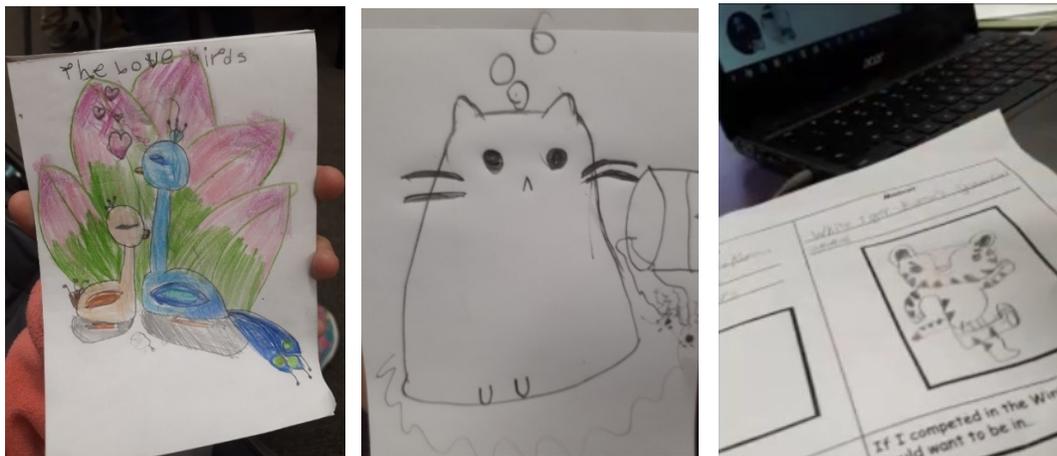
literacies in a linear and sequential order, suggesting that learning happens as players move from one space to another; however, the participants in the study did not engage in these literacy practices in order, before, during, and after play but engaged in them throughout and during play in transliterate ways that changed their understanding and relationships to each other, how they played the game, and what they did with their learning following a sit-down episode of play at the table. Kwento, although mostly solitary in his exploration of Undertale, also moved back and forth between his play (watching Undertale tutorials) and producing and consuming other related texts connected to his learning from play. His engagement with the game extended beyond simply viewing a video and continued long after his viewing events and into merged into other literacy practices in other spaces as he continued to view more videos, search new forums on the game, and write and draw about his own connections to the game.

In addition to Kwento's transliteracy connections to online or video games, I also observed the students writing, drawing, or talking about games such as Minecraft, Roblox, and apps with virtual pets. I also saw evidence of other video games or popular images on the students' clothing, such as Super Mario Brothers or Hello Kitty. "Examining what young children are doing with popular culture and literacy in their everyday lives," explained Dunn et al., (2014), "can enable teachers to support and extend children's literacy learning more effectively" (p. 29). Many times, these games seeped into their conversations or writing or were used as a starting place to find other related material such as books or videos. One student loved anime and was regularly drawing animals in an anime style in a notebook or when given tasks to illustrate or draw her thinking (see Figure 5.6). Video games and other media such as television or cartoons were a large part of many of the students out-of-school experiences, but they found

ways to bridge learning by suggesting an interest or excitement that could be pursued in school-based learning and activities.

Figure 5.6

Anime-Inspired Drawings



Social Transliteracy in Student Created Clubs

Social transliteracy was also evident in collaborative learning experiences both within classroom activities and outside of school. Social aspects of engagement (McCaskin, 2009) are strongly affected by the situation and the context, and students are more likely to engage with an activity if they have a sense of being literate and competent with the task. Although many of the activities were connected to school learning, students engaged in social transliteracy outside of the classroom by extending their in-school literacy experiences into out-of-school spaces. One relevant example of this was when the students used transliteracy practices to create and engage in social clubs.

In the spring, a small group of students created a club during recess. It began with one girl and three of the boys from the classroom. At first, the children in the club worked to make up a language. They explained to me that all the words in their language needed to start with “br” and br could be added to any English word they wanted to say. They asked me not to tell the

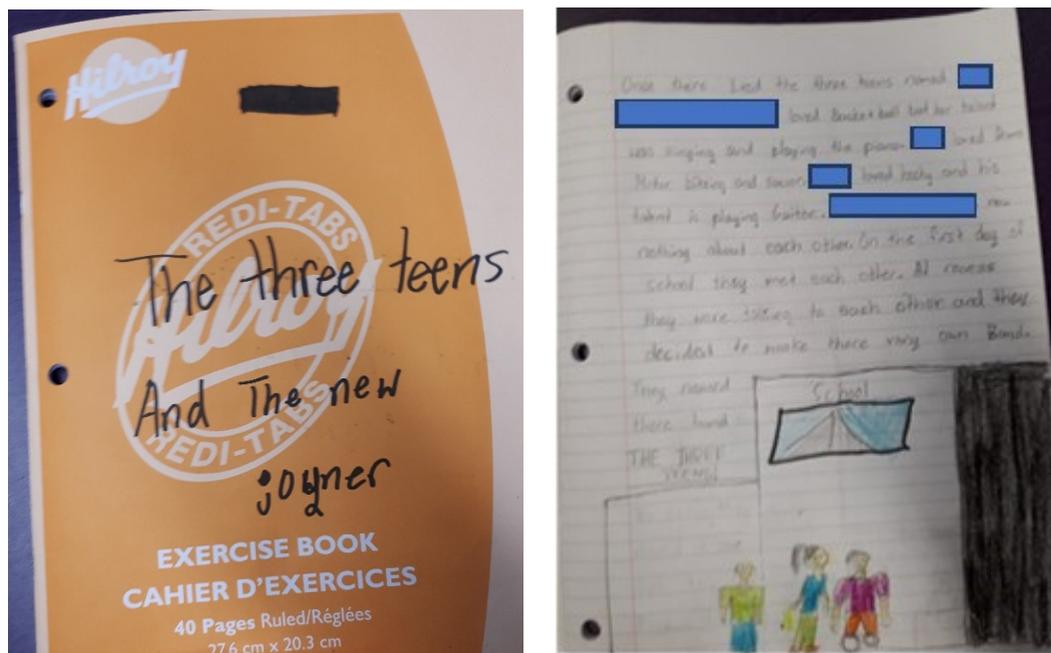
other students the code to the language. They explained that two of the original members created the language, and the other two members were still learning it. One boy said that he was quickly catching on, and the other told me that he was “still in training.” The children in the club spent their recesses practicing how to communicate in their language. At that point, they were considering training a girl from the class in it. I would consider the original members of the club to be the more popular children. To join the club, one of the members had to share the secret code (which was a word in their secret language) with potential members. The membership was exclusive to the original group for one week, but after that, everyone knew about the club, and everyone wanted in. The club only let in three additional members, one girl and two boys from the class, making it a club of seven students. Andrew, who was not in the club, tried very hard to join by asking many times. He was told by the group that he needed to be able to speak the language before he could join, but the group fizzled out at that point, and the original language excitement ended.

The group then moved on to writing a story in a paper notebook called “The three teens and the new joyner.” It featured themselves as teenagers, and only the original four participated. They appeared to only invite each other into the writing project and excluded all the other students (see Figure 5.7). Again, all the work on their story happened at recess, and the book was kept in one of their backpacks and only seen when they were out of the classroom. I observed the children hiding their book under their shirts or by their legs as they brought it outside. Social transliteracy was evident in the social club developed by this group. They engaged in multiple literacies but in transliterate ways. They developed and engaged socially with each other through the transliteracy practices, for example, using oral language, including using language to control others’ behaviour and to include or exclude people. They also selected a paper notebook to write

their story because it was easily carried from one place to another and could be passed around by members of the group. My understanding was that one of the students was the main writer, and the others contributed ideas and illustrations. Although many of the activities were connected to school learning, students used literacy outside of the classroom or extended their in-school literacy experiences into out-of-school spaces. The activities are examples of social transliteracy, as they illustrate the fluidity of literacy practices and modes (oral, visual, and written) required for their social experiences. Viewing the transliteracy practices together and in relationship with each other helps explain the social nature of literacy much better than seeing literacy events, such as the creation of a language or writing a narrative, as separate, unrelated activities. They must be viewed in relation to each other and viewed in how they impacted the social organization of the students themselves and how it was used to control or show power amongst the grade threes.

Figure 5.7

Student-Created Story



Technology-Based Language

As a result of the regular use of digital technology in the grade three class, words connected to the use of technology were a part of the everyday language used in the classroom. It appeared that the students were testing out new vocabulary associated with technology, devices, or the internet in their oral and written language. Hinrichsen and Coombs (2013) suggested that resources needed for decoding and making meaning are increasing, given new operations required for using and engaging with digital texts. They wrote, “this includes new terminology and sign systems; presentational conventions and stylistic options; navigational mechanisms; and operational concepts and protocols such as the distinction between ‘save’ and ‘save as’” (p. 7). With changing operations for navigating and using digital texts comes new language associated with their use. Using a technology-based vernacular in conversation was an indication that they were understanding, or coming to understand, what the term meant. The use of the word, Google, which was very commonly used as a verb in the grade three classroom, especially when they wanted to search for something online, aligns with the noted change in its public and colloquial use. In 2006, it was added to the Merriam Webster Collegiate Dictionary and the Oxford English dictionaries as a verb meaning “to use the Google search engine to obtain information on the Internet” (“Google,” n.d.).

Some language related to using computers, devices, and social media was noted in the personal conversations with one another in social experiences, even in times when they were not using a computer. The words they used were relevant to the transliteracy practices in which they engaged. They often talked about the need to “look it up” or “Google” something and would bring in social media references such as YouTubers they watched or funny memes (an action or captioned image or video that uses humour to share cultural or social beliefs or attitudes). The

students would occasionally share a video or meme with each other by acting it out, describing it, or showing it on a device. The tagline would then become the topic of interest for a while, and most of the students would participate. Sometimes they would act out a meme or activity they saw online both in the classroom and on the playground. The references to social media and the mimicking of it that I observed, further supports the social nature of transliteracy and that it spills into other contexts and experiences in people's lives. Occasionally, the students' written work also emulated digital texts from the internet or social media. For example, students would draw images with speech bubbles, captions, or what seemed like texting bubbles. Students would also use textspeak or common abbreviations used in SMS/texting language.

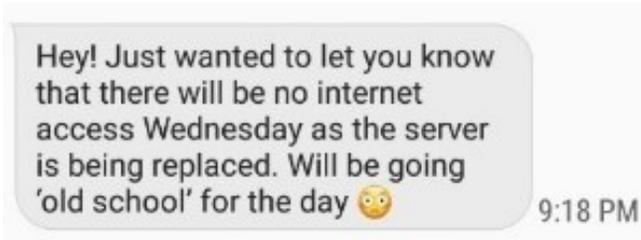
The students learned some technology-based language from the teachers as they modeled digital transliteracy and used think aloud and questioning when working with devices with the students. Just as Hinrichsen and Coombs (2013) observed that language is embedded in operational operations, I found that teachers discovered the need to pay particular attention to the words they used to describe operations, as those words are an equally important part of learning to use a platform or application. Words such as hover, scroll, cursor, swipe, home, and even right-click were words that required some explanation as the teachers were trying to show the students how to access content online. Students also needed to learn the name for parts of websites such as URLs, new tab, browser, search bar, image tab, and what it means to minimize or close a browser. As a result of teacher modeling and direct instruction on technology-based language, students used the language on their own and even corrected each other when someone used it incorrectly. It also developed students' metalinguistic awareness when used across platforms and domains of life and learning.

Language is adapting to the changes in multimodal digital texts and how they are used. New vocabulary and use of grammar have emerged as a result of the tools people use to communicate. For example, texting, or using SMS, has brought about many acronyms that challenge traditional spelling and grammar conventions. Although the students in grade three did not do a lot of texting on personal devices, they were familiar with some textspeak such as LOL (laughing out loud) and OMG (oh my gosh) and used emojis in their writing and drawing, such as happy or sad faces. I texted regularly with Mrs. Carpenter, and the language we used over SMS was more casual than the language we used over email or face to face. Texts from Denise started with “Hey” or “Hi” or included phrases such as “no worries” or “you bet.” They occasionally included emojis and photographs. Texting was mostly used to coordinate times for classroom visits and to communicate if there was a slight change I needed to know. For example, one evening, she texted me to let me know that there would be no internet as the server was being replaced, and they “will be going ‘old school’ for the day” (see Figure 5.8). Although the register of texting language is more casual, there are still socially established protocols that students learn from engaging in texting and talking about it with their friends. In the activity in which they learned to write Twitter tweets, they had a specific conversation on the appropriate language and protocols for tweeting, just as is the case with SMS. Being able to choose and use the proper register, protocol, language, and grammar across platforms and applications is a skill these grade three students will need to further develop and use over time and experience with social media and use of digital devices. Sukovic (2017) wrote that transliteracy “comes to the fore in the process of remixing resources and protocols, and recombining established practices to open new information and knowledge spaces” (p. 32). Language, whether oral or written, is key in representing how knowledge gets remixed as people construct meaning and communicate and

collaborate with one another. Transliteracy extends opportunities for literacy across new and old registers and ways of communication.

Figure 5.8

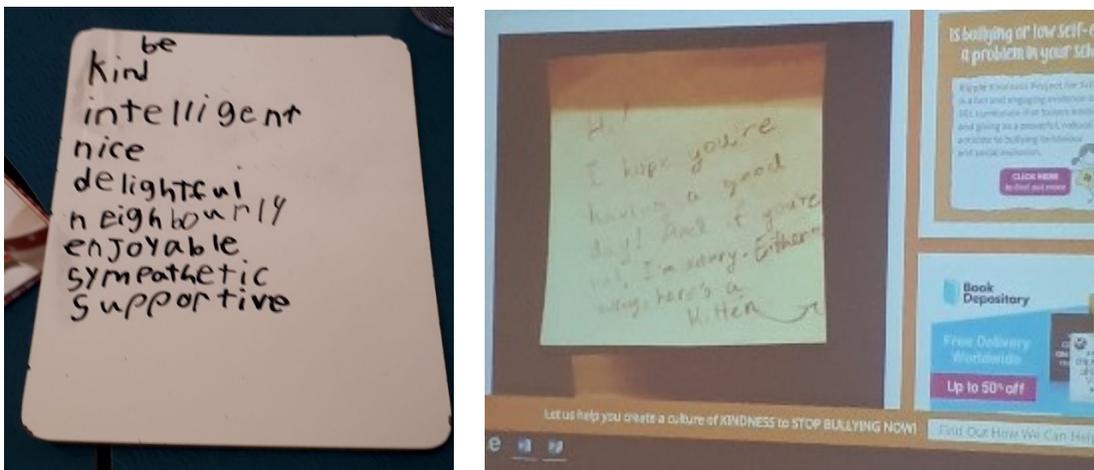
Example of Text Message

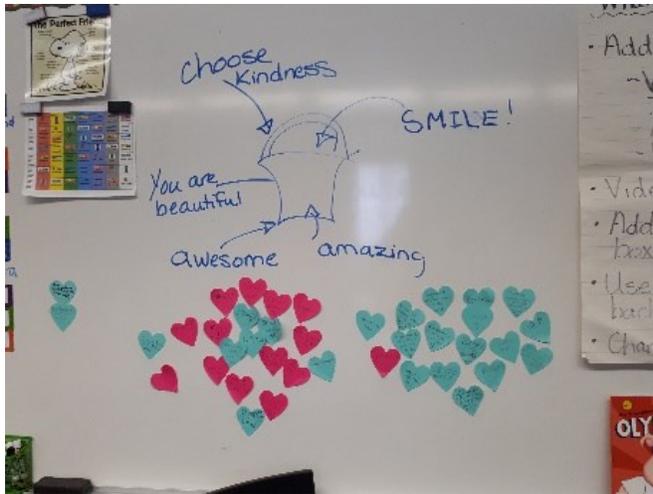


Mrs. Carpenter also engaged in explicit teaching about the language used in other forms of communication, such as during the Twitter example previously explained. Another example of discussing language use, including registers and forms of oral and written language, was during health class, the students were learning to resolve conflict among friends and talked about ways to send messages of encouragement and love that are short but powerful.

Figure 5.9

Examples of Learning to Write Short and Powerful Messages





In Figure 5.9, Mrs. Carpenter recorded ideas shared by the students and demonstrated how they can be translated into social media speak. She also showed images of writing notes of apology on Post-it notes, and the students engaged in role-playing to talk through difficult situations. She related words of kindness to their previous shared reading on the book *Have You Filled a Bucket Today?* by Carol McCloud (2006) and used the topic of the book to brainstorm language they could use in their messages. Also as part of the lesson, Mrs. Carpenter also showed the novel *TBH, This Is So Awkward* by Lisa Greenwald (2018) and in her book talk discussed how there was an issue in the girls' friendship that emerged from a problem over misinterpreting SMS/texts. The entire book is written in text messages so readers can see that meaning sometimes is lost through texting or misinterpretations can occur.

As she was describing the book, Mrs. Carpenter also told the students that she needed to look up some of the SMS language/textspeak because she did not know it as she started reading but then later noticed that the author had included a translation page at the back of the book that she could use instead. She also talked about her experience of not knowing what LOL meant for a long time, which turned the conversation to what it and other common textspeak phrases or acronyms mean. The students were highly engaged in this conversation and empathized with

Mrs. Carpenter when she shared that she wanted to learn more about texting language. She told the students, “I didn’t want to appear like I didn’t know what I was talking about.” One student called out, “So, you Googled it,” and Mrs. Carpenter agreed and then explained how she used Google to type in “what does LOL mean?” to find out. She also related text messaging to her personal life when she shared with the students that now, when her teenage children text her, she tries to “be the cool mom” and use text language, but sometimes when they respond, she still has to look up what they are saying. The discussion the students were having with Mrs. Carpenter about learning text speak shared some similarities with learning any new language, such as using resources to find the meaning of new words, using context cues to read the new language, and practicing it socially with more experienced users. Additionally, authentic, inquiry-based units that focus on real-world issues support cross-disciplinary learning and encourage students to think globally and act locally (Dwyer, 2016). Through the health lessons on friendship, students engaged in thinking about social uses of language and how we can use different forms of language to connect with others and to build and maintain relationships.

Disciplinary Transliteracy in Content Areas

My observations and data collection extended beyond language arts time, which afforded the opportunity to observe transliteracy practices across the curriculum, both in and out of the grade three classroom. Quite often, elementary teachers teach more than a single course or two (as is the case in secondary school); therefore, they can make connections across content and literacy strategies encountered throughout the school day. Many of the examples of transliteracy shared in Chapter Four involved cross curricular aspects from multiple subjects and disciplines and were typical in the grade three classroom.

Disciplinary literacy is sometimes called content area literacy; however, there are distinct pedagogical differences between them (Goldman et al., 2016; Hinchman & O'Brien, 2019; Moje, 2015; Shanahan et al., 2019). Shanahan et al. (2019) described disciplinary literacy as understanding literacy within its field or discipline and its unique sociocultural practices, whereas content-area reading focuses on literacy strategies and practices to help decode and comprehend the texts in which readers are engaging. They suggested that disciplinary literacy involves participating in the literacy activities and discourse of the field; for example, in science, this might mean learning to read and write as a scientist. Content-area literacy would focus primarily on strategies to help read, write, or research across different content or topics, and in the case of science, informational texts and media and research findings. Hinchman and O'Brien (2019) recently appealed that research in the areas of disciplinary literacy and in content area reading has failed due to seeing reading only from an infusion approach, that is, focusing on how cognitive models or functional skills and strategies can be superimposed onto very discipline-specific learning. They called for researchers and teachers to consider a hybridity approach that “builds from the variety of discourses in all learning spaces—including literacy and disciplinary discourses as well as school and community cultural beliefs, practices, and resources” (p. 525).

The descriptions of transliteracy practices that follow contribute to understanding disciplinary literacy from a hybridity perspective but also capture the need to teach content area literacy strategies as well. Disciplinary transliteracy is a way to capture the nature of hybrid literacy opportunities across the curriculum by incorporating good literacy practices paired with understanding how literacy in other disciplines is socially and culturally situated and practiced. “Free movement across the fields,” stated Sukovic (2017), “is required to develop transliteracy, which, in turn, provides conditions for deepening connections between traditionally disparate

ways of knowing” (p. 101). What sets disciplinary transliteracy apart from other understandings of disciplinary literacy, or even content area literacy, is the acknowledgement that constructing meaning is occurring because of all the learning happening outside of the current literacy experience as well as across multiple resources and media. Learners draw from their experiences and funds of knowledge that extend beyond a specific discipline or content area knowledge and understanding. Transliteracy, as stated by Megwalu (2014), “is about developing the ability to have meaningful and purposeful interactions with information found across a multitude of platforms” (p. 354). Transliteracy also involves using a variety of resources and strategies that may or may not be specific to a discipline but are what students use to make meaning.

Along with considering when and why to teach content- or discipline-specific literacies outside of English language arts is the challenge of choosing the tools and resources to do so. Ciampa (2016) wrote, “it has become increasingly necessary to integrate technology and content area literacy instruction so students can develop the strategic knowledge and skills to be discipline literate” (p. 295); however, her research has shown that too often the focus is on acquiring the physical technology tools and not on how to increase teacher competency in integrating and using the tools across the curriculum. Mrs. Carpenter and Mrs. Rayne’s successful immersion of transliteracy across the subject areas was related to the knowledge and skills they possessed that were required to adequately use the available technology. Ciampa further claimed that to help “teachers and students move forward into the digital age, we need to give them time to explore and critically evaluate a wide range of digital resources and time to talk with other teachers and teacher educators about how they have been using these resources in their classrooms” (p. 305). For disciplinary transliteracy to be successful, continued professional development for teachers, along with direct instruction for students, is required when using new

technologies even, and especially when the learning is happening outside of English language arts classes.

Many digital learning environments, such as spaces like Google Classroom or websites for creating, offer built-in scaffolding, making them easy to use in most contexts and content areas, but teachers and students do need to know how to use them. The students in grade three were flexible in their willingness to try new resources and websites, sometimes even more so than the teachers. Generally, I observed that students also recognized the potential of using learning tools in contexts different from the one in which they learned it. For example, in math, Mrs. Carpenter taught the students to create online surveys for each other. Her learning goal was to teach them to use the data collected from their results to graph preferences. The example she did with the students involved creating a survey about favourite ice cream flavours. Although the intention was to learn to collect data and then graph it, the activity involved many cross-disciplinary transliteracies. The students learned how to ask questions by reviewing other various online surveys and in discussion with each other during the opportunity to create a survey together. They also learned to choose a topic of interest and talked about why people create surveys. They discussed what can happen with online survey results, both in positive (gaining needed information) and negative (selling or sharing results, not using them for intended purposes) ways. In creating and responding to each other's online surveys, they participated socially by contributing information and learned the digital skills required to create and take a survey. Because Mrs. Carpenter left the topic to choice, some students chose to create online surveys that were related to their language arts Olympics projects, others related theirs to personal interests (cat breeds, sports, vehicles), and some connected to other school topics (countries/social studies, school, jobs). Furthermore, Mrs. Carpenter took all of the surveys and

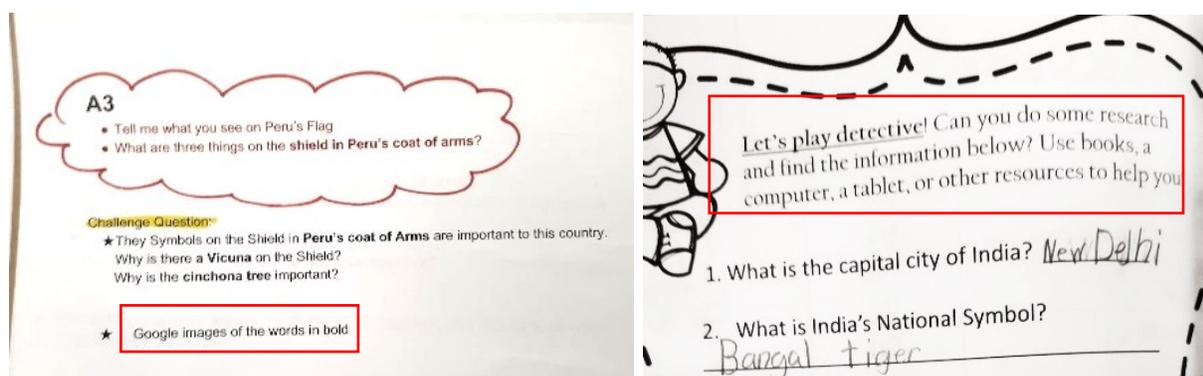
linked them to a Symbaloo page with the intention of making it easier to find and access the class surveys. This was a transliteracy practice that modeled a method of collecting shared or related activities by using an online curation tool used in a different subject area and was used in a slightly different way from how they had previously experienced it.

Mrs. Rayne, who taught the grade threes social studies and science was transliterate in her teaching, and thus, also a good model for her students in how to construct meaning through transliteracy practices. For example, she regularly used the computer and document camera to project images onto the SMART Board. She smoothly moved among paper-based textbooks and maps, paper assignment sheets, and the internet to teach the required or expected content. Mrs. Rayne often used YouTube videos and Google images while teaching and did so in both spontaneous ways, in response to student questions or interests, and in planned ways, by preselecting images, videos and websites ahead of the lesson. She would often have the preselected resources preloaded on the computer, ready to drag onto the SMART Board. Mrs. Rayne also expected disciplinary transliteracy in the assignments and learning activities she offered students. Figure 5.10 shows examples of invitations to use transliteracy practices in social studies. The worksheet is from a purchased teacher resource, and the card was created by Mrs. Rayne. On the assignment card, which was for small groups to work together to learn about Peru, is a suggestion for students to use Google Images to find the answer by searching the bolded words from the written task. The students were given options to use their textbook, notes, and a computer or iPad. Most groups decided to divide the resources among themselves, and each use what they had to search for the answer. Often more than one student shared the computer or iPad, and it was often where the students looked first for answers, especially when they were not easily found in the textbook.

Mrs. Rayne engaged in explicitly teaching the students how to read paper maps as well as digital maps, to use the glossary and index in their textbooks, and to use Google search to find related information and images in authentic ways and when it was required for the social studies and science activities. She demonstrated disciplinary transliteracy, that is, learning the literacies of the discipline in practice, more so than content area literacy, such as teaching reading and writing skills. I believe that I was able to clearly see the disciplinary transliteracy in her classes because she was not assigned to teach English language arts and focused a lot of her teaching on social studies and science-specific learning. Moje (2015) claimed that “to teach disciplinary literacy, teachers need to involve learners in inquiry that allows the learner to gain insight into how questions are asked and examined and how conclusions are drawn, supported, communicated, contested, and defended” (p. 257). I often heard Mrs. Rayne suggest to the students that they think “like a scientist” or “like an archeologist,” which prompted them to better understand discipline related perspectives.

Figure 5.10

Examples of Invitations to Use Transliteracy Practices in Social Studies



In science, Mrs. Rayne used videos for instruction and used images to support learning. She developed a mini-unit for the students on building that involved using various materials to build structures that would meet height and strength requirements. After some instruction and

discussion about materials and shapes used for support in buildings, the students were challenged to create their own structures in small groups. The structure was to use a set number of straws and tape as materials. Together, they searched for samples of others' work online and then were given the freedom to continue their planning and research on their own. One student asked if it was cheating to look at and possibly copy someone else's design online. Mrs. Rayne explained that looking at how other people create things online can often give you new ideas, especially when you do not know where to start. She told the students that even if they copied a build from an image, they would still need to engage in the planning and thinking required to make it happen. Looking widely across resources and media is a transliteracy practice that can spark creativity and provide the background knowledge required to get started on a new or challenging task. It also presents an opportunity to make judgements about whether what is viewed or read is something the user will choose. Because of the vast number of examples found online, students learn from sorting good from poor examples. The grade three students often made quick decisions and either kept scrolling, clicking, or swiping to the next idea or image.

Sometimes the students experienced frustration when searching online. Some of their frustration was related to the limitations of a Chromebook, such as a small screen, finicky touchpad, and inexperience using and switching between multiple tabs or windows. Sometimes the students simply were frustrated with using a computer when they believed there were other better options for getting the information they needed. During the Olympics unit, Benson expressed some frustration with the need to look up the same information daily on the Chromebook to complete the math graph and to carry out their class research. He had responded to Mrs. Carpenter's query about the place of newspapers and other printed articles in the students' portfolio as part of their research activities. When I asked him to explain what he

meant, he replied that he has been thinking about how helpful it would be to have a chart with all the sports listed and the dates on which they were occurring posted on the wall. He felt that he always needed to first search the sport and date to find if the events had happened yet and that it was wasting his time. He commented that if there was a chart to reference, they “could go back to what we were writing on Chromebook so instead of just going back and forth, back and forth.” He was referring to the usefulness of being able to reference a paper printout as he worked on his writing, as the switching between tabs was wasting his time. He explained that it would also reduce the number of tabs he had open at one time because the required information about the sports and dates would be available before he even needed to start his research. He was also aware that working Google slides also meant another tab to negotiate switching back and forth between as he tried to copy and write down important information. Benson seemed to recognize that not all transliteracy practices should involve just digital texts or technologies and that sometimes using digital and analog texts together was most beneficial. The following section describes transliteracy opportunities where students did use several resources simultaneously and reciprocally as they constructed meaning.

Simultaneous and Reciprocal Transliteracy Practices Across the Curriculum

The reciprocity of digital and analog texts was significant to the students’ learning and meaning-making. The teacher often modeled how to use paper and pencil tasks, along with a word processing program such as Google Docs or Slides. Paper tasks, such as planning or graphic organizers, were used to prepare for writing or presenting using online platforms but also were used to document what was read and viewed online. For writing assignments that would be completed using a computer, the students choose to use paper first for their planning process and then to transfer their ideas to the computer. Blank paper or a personal whiteboard seemed to be

useful in helping the children to record their ideas before they started to use the computer. In my observations, I noted that less planning happened once they started using Google to search for ideas unless they were using a printed graphic organizer to help collect and sort ideas from online research. At the stage of creating a presentation or Google Doc, the students then moved back and forth between their planning sheets or graphic organizers and continued Google searches for more information or to clarify ideas.

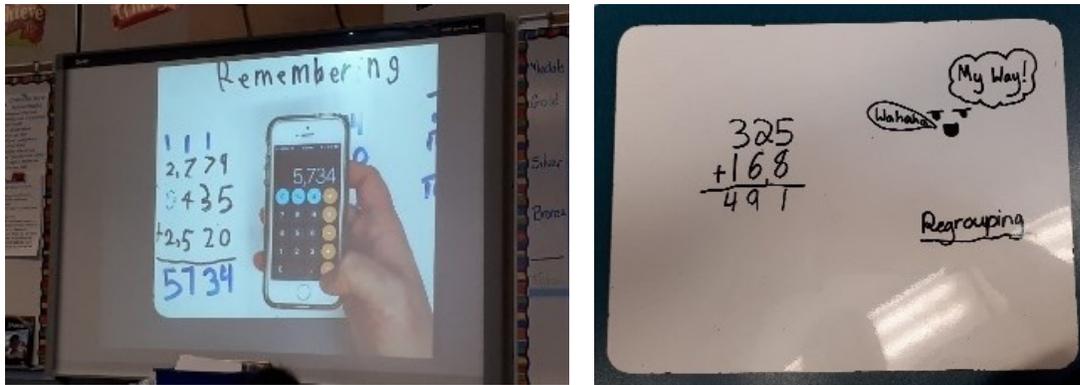
Outside of research projects, I observed students using scraps of paper to write down ideas from what they were working on when using the computer, to share notes or URLs with each other, or to take to the teacher to have help to spell a search term they needed for an online search. I also observed the students using the Chromebooks to spell words for their paper-based writing or to look up statistics or photographs to complete their social studies or science work in their duotangs. As the students worked on various tasks, the teachers would also supplement learning with videos, images projected on the SMART Board, or text or drawings completed on the whiteboard with the whiteboard markers both in planned and spontaneous ways. The teachers also used large paper chart paper, printed off posters or lists of rules or expectations, and magnets with writing on them stuck to the boards at the front. Quite often, a student or the teacher would use the document camera to project a paper worksheet onto the SMART Board so all the students could see the work more clearly.

There were also times in which the teachers projected an iPad, Chromebook, or smartphone under the document camera for similar demonstration purposes. Figure 5.11 is an image of Mrs. Carpenter during a math lesson. Each student had their own small whiteboard and marker and was thinking through and writing about the strategies they use to complete math problems on their own. The word “Remembering” in the image is part of one student’s response.

You can also see an equation and a pictorial representation slightly hidden under the phone. The image is a capture of a moment when Mrs. Carpenter took one of the students' whiteboards and projected it under the document camera. From there, she and the student talked through the student's various math strategies in front of the class. At one point in the discussion, Mrs. Carpenter retrieved her personal phone from her desk and used the calculator app to show the students how they could check their answers using a calculator or use a calculator as a strategy for solving the equation. She explained to the class that she was using her phone because she did not have a calculator handy but, in doing so, showed the students flexibility in problem-solving and how to select from available resources. She also rationalized her choice to use the phone over seeking out a calculator by explaining that given the moment, it was easier and faster to use the app. Even though this was a brief, unplanned activity, it was important transliteracy modeling. There was continuous back and forth and simultaneous use of both analog and digital teaching and learning strategies in the classroom that enhanced how students constructed meaning. The students were given opportunities to use their available resources to get their jobs done. If there was a restriction on a particular tool, such as no iPads for an assignment, they looked to other resources, although there were not many times in which such restrictions were placed, especially if the intent of using a device was clear.

Figure 5.11

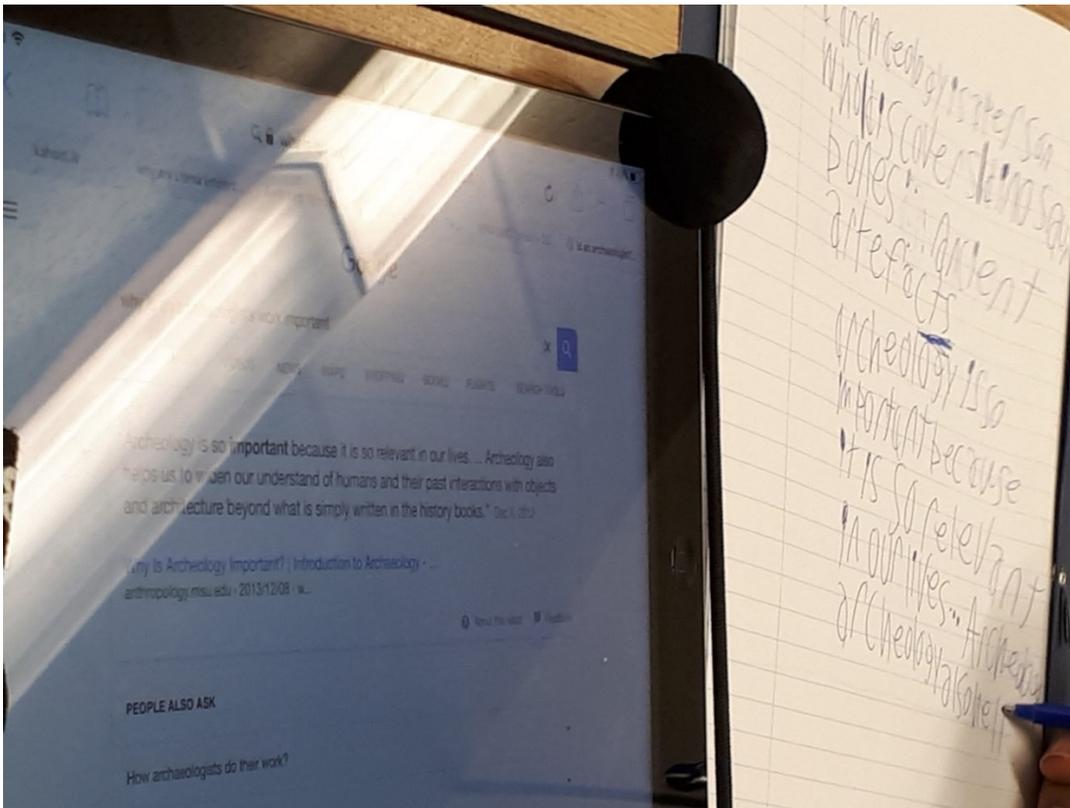
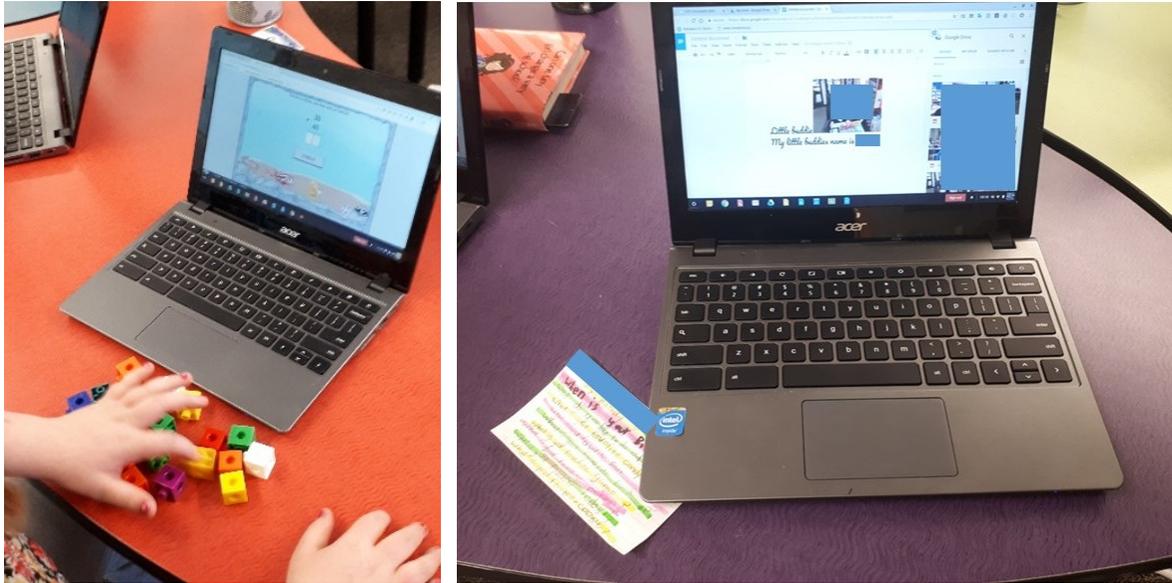
Transliteracy in Math



Working on a computer does not mean that paper or hands-on tasks (see Figure 5.12) alongside it cannot be helpful. In fact, this study shows that the reciprocity of paper and computers together can be highly successful for young students. The reciprocal and simultaneous use of resources to construct meaning also suggests that many resources can and should be available in the classroom. When resources are available to be used simultaneously, students have an opportunity to put their digital, critical, and social transliteracies to work and to learn within and across ideas.

Figure 5.12

Simultaneous and Reciprocal Learning using Transliteracy



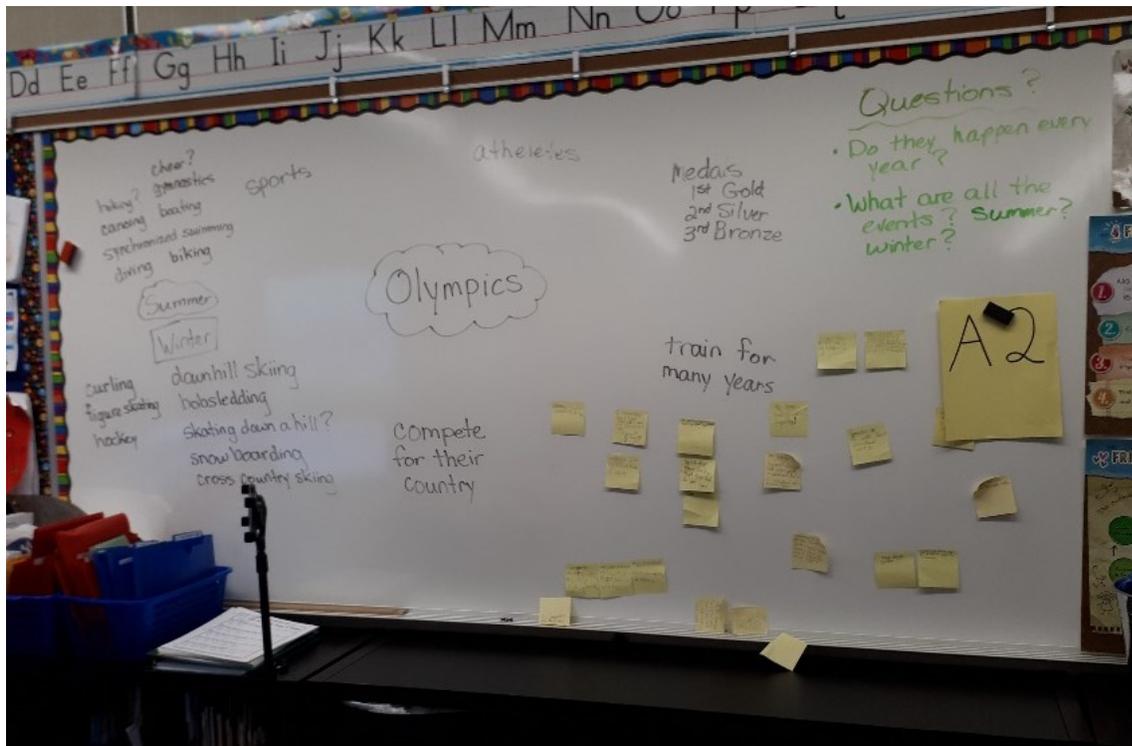
Research: Learning to Use Search Engines and their Intricacies

Research was influential in developing and practicing disciplinary transliteracy in multiple subject areas. The participants engaged in both spontaneous and planned research. Spontaneous research was unplanned and occurred “in the moment.” The students and the teachers frequently opted to “look it up” when they had a question or wanted more information as a result of discussion or classwork. In the grade three classroom, “look it up” referred to a Google search. The teachers encouraged students to take over the responsibility for finding answers to their own questions and allowed them to use devices such as the Chromebooks or iPads when needed. If student devices were unavailable, the teachers often let the students use Mrs. Carpenter’s desktop computer or the teachers assisted by searching for something on their personal phone. There were even moments during my data collection that I engaged in “look it up” activities with individual students in response to their inquiries. The students saw the adults in the room as resourceful helpers when they needed more information. When given the opportunity to use a device for research, instead of asking the adult for the answer, they asked for spelling assistance or for help identifying applicable search term terms.

The students also engaged in planned research activities (see Figure 5.13 for example of whole class planning). Many of the interdisciplinary units, especially those containing writing activities, involved research. The teachers modeled research skills, scaffolded the students’ research through graphic organizers, offered controlled choices through curation sites such as Symbaloo, and allowed students to search freely using Google. In addition to some of the research projects already mentioned, such as in English language arts (e.g., the Olympics), social studies (e.g., Peru, Ukraine, Tunisia), and science (e.g. building structures, rocks and minerals), students engaged in research for art, physical education, math, and health.

Figure 5.13

Whole Class Planning for the Olympics Research Project



I had an opportunity to observe a research project the grade five students were working on in the library with Mrs. L., the curriculum coordinator. When I arrived at the library, the students were gathered around the SMART Board facing a live video of another class on the screen. Most of the students were on the floor, but some were at tables with Chromebooks and iPads. There was a large map of the world pinned to a bulletin board. The students explained to me that they were playing Mystery Skype (<https://education.skype.com/>), and the objective was for each class, the one in the school and the one I saw projected on the SMART Board, to guess the location from which each group was streaming. Mrs. L. explained that Mystery Skype is a game for two separate classrooms to practice asking each other yes or no questions by starting first with general questions and then moving to more specific ones. In between questions, classes are free to research based on the responses they receive. Some of the curricular outcomes of this

activity include learning about others who live in different communities, building communication skills, and learning about digital citizenship. The Mystery Skype game forced the students to engage in purposeful and quick research. It honed their questioning, listening, and mapping skills. It also encouraged teamwork and critical listening to responses so they could make appropriate adjustments to their inquiry process. The students were highly engaged in this activity. They were required to draw upon their transliteracy practices and knowledge from across the curriculum and from their personal funds of knowledge.

School Provoked Transliterations

Transliteracy practices were evident in how students constructed meaning in subject areas and domains of everyday life beyond English language arts activities. Literacy is not a subject to be learned in a class, but practices developed socially, culturally, and contextually across the curriculum and within many domains of everyday life (e.g., Barton & Hamilton, 1998; Heath, 1983; Street, 1984, 2013). Transliteracy involves recognizing meaning-making as a part of all and across all subject area instruction, and also within-school and out-of-school experiences.

The following examples illustrate cross-disciplinary transliteracy in how students constructed meaning about the Olympics through engagement in various literacy practices at home. Mrs. Carpenter celebrated the literacy practices students shared with her from their home experiences and further encouraged others in the class to do the same. Emily, who was very interested in and excited about the Olympics, showed up at school one day with a t-shirt she decorated at home with the Olympic rings drawn on with a permanent marker along with written text repeating the words, *Winter Olympics, 2018 and PyeongChang*. When I asked Emily why she created the shirt, she replied that she wanted an Olympic t-shirt and did not know where to get one, so she made one herself. She also described her evening activities of watching the

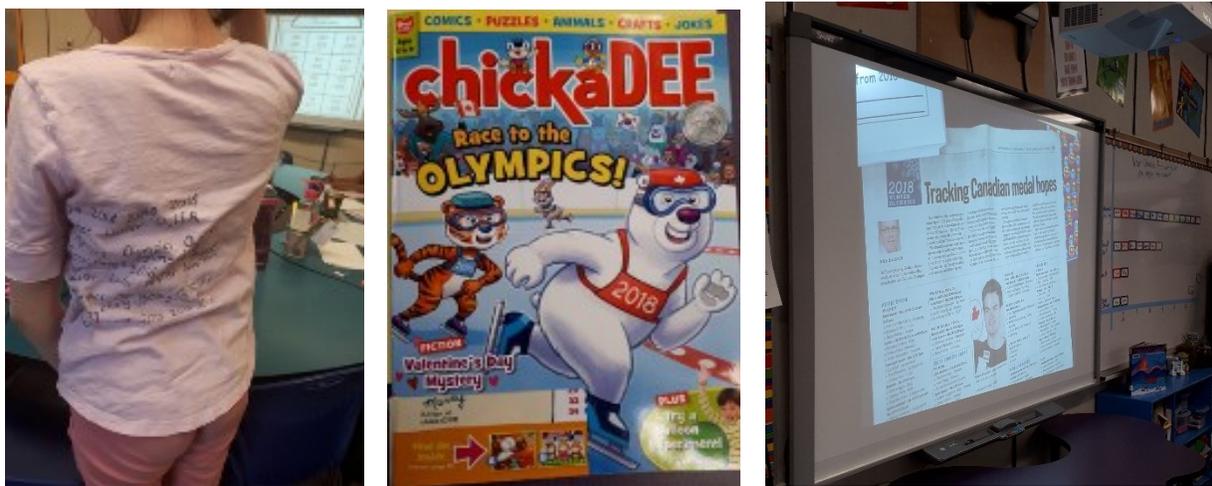
Olympics on television with her parents, using her iPad to search for details about who had won events or about the events themselves, and also reading results in the newspaper. Emily also brought a children's magazine highlighting stories and activities related to the Olympics. At school, when given a choice in what to research online or for free time on the Chromebooks, Emily chose to go to the official Olympics website over anything else. She also chose to create an online survey on people's favourite Olympic sport in a whole-class survey activity. Emily engaged in constructing meaning about the Olympics in transliterate ways. Her in-school literacy activities influenced her out-of-school literacy interests as she explored many ways of receiving the information in which she was interested and then finding creative ways to share what she learned. Sukovic (2017) wrote, "Connected learning is a major enabler of transliteracy. With its orientation toward lifelong learning and life demands, transliteracy development can only benefit from being guided and practiced outside of school" (p. 99).

Once the students became aware of how the teacher celebrated their out-of-school transliteracies related to the Olympics, many students started talking about what they were doing at home to continue learning about their focal sport or who was winning to contribute to the class graphing activity. Benson even brought in a newspaper article to help others who might not have access to one at home. These practices were authentic and showed the students the many avenues for gathering information. Dwyer (2016) suggested that "when students generate their own questions in an inquiry-based learning unit, their quest for information is more meaningful because it is derived from their current interest and inquisitiveness" (p. 385). I believe this inquiry practice also empowers students to see themselves as capable learners beyond school. Mrs. Carpenter nurtured Emily's quest for more information by welcoming her to share her learning experiences with the class and by positively reinforcing the importance of continued

learning outside of school (see Figure 5.14). The students' reaction to how Emily received attention from Mrs. Carpenter at school further prompted more out-of-school learning about the Olympics. The daily discussion about what they were learning at home, which included discussions of how and why, demonstrated to students how they could expand their personal interests or curiosities by continuing to seek knowledge and meaning across resources in spaces or on devices other than those accessed at school.

Figure 5.14

Emily's Connections to the Olympics



I had the following discussion with a student as she relayed her actions as she worked on a homework assignment in which she was to design a musical instrument she could use to describe some elements of sound (pitch, tempo, volume). It also demonstrates how transliteracy contributed to her success in researching and completing the project while she worked on it independently.

Jacqueline: I want to ask you about the process that you went through to make that drum. Tell me what Mrs. R. asked you to do and how you got to that?

Haley: Miss. R. said that we are going to make, or we are going to do something with sound. So, she sent home with us a paper for the parents to know what we are doing. I think Miss. Carpenter made it, and then Miss. R. just changed the name. And then we made our instrument at home.

Jacqueline: How did you decide what you were going to do?

Haley: I used the computer for mine. I used the word drum. And it showed me all these drums, and then I wanted to make this drum with this string and tape.

Jacqueline: So, were you looking at pictures of drums that kids made, or were you looking at real drums?

Haley: That kids made.

Jacqueline: So how did you get to pictures of what kids made?

Haley: I went to images.

Jacqueline: Okay, and did you find some there or did you have to put some more words in?

Haley: I found that one that I made, that some kid in Grade 3 made.

Jacqueline: Did anybody help you with the computer at home?

Haley: No.

Jacqueline: Are you allowed to use the computer to search things?

Haley: Yes.

Jacqueline: Okay, what was it that made you use the computer for your research? What were you thinking about?

Haley: Because I couldn't find anything, like, how to make it, so I searched it up online.

Jacqueline: What did you look at before you searched online? Did you look in a book?
Did you ask someone?

Haley: I asked my dad and he didn't know, so I looked it up on the internet.

Jacqueline: Okay. You didn't have any books or anything on drums?

Haley: No

At this point, I only have some insight into her research methods and what she does when she wants to find information. I learned that she began by asking her dad and then went straight to the internet for the information when he did not know. I also learned that she found that using images would get her closer to her goal rather than seeking text-based sites, which I believe would be a struggle based on her current reading abilities, especially with scientific-related text and vocabulary often found on science content websites. She used the paper sent home, along with class discussion and discussions with her dad to narrow down a topic and then used a keyword and the images component to find something in which she might be interested. I also learned that she knew she needed something more specific than a word such as *sound* and needed to choose her topic first before her research (even though her search term was still quite general). From her description, it seemed as if she knew to look first for child-created projects and to mentally filter out the other images. In a Google search, especially one with a term such as *drum*, there will be pages of results, and she likely had to look through a few before she found something appropriate. Looking in a book, at least at home, did not seem to be an option for her, as she was quite surprised when I asked her if she looked in a book.

Jacqueline: Okay. And did it work for you? Are you happy with the way it turned out? I like it too, it's really good.

Haley: Yeah, I like it.

Jacqueline: What about the part about pitch and volume? Did you think about that and how it fit in with your assignment?

Haley: I tested, like, four cans. I tested the first one. The top one was low sound. and the bottom one was no sound. The second one was high pitch, and the first one was low pitch, and the third one was no pitch at all. The fourth one was, like, low-low pitch and then the bottom of it was high pitch.

Jacqueline: And which one did you pick?

Haley: I picked the fourth one.

Jacqueline: Did you make them all into drums at home and test them out?

Haley: Yes. I made them into drums.

Jacqueline: Wow, so you have three more drums at home?

Although this short encounter gave me a number of insights into what Haley knows about the content as well as into her digital literacy skills, the above discussion illustrated how her quick image search on Google influenced how she further constructed meaning about the elements of sound through her experimentation with various drums. The internet simply provided her with a starting point for her to imagine a drum that she might be able to construct with the materials she had available at home, and from there, she truly made sense of sound from the drums she created.

Conclusion

This research highlighted that transliteracy seems to develop within the spaces in between and among all the choices, options, and decisions that individuals make in terms of their literacy practices. For example, when we approach reading from a critical literacy standpoint, the learning needs to extend beyond a singular text to consideration of all the texts and learning

across and among platforms and spaces readers are using to make sense of ideas, including personal funds of knowledge, conversations about the topic or medium, other related texts from past or present experiences. Learning is much wider than what is in one's hand at the moment and cannot be limited to individual episodes of learning. People are making meaning all the time and, currently, tend to seek out what is unknown quickly using available devices and resources.

The next and final chapter is a discussion of how transliteracy can contribute to teaching and learning at school as well as to scholarship and understandings of meaning making. It begins with a discussion of the barriers to transliteracy and offers a preliminary understanding of what transliteracy means based on the findings of this ethnographic study alongside other transliteracy research.

Chapter 6: Contributions and Significance

This research explored where analog and digital learning mingled and merged in a grade three classroom abundant with multiliteracies. Within this hybrid context of traditional and digital texts, transliteracy practices emerged that provided new insight into how young 21st-century learners construct meaning. Seeing literacy practices from a transliteracy mindset allowed me to identify valuable ways many texts and media work together to enhance and support students' learning as well as to promote differentiated and inclusive opportunities. In addition to the four primary themes discussed in Chapter 5, two additional topics are relevant to transliteracy in elementary school: barriers to transliteracy and transliteracy pedagogical practices.

This final chapter includes a reconceptualized vision of transliteracy as well as a preliminary description of a transliterate learner. Theoretical implications of this study are offered as well as the contributions transliteracy understandings have for educational practice, curriculum, and research. Pedagogical implications of this study are divided into three areas: choice and differentiation, guided practice and modeling, and resources and multiliteracies. Following is a description of how this study impacts elementary school curriculum and concludes with limitations of this study, suggestions for future research, and a few final thoughts.

Barriers to Transliteracy Practices in School

With technology always comes a new host of challenges because, although they are named “smart” and help us find what we need or want and provide us with entertainment, digital devices are still machines running from binary code that occasionally fails. Charging devices, connecting to wi-fi, accessing and paying for data, cellphone service, or even applications (apps) are all parts of relying on and using digital technology in daily life. With technology now

prevalent in many Canadian classrooms, similar issues can arise, simply because technology involves machines that require different attention and expertise along with a big budget to support them. There are many benefits to connected classrooms that use digital technologies, such as computers, SMART Boards, document cameras, and personal handheld devices to engage with a variety of interesting and exciting learning opportunities, and that contribute to transliteracy practices, but this research also revealed barriers to learning or use of technology that were experienced in the grade three classroom. The identified barriers are divided into six categories—equipment, connectivity and program, systemic, financial, expertise, and pedagogical—with an explanation of how each barrier is experienced and an analysis of how these types of barriers can impact learning.

Equipment Barriers

The state of the equipment was the most common barrier to learning. Chromebooks that would not turn on, iPads that would not charge, broken headphones, and mice that would not work were randomly experienced in the class. Although Mrs. Carpenter had a well-established process for dealing with computer troubleshooting, broken equipment meant that tasks or partnerships needed to change. Mrs. Carpenter planned an engaging transliteracy project that involved the students recording themselves doing updates on the Olympics in front of a green screen and then editing them using an app on the iPads. The students participated in writing their scripts and updates, and Mrs. Carpenter had the app selected and loaded, but the green screen for the school was first lost and then broken. Of course, Mrs. Carpenter was very flexible and was able to deal easily with the situation by first postponing it until the green screen could be repaired and then changing the project into a live broadcast over the morning announcements, but that meant that the students missed the opportunity to record, edit, and learn to upload and

stream videos. Additionally, when other equipment did not work, such as the SMART Board, technicians needed to be called in through the school board, and the repair took much longer. When teachers model how to be flexible and adapt to the situation when equipment fails, students learn that there is always more than one way to accomplish most tasks.

Connectivity and Program Barriers

During one of my first visits to the grade three classroom, I noticed Benson holding his Chromebook over his head and walking it around the room. No one, including the teacher, seemed too concerned with his behaviour. When I asked him what he was doing, he replied, “I’m taking this thing on a walkabout. I can’t connect to the wi-fi.” I asked Benson if this was something that usually happened, and he explained that the wi-fi signal was not great in the classroom and that sometimes they even needed to go out into the hallway to connect. Many schools now use wi-fi signals, especially for student devices, like Chromebooks or iPads. Having a wireless signal allows devices to be moved, shared, and used anywhere where they can pick up the wi-fi. Some schools are eliminating computer labs and designated computer spaces because they are becoming less useful as more devices can now be used directly in classrooms. Wireless signals can be unpredictable at times or simply not work well in certain locations, much like in Mrs. Carpenter’s classroom. It is disruptive to not have access to the internet when it is needed, and alternatives to online work must be readily available or built into planning. One day while I was at the school, the internet for the whole school stopped working. Mrs. Carpenter and Mrs. Rayne had planned to use it that day but needed to shift what they were doing. Although they still had access to the SMART Board and document camera, they were shut off, and the teachers both used alternatives such as paper and pencil activities or research from books. The students thought it was a little amusing, especially since Mrs. Carpenter told them it would be “an old

school” kind of day and shared with them lots of stories about what school was like before the internet. I remember that day to be quiet and peaceful. The work was all completed, without the internet, and students saw offline activities as relevant ways of constructing meaning in their classroom. There was another day shortly after in which the school’s internet router was replaced, but this time, teachers and students had a little more time to prepare for a day without wi-fi.

In addition to barriers to learning that can arise because of connectivity issues are program issues. I observed several instances when apps and programs halted the activity, caused Mrs. Carpenter to change her plans, or needed a lot of troubleshooting time to solve. For example, when the students were using Google Slides to create presentations, a number of them decided they wanted to put their photo on the last slide. Mrs. Carpenter realized that she had easy access to the students’ photos for the school library cards on her computer and was able to drag and drop them into the students’ Google drives. However, one student’s photo was not on the computer. He was asked to think about how to solve the problem, and he decided that he would use the iPad to take a photo of his physical library card. He grabbed the iPad, took the photo, and then was stumped by the issue of how to get the photo into his Google drive. He had run into a platform and application compatibility problem. The Chromebooks and the teacher’s computer run Windows, and the school uses the Google suite. The iPads use an iOS operating system that did not have any Google apps downloaded nor could use a memory stick to upload the photo file. The teacher and the student decided that she would log into her personal email, upload the file, send it to herself, and then drop the file in his Google drive. It was a bit of problem-solving that worked out in the end, but it was a reminder that compatibility among operating systems and

programs across devices that are being used simultaneously can cause barriers to learning activities.

Systemic Barriers

Multiple discussions with the teachers in the grade three classroom revealed the drastic impact school board technology policies can have on daily learning in the classroom. Mrs. Carpenter explained that in the previous years, each teacher in the school was given an iTunes gift card that could be used to purchase and download apps for the iPad. Teachers created Apple IDs and accounts and were responsible for selecting what they wanted to use with their students and were given the liberty to make appropriate choices without needing to have each choice approved. In the current year of the study, the school board policy changed, which meant that all the apps on the school iPads were wiped clean, and any time a teacher wanted an app, she needed to write a request to a central information technology office for approval. She was also no longer able to do any downloads herself. She expressed that this was extremely frustrating, and it showed distrust in teachers' judgement about which apps might be most relevant to her students. At the beginning of this paper, I referenced the common phrase, "I think there's an app for that." That phrase implies that there is always an app to meet any need or interest, but it also suggests that apps can be downloaded when you need them in response to any immediate need. Mrs. Carpenter experienced frustration with not being able to download anything on the iPads, especially when she feels there is an immediate need to use a particular app. She also lost access to all the apps she previously downloaded and cannot have them replaced, as some are not board approved. For example, the Lego stop motion app that she has been using for years was not approved, which she feels was unjustified, as she believes that it is very easy for grade three students to use, and she has witnessed them use it very successfully in the past. I recognize the

importance of policies for software and apps being used in schools, but in this case, privileges were removed from a very capable person who has demonstrated her transliteracy knowledge over many years of implementing technology into her lesson plans, without considering the implications the policy had on responding to students' needs in the moment.

Financial Barriers

Devices are expensive and are becoming a large part of schools' budgets. Relocating devices such as computers out of computer rooms or labs into classrooms means that schools need to purchase more portable devices such as laptops, which also require charging and storage carts. Also, with increased use and at younger ages, sharing can be more challenging, which could also result in the need for more devices across the school. Although a lot of the material that students might access on the internet is free or inexpensive, the devices needed to access it can be expensive to purchase and to repair if broken. Beyond computers and tablets, schools must also purchase more expensive devices such as SMART Boards, document cameras, FM and speaker systems, maker space tools and games, and software licences. Financial restrictions can be barriers to how often devices are used by teachers and even which devices are available in the school.

Expertise Barriers

It is well researched that teacher expertise plays a role in how and why they might use certain technologies in their teaching (e.g., Backfisch et al., 2020; Fahrman et al., 2020; Spiteri & Rundgren, 2020). Lack of expertise with a technology or even lack of confidence can be a barrier to a teacher's use of digital technologies or transliteracy practices that involve the internet or collaborative online activities for students. Mrs. Carpenter expressed frustration over and reluctance to implement the Google Read and Write tools into her teaching because she felt she

did not receive enough training and that she and the students do not get enough time to learn about it through just using it. She feels pressure from the school district to use it, as they have paid for the licence for it, but she wishes someone would just come into her classroom and teach her how to use it alongside the students. She also feels that it is overwhelming, so she would really like to start by just knowing the top five best things one can do with the toolbar. In addition to teacher expertise with computers and applications is student expertise. The more proficient a student is on a device or program, the more quickly they can get to the task at hand instead of using time to learn the program.

The time that it takes, along with limited personal expertise or knowledge, is also a barrier to using a wide range of transliteracy practices. Some applications, even if it is just a toolbar add-on, can take time and patience to learn. Sometimes time is wasted trying to figure out new programs, for both teachers and students, or the experience is frustrating because the users do not yet know enough to use it successfully.

Pedagogical Barriers

Technology presented barriers to pedagogy since using devices and computer applications requires that teachers adjust their planning, implementation, and assessment. The process of learning may not be as visible when students use computers to create something digital, as often, just the product is shared. Teachers can benefit from learning about the processes and strategies the students used. Additionally, the internet and various apps offer different ways for learning to be represented than might be traditionally used in a classroom without digital technology, and sometimes students choose to use apps and programs with which the teacher is not familiar. Students can also engage in collaborative work online that might have different structures than collaborative work in a face-to-face context. Online work also allows

students to collaborate with others who are not in the class and may even be very geographically far away. Another aspect of online work, which may be seen as a barrier, is that information online may be shared publicly, and there must be instruction and learning around dealing with the public nature of the internet.

Reducing Barriers

There are aspects of using technology that are difficult to control, especially those related to finances or systems where teachers do not control the access to digital platforms, apps, or devices. Liu (2009) called transliteracy a mix of inherited convention and recent inventions, expectation, and improvisation. When teachers model problem solving and flexibility in resources as well as digital and critical transliteracy across disciplines, students learn the thinking required for engaging and constructing meaning around texts, which is far more valuable than learning to rely on specific technology or devices.

Defining Transliteracy

As new literacies emerge, social practices of literacy are reshaped. Definitions of elements such as producing, consuming, authorship, and publication are blurred as people interact in transliterate ways with different texts and modalities. Below are emerging ideas of transliteracy reflecting existing ideas of transliteracy combined with the findings of this study.

A perspective of transliteracy explores the links between literacies as well as the ways in which we draw from the many literacies at work in our lives. Transliteracy

- attempts to understand how people behave in new social and information sharing environments of the 21st-century.
- is contextually and technologically situated in different ways, given varied contexts and situations.

- practices are embedded in all areas of learning.
- involves literacy constructed outside of typical norms of publication; for example, through tagging, images, videos, blogs, and other publicly created documents. These resources are valued as authentic sources for learning.
- is embedded in social practices, thus, better described as how something is constructed rather than a set of skills.

Transliteracy exists as students construct meaning in spaces not restricted by boundaries of resources, time, or physical space. Transliteracy

- is related to different ways of learning that are non-linear and span time or space.
- meaning-making is broad—students seek breadth and depth beyond a single text or media. It is making meaning and connections across and within multiple texts and literacies.
- is influenced by shared or guided learning opportunities with more experienced others and shared examples.
- practices for young students suggest reliance on modeling that includes digital, critical, and disciplinary transliteracy instruction and framing. The most experienced is not always the adult or teacher.
- involves conscious awareness of available choices and relies on digital and critical literacy skills in decision-making. Choices also made relative to confidence, preferences, inclinations towards specific technologies, the availability of what is at hand, and previous success or experience.

Transliteracies is a framework for interpreting multiliteracies practices and the construction of meaning. Transliteracy

- supports that the flow of learning, or how meaning is constructed, is cyclical, spiral, or a tangled web full of choices and resources but connected by a common goal. Transliteracy is learning how to use and negotiate those resources to construct meaning.
- allows for possibilities of deeper engagement with knowledge and ideas when meaning constructed from a variety of sources.
- is both planned and spontaneous learning.
- it is fluid, non-static text engagement and involves learning across texts and using texts, tools, and platforms simultaneously. To be able to fluidly and simultaneously construct meaning across texts and media, digital, critical, social, and disciplinary transliteracy skills, strategies, and understandings must be in place.

Transliteracy represents a 21st-century style of communicating and acting with one another. Transliteracy

- involves practicing an ever-expanding range of literacies needed to contribute, act, and function in a society that relies heavily on digital technologies, social networks, and many multimodal media and texts.
- includes locally and globally building and maintaining relationships through seeking others' ideas, offering and requesting feedback, and sharing or reconstructing knowledge.
- is supportive of all learning preferences and communication modes across time and culture. It does not privilege one above another but treats all as holding value.
- enables differentiated constructions and expressions of learning.

- is inclusive of connected, cross-disciplinary learning in and out of school. All learning counts, as it influences further thinking and research.
- supports traditional literacy practices and development across the six language arts (reading, writing, speaking, listening, viewing, and representing/constructing).
- can be inspired by curricular, social, or internet inspired experiences.
- captures our capacity to construct meaning across and within a boundless range of texts, modalities, devices, and literacies, both online and offline.

Transliterate Learners

As the students from this study grow older, they will engage in more social networked environments (Görzig & Holloway, 2019; Johnson et al., 2016) and will rely more heavily on transliteracy to learn and communicate, especially with new advancements in technology. The following is a description of a young, transliterate learner gleaned from the experiences of the grade three students in this study.

Transliterate learners are excited and enthusiastic about learning with peers in social and public spaces. They are flexible and spontaneous, good at problem-solving, can easily and seamlessly switch tasks, and are adaptable and resilient. Transliterate learners bring a way of thinking and researching that relies on a “look it up” in-the-moment style of inquiry. They have an affinity for technology and desire an approach to education that transcends time and space boundaries. They must learn to negotiate how to distinguish between good and poor resources (or a good fit for the moment resources). Transliterate learners have strategies for storing and organizing knowledge such as bookmarking, tagging, or curating online ideas for later and rely heavily on digital tools when working independently. They exhibit a willingness to try something new within a supported environment of either face-to-face or virtual supports and see benefits of

modeling and helping each other through digital feedback or sharing the mouse (or screen) activities. Transliteracy connects people and ideas in meaningful ways. It brings forth opportunities for transliterate learners with different perspectives, preferences, or resources to work together.

Contributions to Scholarship

This study contributes to addressing the large gap in qualitative research on children's transliteracy in school. The literacies of elementary-school-aged students, particularly those literacies related to digital technologies or online work at school, are still understudied (Burnett et al., 2014; Marsh et al., 2016). Interestingly, since the COVID-19 pandemic, there has been an increased interest in researching online and digital learning both in academic and professional communities.

Gaps also specifically exist in transliteracies research as few educational studies have focused on younger children's transliteracy at school. New research supports young children's ability and capacities for using digital technology; however, additional research is needed to explore further how technology use is related to learning and constructing meaning. There is clear support for transliteracy research (Liu, 2009; Megwalu, 2014; Sukovic, 2015, 2017; Thomas, 2013).

The concept of transliteracy makes sense as a way to describe how children use multi and multiple literacies in their everyday lives and to discuss the fluidity and simultaneous nature of literacy practices. Highlighting transliteracy through this research brings forward an innovative way to understand possibilities for learning when both digital and analog multiliteracies are available and used concurrently in the classroom. It also gives a name to the learning that occurs

across and within multiple platforms, media, texts, and modalities, whereas up to this point, there was little vocabulary that acknowledges constructing meaning in transliterate ways.

It is within contexts rich in technology that transliteracy comes to the forefront. This research has provided numerous examples of elementary students' transliteracy practices and also of how teachers provide transliterate learning experiences and opportunities to learn.

Following are brief descriptions of the scholarly contributions of this study to the following areas: constructing and expressing meaning, language arts and multimodality, and transliterate research methods.

Constructing and Expressing Meaning

I believe that transliteracy can be understood through the paradigm of constructivism. Learning involves multiple parts that must come together to become a whole, rather a fuller understanding. Learning, however, is not finite, and we are continually reconstructing what we know and understand. Transliteracy supports that the parts of learning do not come from simply one text or experience but across and within multiple ones. Human beings have differing preferences for learning, as well as varying access to resources; thus, the idea of transliteracy supports the notion that constructing meaning is different for everyone. Simple as it may seem, this concept has important implications for teaching, learning, and research. Learning does not and will not need to be the same for each learner. It suggests that the opportunities teachers offer students as they construct meaning must be flexible and include genuine choices. In relation to assessment and even research activities, this recognition also suggests that constructing meaning, or learning, cannot be viewed narrowly as simply learning, or not learning, but be examined through the transliterate choices learners make as they come to know or understand something. Knowledge is constructed through active participation in social experiences that are changing,

and knowledge as a social construct cannot be separated from its purposeful social and cultural context. Time continues to shift and, accordingly, signifies that meaning-making happens in the past (what was), in the present (what is), and in the future (what could be).

It was clear in this study that the grade three students used multiple techniques to search for and work with a variety of resources collaboratively and socially. They communicated new meanings and knowledge by using different tones, genres, modalities, and media through employing transliterate skills, knowledge, thinking, and acting.

Seeing transliteracy as a dominant approach to constructing meaning supports that learning cannot be viewed as static or linear; it is dynamic and reciprocal as learners continually construct meaning across multiple sources and spaces. Transliteracy acknowledges this reciprocity and continued development and signifies a change in how resources are used and accessed in classrooms to support learning. Transliteracy is a topic highly relevant to 21st-century learning. Exploring and writing about how students engage with literacy in a digital world can open conversations about the many ways that children construct meaning and the practices that contribute to meaning-making in a sociocultural context.

The Six Language Arts and Multimodality - Trans versus Multi

Literacy instruction is transforming to reflect growing changes in oral, visual, and written communication, including how and when people communicate. Transliteracy, in practice, is naturally cross-disciplinary and cross-textual. Through a literacy lens, seeing transliteracy as composed of the six strands of language arts (reading, writing, speaking, listening, viewing, and representing) shows transliteracy as a part of how people learn, and being transliterate in teaching practices is recognizing that many texts are multimodal and we rely on many modalities and multimedia to construct meaning. According to Serafini (2015), “if children are to

understand how visual images and multimodal features represent and construct meaning, they need knowledge of the meaning-making systems used in their production” (p. 412). This suggests that it is necessary to know more about how and why texts are constructed as much as the nature of their existence, which supports continually framing learning in digital and critical transliteracy.

The term *multimodality* surfaced in educational research near the time The New London Group wrote their seminal piece on multiliteracies in 1996. The shift to seeing literacy as multiple, with the prefix *multi* appearing before familiar literacy terms was an important steppingstone to understanding and redefining literacy at the beginning of the 21st century. “More than one,” “many,” “various,” “contextual,” and “situated” were terms or phrases newly associated with defining literacy. Largely due to extensive changes over the last few decades to how information and ideas are shared using worldwide digital communication and collaboration, there is unlimited knowledge at our fingertips, endless opportunities for expression, and new ways for working with others despite physical boundaries. New digital technologies also brought options and choices and new personal preferences for receiving and expressing language and literacy. Challenges to vast amounts of information and choices include literacy practices that involve surface skimming, sifting for fake information and media, and the need for learning new skills for using devices. The abundance of choice, along with my observations in this study, also suggests that because there are many places and ways to access information or to construct and share something, that people are more inclined to look across sources and different texts; hence, the notion of *trans* is a more appropriate description of how meaning is constructed over the notion of *multi*. Yes, multiple modes and literacies exist, but that does not describe the act of learning. *Trans*, an English affix with Latin etymology, is often used with words that mean

across, beyond, through, or changing thoroughly (“Trans,” n.d.). Trans describes action; multi describes things. There is fluidity in how we seek to learn that is not captured in the sense of multiple.

Other words with the prefix *trans* are appearing in language and literacy research. Transmediality is also a term that challenges current understandings of media, such as multimediality and intermediality, to question the boundaries of understanding art and media. Multimediality and intermediality suggest only understanding within a singular phenomenon or object, even if it involves more than one medium. Transmediality has emerged as a term to describe phenomena that appear across media. Rippl and Etter (2013) explore transmediality in graphic narratives as the potential to construct narrative meaning across different media.

Translanguaging involves the “use of two or more languages to make meaning, shape experience, and gain understanding and knowledge” (Fortune et al., 2019, p. 33). It also includes recognizing a speaker’s entire linguistic repertoire beyond adherence to socially and politically defined boundaries and sees it as one integrated system (Garcia, 2013; Otheguy et al., 2015). Researchers that support translanguaging oppose language separation and propose pedagogy that promotes language mixing and integration. Like notions of transliteracy, translanguaging and transmediality emerged because a need existed to stop separating media, languages, and literacies in how we understand meaning-making. Much can be learned when we consider that constructing meaning transcends boundaries of singular texts, events, practices, or media, and can and does exist more broadly across many visual, textual, and linguistic experiences.

Transliterate Research Methods: Implications for Qualitative Research Methods

Ethnographic research served to be an appropriate means for examining learning and constructing meaning through the transliteracy practices observed in the classroom. Ethnography

aims to examine social interactions and encounters, understand roles and behaviours, identify new patterns and gain insights into new phenomena, understand practices, and study behaviour in a group. In my everyday life, I am accustomed to using and relying on digital technologies. As I collected data for this study and continued to think about how transliteracy relates to constructing meaning, I became very aware of the variety of resources from which I was drawing. Multiliteracies and multimodal theory supports that learning is never monomodal, and it happens within a social or cultural context. In this study, I came to see how ethnography naturally encourages transliteracy through the various methods typically used for data collection and analysis. Additionally, digital technology allowed me to collect digital artefacts and observations that were multimodal in representation. From a transliteracy perspective, I was using multiple platforms for recording, such as video, audio, and screenshot recordings, but at the same time was also typing field notes on my laptop, scribbling notes on scraps of paper, or taking a picture snapshot of a literacy product or process. On their own, any one of those data collection artefacts would not be as useful as using more than one together.

There were also many instances in which I was required to shift between analog and digital tools or use both simultaneously. The combination of artefacts and looking both across and within them was important for me to construct meaning of what I was hearing, seeing, and thinking about. Beyond the data collection methods I used in the classroom, I also relied on other studies and scholarly writing to make further sense of the collected data. Not only was I seeking to discover and understand transliteracy in a classroom better, but I was using transliteracy to do it. Because of my transliteracy lens in this study, I was able to see the potential for transliteracy to describe ethnographic research methods. Methodologically, I could also see transliteracy as a

framework for interpreting across the multiliteracies I observed in how the students constructed meaning.

Contributions to Teacher Practice

This research reveals how transliteracy is an important way children communicate and construct meaning, and it contributes to pedagogy in four impactful ways: (1) presents examples of transliteracy in a grade three classroom, (2) describes how using transliteracy practices contribute to learning in an environment of both analog and digital resources, (3) discusses students' preferences or inclinations for learning, and (4) holds insights into how teachers can support learning through transliteracy practices. According to Kuhn (1962), ideas and theories are

always announced together with applications to some concrete range of natural phenomena; without them it would not be even a candidate for acceptance. After it has been accepted, those same applications or others accompany the theory in textbooks from which future practitioners will learn his trade (p. 47).

This section describes specific implications for teaching that support a transliteracy mindset and includes ideas for connecting transliteracy to how literacy is represented in elementary school curricula.

Concept-Based Curriculum and Transliteracy

It is not uncommon to hear the assumption that literacy development is the responsibility of English language teachers or is meant for elementary school language arts. This erroneous perception exists among both teacher and parent circles and is one I struggle with hearing so often. Part of my fundamental beliefs of literacy and language is that literacy is part of our daily lives and is continually developed and changed among all of our experiences and

communication-related interactions with one another's thoughts, actions, and ideas. To me, this suggests that literacy is a natural and inseparable aspect of all experience and of all actions in school. Because it often resides as a standalone subject in school, it is difficult for some to see the influence of literacy across many domains of life and academics. Fortunately, research in literacy education is promoting a shift to see life literacy and its role beyond the English classroom. In 2002, Jardine et al. wrote that there is an unsettling fragmentation occurring in schools. They suggested curriculum integration often results in a surface skittering over topics with odd things being placed and taught together where only a broad picture of the topic and only surface similarities, connections, and relations result. They write, "integration and wholeness have more to do with the way one knows, the way one is, the way one hopes children will become and how we and they will carry ourselves, and how light and careful our footfalls will be on this earth" (p. 329). In purporting that curriculum integration requires more work, they suggest that teachers need to settle down somewhere to do things well and to treat things with the integrity they deserve.

A current trend in Alberta curriculum is a movement towards concept-based curriculum which involves subject-area programs of study with "fewer but broader learner outcomes, in order to ensure that students possess deep understandings of key ideas, connect them across disciplines, and apply them in real-life contexts" with diverse perspectives (von Heyking, 2019). Literacy and numeracy are valued as foundational competencies—a part of all subject or discipline areas. Transliteracy supports notions of concept-based curriculum, as it speaks to how literacy is socially situated and is not bound by disciplines or subjects but is enacted in all of the literacy events and practices occurring. Transliteracy considers ways to implement these ideas into practice and promotes the use of multiliteracies, student choice in learning, and

opportunities to use more than one mode, device, or platform simultaneously at school.

Language and literacy activities in transliteracy are based on the everyday lives of the students, their widening interests, and their developmental needs.

Implications for Teaching

Twenty-first-century learners need to be critically transliterate, digitally transliterate, and socially transliterate, and need to understand how transliteracy practices span content areas, time, and physical and virtual spaces. Students in classrooms with both analog and digital resources have work to do to negotiate the options and available resources. Transliteracy acknowledges there is more than one way to accomplish a task, and more than one tool or resource can be used simultaneously and in reciprocal ways. The following implications are practical ideas for teaching based on my observations and analysis. They include how resources can be used simultaneously and reciprocally, how and why to use a wide variety of multiliteracies, why choice and preferences are essential, and how to consider device use and resources in the classroom.

Confidence, Choice, and Differentiation

Agency and choice are connected to students' funds of knowledge. If constructing meaning involves connecting to funds of knowledge, then teachers could benefit from allowing more student choice in content as well as in the methods of construction. If a student has experience with a particular app or program, they might choose to work with that, or something similar, to accomplish their learning tasks. It is true there are times when the content is the same for all students, so in those cases, perhaps the choices can be in how students learn (the process) and how they represent their learning (the product). In contrast, there are also times when students are learning a particular process, or literacy strategy, which could mean that the content

can be left to choice. From her study on agency in early grade classrooms, Adair (2014) claimed that agency also requires movement away from single indicator systems that focus only on one marker or indicator for success (p. 233). Thus, if choice in content, process, or product supports constructing meaning in transliterate learning opportunities, then it is reasonable to consider that how students are assessed must also be addressed. Learning goals from provincial English Language Arts curricula, however, rarely focus on specific content or are limited to one prescribed process or product.

Confidence with technology impacted the learning tools and platforms students chose to use in the classroom. Confidence was connected to (1) the students' previous experiences, or familiarity, with the technology; (2) whether the student was given a choice of technologies; and (3) if students were taught specific strategies for using and understanding the technology through digital and critical literacy understandings. Previous experience or familiarity with a technology did incite the students to use it once again, but there were many instances in which I observed the students take risks in trying something new when they were educated by their teachers in how and why to use new tools or resources. The students often resorted back to what they knew or were comfortable using, when options were presented without instruction. Confidence and willingness to try a new resource or technology appears to increase when these three factors (experience, choice, and strategies) are in place. Thomas et al. (2007) concur that "a willingness to embrace the new might be an essential feature of transliteracy because its opposites, fear and reluctance to learn, are powerful inhibitors to the acquisition of new skills, and skills play an important role in transliterate practice" (para. 2).

Student choice and agency are significant to literacy success at school and contribute to student engagement and motivation (Adair, 2014; Cambourne, 2000; Pressley et al., 2009;

Vaughn, 2014). Given the abundant ways one can learn and achieve a goal, choice and preference are central to understanding transliteracy. As new technologies, software, and accessibility tools are developed at an unprecedented pace, it is impossible to learn each one in depth. Educators can, however, teach students how to choose what might be best for their purposes and to learn general categories of what might be available. For example, online, there are various curation websites (and apps) for collecting related links or ideas, like the Symbaloo and Thinglink sites Mrs. Carpenter used. Curation sites are useful for gathering and organizing information from other places. When students learn to use curation sites, either as a consumer or creator, they are learning to make critical decisions about what to include or exclude as they collect links, images, and videos. Through these sites, teachers can assess critical transliteracy as well as other aspects of learning such comprehension of the topic through cohesion of collected materials. They are useful for teaching in that teachers can use them as a way to limit access to particular sites, as Mrs. Carpenter did through her literacy centres Symbaloo pages, or to share links in a user-friendly way such as when she shared the students' surveys they created. They also can demonstrate how information can be linked across online sources.

There are also websites for online collaboration, like wikis or Google Docs, where students can co-construct text and other media in real time. These types of sites are designed for multiple creators and encourage collaborative learning and constructing. They also involve ways to share co-constructed work with wider audiences through shared links or online publishing. There are sites specifically created for communication, like blogs, online comic creators, or Instagram, and sites for creating, like video creating, editing, and posting. It is also important to note that within those categories are many options for users with various levels of experience and options for use with different devices. Having choice can be empowering; however, instruction

in how to make appropriate choices, through critical, digital, social, and disciplinary transliteracy helps students to deal with the overwhelming amount of information online as well as the many ways to use it.

Teaching to use and select from available resources teaches students flexibility and resiliency. When familiar resources were unavailable, students learned the daily tasks could still be completed but in different ways. School activities did not stop; students simply carried on using different resources. Overreliance on one technology over another does not teach flexibility, confidence with other resources, or willingness to try something new or different when what they are familiar with is unavailable. It undermines children's capacities for learning when teachers only emphasize one or a few ways of learning in the classroom or when they insist that one way is better than another without acknowledging choice, preference, or students' own understanding of the right tool for the right job.

Allowing choice and recognizing that it can have positive impacts on learning requires a teacher outlook in which choice, preference, and differentiation are priorities. It is important to understand how to navigate and choose among many literacy practices and to be able to fluidly move across contexts, modalities, technologies, and genres (Sukovic, 2014, p. 207). When considering outcomes for learning tasks, teachers can ask themselves if the product matters as much as the learning processes (and meaning-making) taken to get there. Being open to allowing choice in the classroom allows for more specific differentiation to meet students' needs and interests and allows preferences for learning to be acknowledged better in the classroom. Understanding differences in constructing meaning allows teachers to honour and respect students' learning experiences even if they are different from their own.

Transliteracy addresses diversity and differentiation. It promotes wide access to explore multiple resources and ways of learning in response to individualistic needs and interests. Transliteracy responds to needs for differentiated learning experiences for all students when choice and preference are acknowledged. There are endless tools for learning and constructing meaning available as are global opportunities to collaborate and communicate with other people, both alike and different from the students in the local space. Culturally and linguistically diverse students, for example, might need to access digital tools for translation, spelling support, or image and content support. Other students might need to find higher-level texts or videos to support their needs and interests as literate learners. Many of the websites selected by the teachers for students to use also had academic differentiation built in whereby students could progress through levels or stages depending on their proficiency. For example, Mrs. Carpenter used Spelling City (www.spellingcity.com), a spelling practice website, as part of daily literacy centres. She inputted individual spelling lists for each student depending on their spelling needs, which made it possible to differentiate within a single online resource. The spelling practice website, however, was also paired with analog writing activities during class time, like word searches and cloze sentences to practice the same words, as well as a weekly test of the words. Transliteracy does not prescribe using a particular resource but brings awareness that learning can occur across resources and among resources, in both digital and analog ways, within an atmosphere of discovery.

Guided Practice and Modeling

Teacher modeling was necessary and impacted how students used multiple resources and engaged in transliteracy practices. With their teachers, students watched, answered inquiry-based questions, and then engaged in exploration and guided practice. Having two different teachers

with varying teaching styles and experiences with technology was an asset to the students' transliterate construction of meaning, as well as to their learning about how to learn in transliterate ways. At times, the teachers also invited students to take over the mouse, keyboard, or whiteboard marker and lead the discussion around their own learning and use of specific sites or applications. The tools, texts, and platforms used and discussed by the teachers influenced the children's literacy practices when working independently.

In her work with internet inquiry in elementary school, Dwyer (2016) asserted that "working with the internet and other digital technologies repositions the role of the teacher from the "most knowledgeable other" in the classroom to a co-creator and co-learner with students" (p. 388); however, as was learned in this study, being open to the suggestions of her students, and seeing them as capable internet users and digitally literate people, Mrs. Carpenter modeled the risk-taking that happens when one is transliterate. For example, early in the year, Mrs. Carpenter showed me Thinglink (www.thinglink.com) because she wanted to teach students to use it for one of their research projects. Thinglink, mentioned above as a curation website, is a site that allows users to link other websites, including voice, video, and image files to an anchor image. Users begin by selecting or creating a visual representation of a topic and then adding tags or buttons to external places online that are related. Mrs. Carpenter recognized that before she could offer it as a choice for students, she herself needed time to explore it on her own and to learn what might make the site challenging for grade three students. She explained that sometimes she allows the students to explore the tools even though she is not fully comfortable or confident with them yet (as was her experience with the Google Read and Write toolbar) because she was confident that the students had enough experience with other computer tools to figure it out through their own exploration. She chose to learn alongside them and access online

support if needed to help her with specific issues they could not solve together. This suggests that being open to allowing students to use and model technology outside of the teacher's expertise can provide new and innovative ways to work within available resources and tools and can give confidence to students to try something new. Even something as simple as allowing them to control the mouse of the computer projected on the SMART board or inviting them to become the technology experts through her teams system improved their self-confidence and willingness to persevere when met with challenges during independent work.

When given a controlled choice of writing platforms, such as using Google Docs or Google Slides, some students defaulted to using a program with which they were familiar if the teacher had not taken the time to explain it to the whole class. Pressley et al. (2001) conducted a study of 30 classrooms to determine the most and least effective primary-level literacy teaching strategies. The results of their study revealed that there was much more explicit teaching in the most effective classrooms compared to the least effective, and much of it was opportunistic in response to the students' needs (p. 49). They also suggested that the most effective teachers encouraged student self-regulation, taught more direct reading skills, and explicitly taught process writing and mechanics. Like Pressley et al., I noted that students benefited from explicit instruction, teacher modeling, and guided practice. Teacher modeling was also important in increasing student confidence and willingness to take risks with new tools. When the teacher took the time to model how to navigate a website, find information, or use an application, the students were more willing to try. Mrs. Carpenter was very adept at asking the students to guide her as she navigated a tool; for example, she would ask students where she should click or what might happen if she does this or that. She was also very open to allowing the children to take

over the mouse at her computer and walk the other students through how they might use a website or application.

Modeling and explicit instruction were important in developing the students' transliteracy, but so was guided practice, particularly when the students and teachers engaged in joint text construction. Mrs. Carpenter would often use a blank Google Doc on the SMART Board and type as she and the class wrote together. As she typed, she also modeled and sometimes explained the intricacies of using Google Docs to write, in addition to teaching specific writing and composition strategies. She used both think aloud and direct teaching when writing with the students and used the platform of Google Docs to teach typing skills, spelling, writing composition, and how to use the program. Guided practice was also evidence of scaffolding and in-the-moment teaching based on the students' needs and interests. Making time for guided practice was important in teaching children how to construct meaning, especially in transliterate ways. Children are faced with many choices, and by guiding them not only in content but also in skills and strategy development, teachers are helping them to hone their transliteracy understandings to be able to make choices and be flexible and fluent in how they use literacies both at school and in their daily lives.

A successful pedagogical strategy that both teachers used was to provide examples of previous students' work or of expected work. Sometimes this strategy involved retrieving images using a Google search, such as when Mrs. Rayne used images of structures that other students have built using straws and other materials in the science building unit. Another example was when Mrs. Carpenter asked Andrew to share his Google Drive folder from grade 2 with the class so that together they could teach the students how to create folders and to organize their Google Drive work. Whenever Mrs. Carpenter was using a new digital tool, she shared examples with

the class. This occurred during multiple units throughout the year (e.g., Olympics, dance, fairy tales, stop motion videos, broadcasting). Mrs. Carpenter shared more digital examples or activities than paper-based ones. Perhaps this was related to the ease of keeping a digital file over paper copies of student work. The students' understanding of the task was increased from viewing examples, and at times when examples were not provided, asked her to search for an image or video online. Students also asked the teachers to replay video or image samples throughout their activities.

Modeling transliteracy teaches students adaptability and resiliency, especially when the teacher meets (inevitable) technology challenges. Their modeling also influenced the tools students chose for their own learning, as they selected to use the ones shared, taught, or recommended by the teachers. At home, the students also used the resources they encountered at school and relied on the school websites for direct logins or links to suggested websites. The students also learned from each other and the teachers how to provide feedback, posts, and comments to each other through oral, paper, and online feedback. Teacher modeling, think aloud, questioning, guided practice, and joint construction of text support transliterate exploration of various texts, media, platforms, genres, and learning contexts.

Resources, Tools, and Multiliteracies

Although each student was offered an equal opportunity to engage with technology devices throughout the day, I saw a spectrum of use and reliance on devices and the internet. Students varied in the times in which they would choose to use a device, the exception being Center time. Having choice and an opportunity to use a device when needed allowed the children to construct meaning in transliterate ways.

Teaching with a variety of multiliteracies, including visual and media texts, encourages critical transliteracy and digital transliteracy. With teacher support and direction, students can learn to think about the reliability and validity of media and texts, question issues of social justice, and see how power exists in literacy practices and texts. Using a variety of multiliteracies across content areas further develops transliteracy and can teach students that transliteracy practices are not confined to traditional literacy activities but reflect meaning-making in all learning. Opportunities to use more than one mode, device, or platform simultaneously connected to transliteracy result in deep learning across them. Students relied heavily on digital tools to read and write independently. Using tools such as Google Read & Write alongside other literacy activities improved the students' independence, quality, and quantity of work.

Transliteracy involves teaching about social and cultural literacy practices and taking those contexts into consideration. Teaching from a transliteracy perspective acknowledges that socially and culturally situated literacy practices are also linked to preferences, access, knowledge and understanding of digital literacy, as well as students' needs. By paying attention to how students are transliterate, teachers can provide opportunities for them to be fluid in their learning by employing additional opportunities to be transliterate at school.

Several commercial games and activities have been designed in ways that promote transliterate learning. These games bridge traditional texts or objects with electronic tablet use by allowing children to manipulate and move physical letter tiles or game pieces to play a digital game. Figure 6.0 includes two images of separate Osmo games played in the classroom. They were popular among the grade three students when they could use the iPads either in free time or during literacy centres. Osmo games include a hands-on manipulative, such as letter or tangram tiles, and a special reflective piece placed over the camera of an iPad. The specific apps that

accompany the game pieces have several games and activities for the students to play. The camera reads what the student has done and shows the student if they are correct. One of the class favourites was the Pizza Co. game that showed customers in a pizza parlour who would order different pizzas. The students' job was to create the order using the hands-on ingredients and then swiping it into the virtual oven. The game also involved accepting money from the customer and returning the appropriate amount of change using money manipulatives.

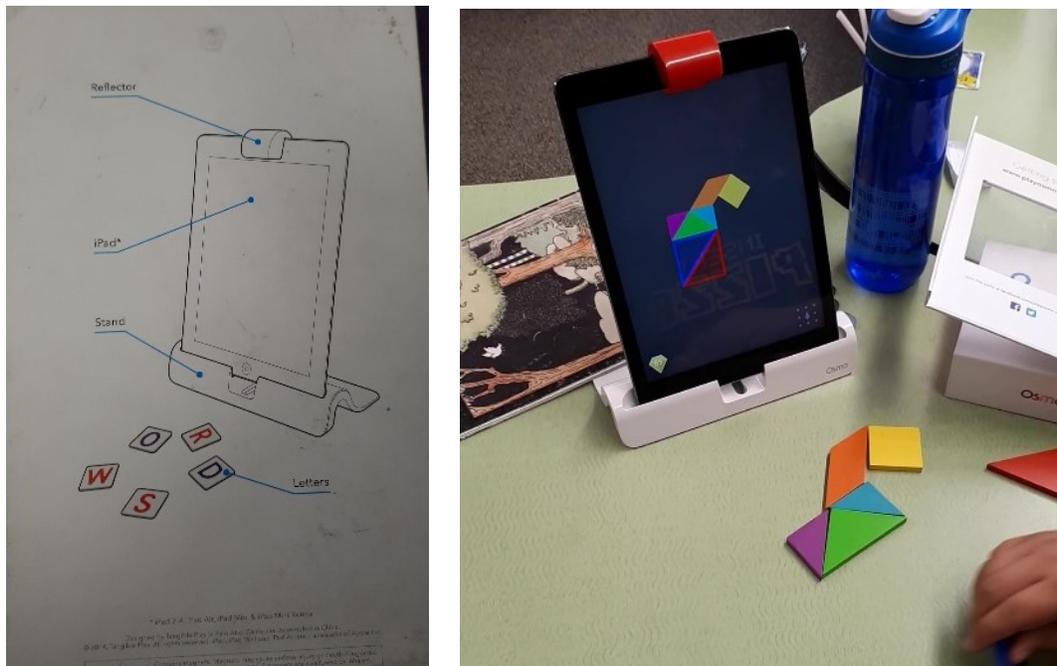
Figure 6.0 also shows a writing pad (called a Rocket Book) that transfers drawn images or text and digitizes them using QR (Quick Response) codes (<https://getrocketbook.com>). QR codes are matrix barcodes that can be scanned using a smartphone app to quickly store or retrieve online information. Kwento used the Rocket Book near the end of the year as an alternative to drawing on paper. Each page in the notebook had a QR code that Mrs. Carpenter could scan and upload. The Rocket Book created digital files that were easily shared with Kwento's family or could be stored in his Google Drive. Kwento seemed excited to write and draw in the Rocket Book as using technology was a motivator for him.

Another technology tool used by the class that required both analog and digital literacy skills were Ozobots (Figure 6.1, Ozobots, www.ozobots.com). The class used Ozobots to learn computer programming by creating sequential stories, doing scavenger hunts, and experimenting with computer coding. Ozobots are small robots that can read code, lines, and colours according to a pre-established set of commands. Both digital surfaces, like iPads, and analog surfaces, like paper and felt markers, can be used to create a sequence for the Ozobot to read and follow. Figure 6.1 shows Ozobot sequences created by students in the class using black, green, blue, and red felt markers to make small squares or circles "of code". The students have also drawn additional images around the code to tell a story as the Ozobot reads the coding sequence and

moves along the drawn code. In addition to observing the grade threes using Ozobots, I also observed the grade one students learn to use them. The Ozobots were connected to transliteracy as the students were required to write a story and then create an Ozobot path to correspond with it. It was more than illustrating, though, as the Ozobots could perform small actions such as moving faster or slower, or could spin, turn, or go backwards. The story also needed to have a clear beginning, middle, and ending with distinguishable events that could be represented by the Ozobots actions. This activity clearly involved more than one literacy and involved moving back and forth between the robot, coding, and the storytelling.

Figure 6.0

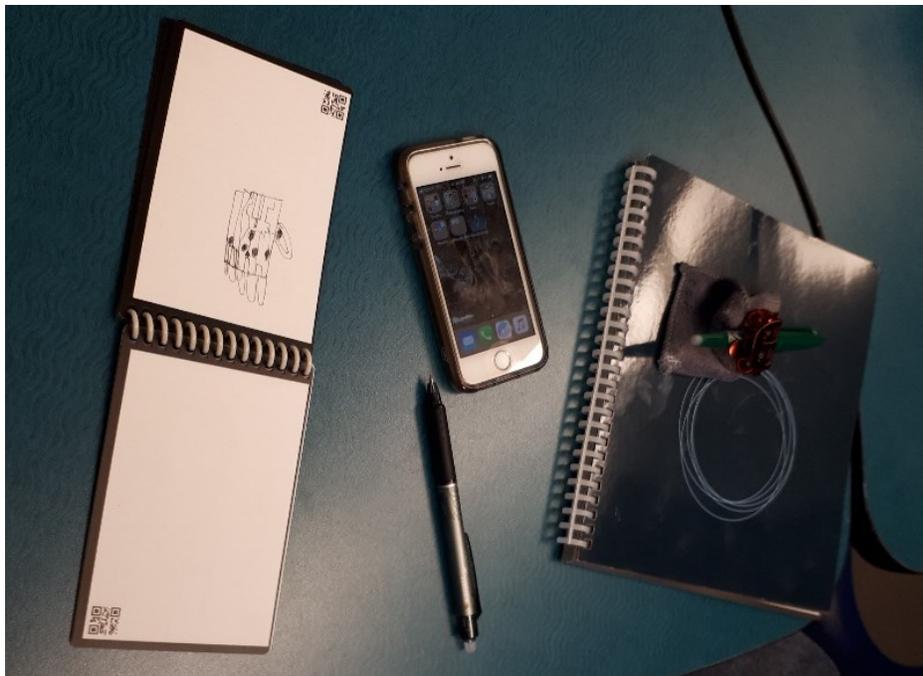
Commercially Available Transliteracy Games



Osmo Letters and Tangram iPad games



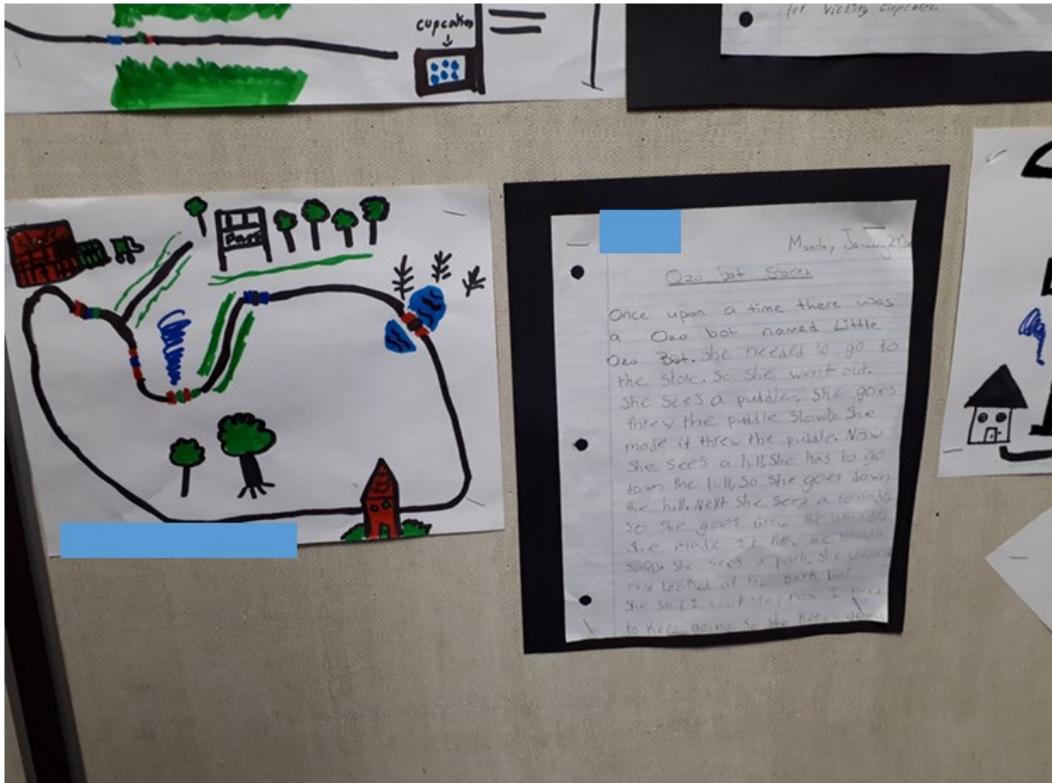
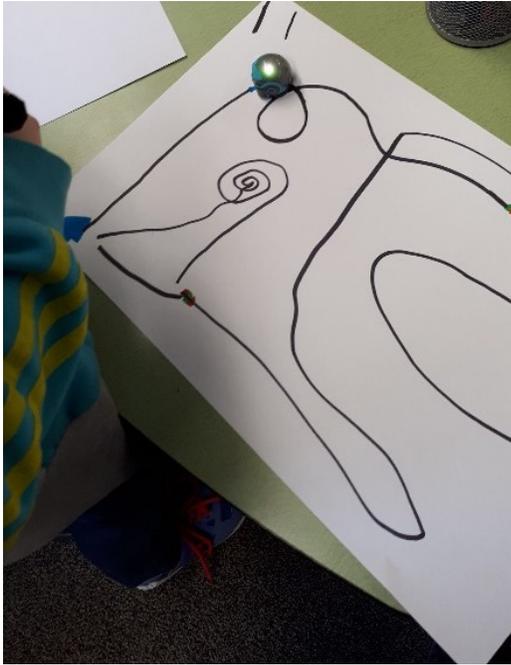
Osmo Pizza Co.



Rocket Book writing pad

Figure 6.1

Using Ozobots to Learn Coding and Writing



The tools and resources shared in Figures 6.0 and 6.1 allow students to connect with literacy and math understandings using digital technologies and engage with these ideas in different and interesting ways. Transliteracy embraces many ways of learning, whether through books, computers, nature, or storytelling with others face to face or on the other side of the world through Skype or YouTube. My work is not to suggest that one way of learning, or resource, is better than another; it is simply to understand how children in elementary school use many ways of learning together and separately to connect with others, to learn with others, and to develop their literacies. Seeing literacy practices from a transliteracies mindset helps to illuminate how resources, media, or platforms for learning are used by children in school.

Recommendations for Transliteracy Pedagogies in Elementary Classrooms

Based on the findings of this study are the following 10 recommendations for transliteracy pedagogies in elementary classrooms:

1. Expose students to and use a wide variety of texts (media, multimodal, audio, visual, written) that encourage transliteracy in teaching and learning practices
2. Allow choice in both content, process, and product and teach students to recognize their preferences for learning
3. Teach technology-based language explicitly and in practice
4. Teach disciplinary transliteracy pedagogy across the curriculum
5. Teach digital transliteracy and cues or plans for using devices (screens down, technology team/troubleshooting plan)
6. Address critical transliteracy, and teach concepts such as online safety; reliability, credibility, validity of information; and how to use images and media

7. Allowing the flow of meaning-making to move back and forth and from separated subject areas to a hybrid and concept-based approach
8. Allow simultaneous use of devices and resources
9. Engage in guided practice and regular modeling of transliteracy practices
10. Shift to a transliteracy mindset to see how it fits with present understandings of literacy and how it reflects constructing meaning in a 21st-century learning context, both in and out of school

Limitations of this Study

The reflexive nature required of observation is, in itself, a limitation of qualitative research. A researcher's being, along with their intention, always impacts what is observed, noticed, and discussed as relevant or not. That also is what makes qualitative research rich and deep. We are all human beings that construct meaning based on our funds of knowledge as we come to new meanings and experiences so, although reflexivity must play a role in discussing ethnographic research, the potential bias that might result is also part of the goal. I came to this research with a particular lens, to seek transliteracy practices and understand if and how they contribute to constructing meaning. To be able to see transliteracy, I needed to bring an understanding of what that is, and have described that in the beginnings of this paper, because that then allows me to frame and discuss my observations and then share how they fit together. Although the nature of reflexivity in qualitative research often is described as a limitation, it is also a way of contextualizing to create understanding.

In addition to acknowledging my role and biases as a qualitative researcher in this study, it is prudent to note that I made particular choices in terms of participants and location that limit the generalizability of this work; however, at the same time, these choices contribute a much-

needed example of transliteracy in an environment that might be different from many others. I sought to find a teacher whose philosophy included strong beliefs about the importance of digital technology at school and who regularly implemented digital literacies and various activities that involved using both computers and analog tools. Although the makeup of the grade three classroom, in its cultural, economic, and linguistic diversity, was somewhat typical of many Canadian classrooms, the use of digital technologies and multiliteracies may not be typical. I recognize that my biases as a researcher, scholar, and person did affect the design of the study and how I collected and analyzed the data, but they led me to make a purposeful choice in how and why I selected a particular group and location.

I selected Mrs. Carpenter's classroom because of the grade level but also because of her proficiency with and use of technology in an educational setting. A limitation that results from selecting a very specific research site and participant group may make this work seem to be an example of an uncommon classroom, but I strongly feel educational research needs examples of transliteracy work in action, where it exemplifies success and challenge, but shows how a transliteracy framing can change the use of available materials and resources and how teachers can afford learning opportunities for students in elementary school. My relationship with the students may have impacted what they chose to share with me, as those who felt more comfortable shared more and more often. It does take time to build relationships, and as was the case with Clarinda, in some cases, took most of the school year to establish. I also selected four students as focal participants, which meant some students in the class were rarely in my notes or observations apart from being a global member of the classroom community and whole class-learning experiences.

Ethnographic work requires agility in the interpretation of the data despite arriving with an interest or research questions to explore. My interpretations of the data are a result of what I know and understand and thus must always be contextualized. I needed to use good interactional and interpersonal skills, remain familiar with the social circumstances, and be sensitive towards the norms and values in the classroom. This pragmatic understanding required me to continually contextualize my observations within both the setting and wider literacy and educational research. Although this research did not directly benefit the specific students involved, its greater benefit lies in the knowledge gained to inform other teachers and researchers about how transliteracy is enacted in classrooms. It drew upon the specific needs and interests of the learners in a space bound only by available technologies and resources, whether they be traditional literacies, or digital literacies or both.

Future Research

Coming into this research, my initial understanding of transliteracy came from the Transliteracy Working Group (Thomas et al., 2007) and from Sukovic's (2017) most recent expansions on the concept. Early work with the idea suggested that transliteracy is an ability to read, write, and interact across a range of literacies. Sukovic furthermore suggested that not only are skills involved but, using technologies, collaborating and participating, and communicating meanings contribute to transliteracy. She wrote, "transliteracy consists of skills, knowledge, thinking, and acting, which enable fluid 'movement across' in a way that is defined by situational, social, cultural, and technological contexts" (Sukovic, 2017, p. 8). It was from Sukovic's definition of transliteracy that I recognized how transliteracy aligns with more general assumptions of literacy as it functions within the larger context of digital and online learning emerging in schools. I saw the potential to further explore transliteracy as an act of learning that

is both socially and contextually mediated but also connected to everyday life, learning, and communication. The overwhelming nature of choice, preference, and access to information is changing how and why we interact with one another and ideas and, subsequently, appears to be a part of learning that is yet to be fully explored. It is that learning that occurs across resources that can be anywhere from a paper note to a blog to a YouTube video, or even conversations happening via online comments in social media. It is also about collaboration across time and space, about curating information, and about critically evaluating suitability and availability. These are not new ideas, but they are new practices given the resources and tools available to students in and out of school personal and public devices. Additionally, to best support teachers, effective professional development for transliteracy teaching is an additional area to investigate.

Transliteracy practices were regularly used in the grade three classroom as the students constructed meaning in their academic and social experiences. Many times, I observed transliteracy practices enrich their learning through choice and agency, through learning new digital literacy practices, through being challenged to think critically in authentic learning experiences, and through the connections they made across the subject areas. At its core is the idea that transliteracy is fluid learning that involves reciprocity and movement across various resources for learning. Transliteracy involves social interactions with one another, with others' ideas online or in written, verbal, or media texts, and in creating and maintaining relationships. Transliteracy is evident in how students solve problems and make choices in literacy practices. Knowing more about the transliteracy practices in the grade three classroom as well as what influenced their decisions around literacy and communication helped identify pedagogical practices that might encourage meaning-making in transliterate ways.

Using the internet is deeply embedded in social and educational practices. Sharing freely with a wider community has great benefits for learning and understanding. Transliteracy is growing as an open-source idea in online communities, and it has piqued interest from many individuals and groups in multiple disciplines. #transliteracy is expanding but needs more research attention in educational spaces to refine what it means, and what it can contribute to current understandings of constructing meaning.

Many students in Canada have grown up with technology immersed in their daily activities. To understand transliteracy further, including its relationship to constructing meaning, and to support learning at school better, we need further research at various grade levels and contexts. Transliteracy research may influence school policies such as device use at school.

Rethinking the Boundaries of Literacy Learning

Digital texts, tools, and the internet have widened the boundaries of literacy learning and practices. “The evolutionary trajectories of multimodality and new literacies” Serafini (2014) stated, “go beyond the technical aspects of digital environments and hypertexts to incorporate new ways of participating and collaborating in social environments” (p. 47). Plenty of current research is happening to uncover how literacy development and digital tools intersect and impact social spaces such as classrooms. Digital technologies are changing how people act socially and culturally in more globalized and interconnected ways than ever; however, there is more work to do to better understand different inclinations for constructing meaning through literacy practices.

More studies from a transliteracy perspective in different contexts might illuminate unprecedented transliteracy practices that can provide needed insight for teachers into how to afford meaningful classroom practices for 21st-century learners. As the findings of this study illustrate, transliteracy practices can involve both digital and analog practices. Times are

changing and educators and schools need to change with them but that does not mean foregoing effective teaching practices already happening in classrooms. It does mean, however, that in continuing to examine the transliteracy opportunities available both within and beyond the classroom, teachers can better support students' shifting transliteracy practices.

Thinking of literacy from a transliteracy perspective can also be fused with other foundational theories of literacy in pre-service teacher education programs or professional development programming for in-service teachers. Transliteracy is more than a set of skills, or even an ability to do something, it is a mindset that the world is full of things, people, and places to explore and learn.

References

- Adair, J. K. (2014). Agency and expanding capabilities in early grade classrooms: What it could mean for young children. *Harvard Educational Review, 84*(2), 217-241.
- Alberta Education. School Technology Branch. (2013). *Learning and technology policy framework*. <https://education.alberta.ca/media/1046/learning-and-technology-policy-framework-web.pdf>
- Alberta Education (2015). *Baseline technology assessment: provincial final report*. Retrieved from: <https://open.alberta.ca/publications/9781460124017#summary>
- American Library Association (ALA) Digital Literacy Task Force (2013). *ALA Task Force releases digital literacy recommendations*. <https://soo.gd/diglitala>
- Anderson, C. (2019). Let's Put Conferring at the Center of Writing Instruction. *Voices From the Middle, 26*(4), 9-13.
- Apple. (2010). Apple launches iPad [Press release]. Retrieved from www.apple.com/ca/newsroom/2010/01/27Apple-Launches-iPad/
- Atkinson, P. (2017). *Thinking ethnographically*. Sage.
- Auerbach, E. (1991). Literacy and ideology. *Annual review of applied linguistics, 12*, 71–85. <https://doi.org/10.1017/S0267190500002154>
- Aukerman, M., & Chambers Schuldt, L. (2016). “The Pictures Can Say More Things”: Change Across Time in Young Children's References to Images and Words During Text Discussion. *Reading Research Quarterly, 51*(3), 267-287.
- Backfisch, I., Lachner, A., Hische, C., Loose, F., & Scheiter, K. (2020). Professional knowledge or motivation? Investigating the role of teachers' expertise on the quality of technology-enhanced lesson plans. *Learning and Instruction, 66*, 101300.

- Balaraj, B. L. (2014). *Case study and ethnography* [Slideshow]. SlideShare.
<https://www.slideshare.net/balarajbl/case-study-ethnography>
- Bamford, A. (2003). *The visual literacy white paper*. Commissioned by Adobe Systems Pty Ltd.
<https://www.aperture.org/wp-content/uploads/2013/05/visual-literacy-wp.pdf>
- Barry, B., Haynes, D., Muller, G., & Peters, J. (2015). Developing multiliteracies: A strategic approach using the i.Plan pedagogical framework. *Literacy Learning: The Middle Years*, 23(2), i–viii.
- Barton, D. (1994). *Literacy: An introduction to the ecology of written language*. Blackwell Publishers.
- Barton, D., & Hamilton, M. (1998). *Local literacies: Reading and writing in one community*. Routledge.
- Barton, D., Hamilton, M., & Ivanič, R. (Eds.) (2000). *Situated literacies: Reading and writing in context*. Routledge.
- Baynham, M. (2004). Ethnographies of literacy: Introduction. *Language and Education*, 18(4), 285–290. <https://doi.org/10.1080/09500780408666881>
- Beavis, C., Thompson, R., & Muspratt, S. (2017). A game isn't a game without interaction. *Serious Play: Literacy, Learning and Digital Games*, 23.
- Blanchard, J., & Moore, T. (2010). *The digital world of young children: Impact on emergent literacy* [White paper]. Pearson Foundation. <https://soo.gd/Blanchard>
- Bloome, D., & Green, J. (2015). The social and linguistic turns in studying language and literacy. In J. Rowsell, & K. Pahl (Eds.) *The Routledge handbook of literacy studies*. Routledge.
- Bowen, T., & Whithaus, C. (Eds.). (2013). *Multimodal literacies and emerging genres*. University of Pittsburgh Press.

- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Sage.
- Brice, M. (2016). *Don't step on each other's words: Aboriginal children in legitimate participation with multiliteracies* [Unpublished doctoral dissertation]. University of Alberta. <https://doi.org/10.7939/R3SQ8QW0M>
- Britton, J. (1998). *A reading research and education centre report: Technical report No. 425. Writing and reading in the classroom*. Report prepared for Centre for the Study of Reading. University of Illinois.
- Bruner, J. (1986). The inspiration of Vygotsky. In *Actual Minds, Possible Worlds* (70–78). Cambridge: Harvard University Press.
- Burke, A., & Hardware, S. (2015). Honouring ESL students' lived experiences in school learning with multiliteracies pedagogy. *Language, culture and curriculum*, 28(2), 143–157. <https://doi.org/10.1080/07908318.2015.1027214>
- Burke, J. J. (2014). *Makerspaces: a practical guide for librarians* (Vol. 8). Lanham, MD: Rowman & Littlefield.
- Burnett, C. (2009). Research into literacy and technology in primary classrooms: An exploration of understandings generated by recent studies. *Journal of research in reading*, 32(1), 22–37. <https://doi.org/10.1111/j.1467-9817.2008.01379.x>
- Burnett, C. (2015). Being together in classrooms at the interface of the physical and virtual: Implications for collaboration in on/off screen sites. *Learning, media and technology*, 41(4), 566–589. <https://doi.org/10.1080/17439884.2015.1050036>.

- Burnett, C. (2016). Acknowledging and interrogating multiplicities: Towards a generous approach in evaluations of early literacy innovation and intervention. *Journal of Early Childhood Literacy*, 17(4), 522–550. <https://doi.org/10.1177/1468798416645851>
- Burnett, C., & Merchant, G. (2015). The challenge of 21st Century literacies. *Journal of Adult and Adolescent Literacies*, 59(3), 271–274. <https://doi.org/10.1002/jaal.482>
- Burnett, C., & Merchant, G. (2016). Boxes of poison: Baroque technique as antidote to simple views of literacy. *Journal of Literacy Research*, 48(3), 258-279.
- Burnett, C., & Merchant, G. (2019). Revisiting critical literacy in the digital age. *The Reading Teacher*, 73(3), 263-266.
- Burnett, C., & Merchant, G. (2020). *Undoing the Digital: Sociomaterialism and Literacy Education*. Routledge.
- Burnett, C., Davies, J., Merchant, G., & Rowsell, J. (Eds.) (2014). *New literacies around the globe: Policy and pedagogy*. Routledge. <https://doi.org/10.4324/9781315867311>
- Burnett, C., Merchant, G., Pahl, K., & Rowsell, J. (2014). The (im) materiality of literacy: The significance of subjectivity to new literacies research. *Discourse: Studies in the Cultural Politics of Education*, 35(1), 90-103.
- Butler, D., & Clay, M. M. (1979). *Reading begins at home: Preparing children for reading before they go to school*. Heinemann Educational Books.
- Cambourne, B. (2000). Conditions for literacy learning: Turning learning theory into classroom instruction: A minicase study. *The Reading Teacher*, 54(4), 414-417.
- Chambers, A. (1985). *Booktalk: Occasional writing on literature and children*. Harper & Row.
- Chambers, A. (1991). *The reading environment: How adults help children enjoy books*. Thimble Press.

- Chapman, D. (2019). Etymology and the Doctrine of Correctness: Word Meaning in Dictionaries of English Usage. *Dictionaries: Journal of the Dictionary Society of North America*, 40(2), 93-116.
- Ciampa, K. (2016). Implementing a digital reading and writing workshop model for content literacy instruction in an urban elementary (K-8) school. *The Reading Teacher*, 70(3), 295-306.
- Chera, P., & Wood, C. (2003). Animated multimedia "talking books" can promote phonological awareness in children beginning to read. *Learning and Instruction*, 13(1), 33–52.
[https://doi.org/10.1016/S0959-4752\(01\)00035-4](https://doi.org/10.1016/S0959-4752(01)00035-4)
- Chowdhury, M. F. (2014). Interpretivism in aiding our understanding of the contemporary social world. *Open Journal of Philosophy*, 2014.
- Clay, M. M. (1966). *Emergent reading behaviour* [Unpublished doctoral dissertation]. University of Auckland.
- Clay, M. M. (1976). Early childhood and cultural diversity in New Zealand. *Reading Teacher*, 29(4), 333–342.
- Clay, M. M. (1979). *Reading: The patterning of complex behaviour* (2nd ed.). Heinemann Educational Books.
- Clay, M. M. (1991). *Becoming literate: The construction of inner control*. Heinemann.
- Coiro, J. (2003). Reading comprehension on the internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56(5), 458–464.
- Coiro, J. (2005). Making sense of online text. *Educational Leadership*, 63(2), 30–35.

- Coiro, J. (2011a). Predicting reading comprehension on the Internet: Contributions of offline reading skills, online reading skills, and prior knowledge. *Journal of Literacy Research*, 43(4), 352–392. <https://doi.org/10.1177/1086296X11421979>
- Coiro, J. (2011b). Talking about reading as thinking: Modeling the hidden complexities of online reading comprehension. *Theory into Practice*, 50(2), 107–115. <https://doi.org/10.1080/00405841.2011.558435>
- Coiro, J. (2012a). The new literacies of online reading comprehension: Future directions. *Educational Forum*, 76(4), 412-417.
- Coiro, J. (2012b). Understanding dispositions toward reading on the Internet. *Journal of Adolescent & Adult Literacy*, 55(7), 645–648. <https://doi.org/10.1002/JAAL.00077>
- Coiro, J. (2020). Toward a multifaceted heuristic of digital reading to inform assessment, research, practice, and policy. *Reading Research Quarterly*, 0(0), 1-23. <https://doi.org/10.1002/rrq.302>
- Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*, 42(2), 214–257. <https://doi.org/10.1598/RRQ.42.2.2>
- Coiro, J., & Moore, D. W. (2012). New literacies and adolescent learners: An interview with Julie Coiro. *Journal of Adolescent & Adult Literacy*, 55(6), 551–553. <https://doi.org/10.1002/JAAL.00065t>
- Coiro, J., Knobel, M., Lankshear, C., & Leu, D. (Eds.) (2008). *Handbook of research on new literacies*. Lawrence Erlbaum Associates.
- Coles, R., & Thomson, P. (2016). Beyond records and representations: in between writing in educational ethnography. *Ethnography and Education*, 11(3), 253-266.

- Collin, R., & Street, B. V. (2014). Ideology and interaction: Debating determinisms in literacy studies. *Reading Research Quarterly*, 49(3), 351–359. <https://doi.org/10.1002/rrq.75>
- Cook, M. P. (2006). Visual representations in science education: The influence of prior knowledge and cognitive load theory on instructional design principles. *Science education*, 90(6), 1073-1091.
- Cope, B., & Kalantzis, M. (Eds.). (2000). *Multiliteracies: Literacy, learning and the design of social futures*. Routledge. <https://doi.org/10.4324/9780203979402>
- Cope B., & Kalantzis M. (2009). A grammar of multimodality. *International Journal of Learning*, 16(2), 361–426.
- Cope, B., & Kalantzis, M. (2015). The things you do to know: An introduction to the pedagogy of multiliteracies. In B. Cope & M. Kalantzis (Eds.), *A pedagogy of multiliteracies* (pp. 1–36). Palgrave Macmillan.
- Covey, S. (1989). *The seven habits of effective people*. New York.
- Craft, A., Cremin, T., Hay, P., & Clack, J. (2014). Creative primary schools: Developing and maintaining pedagogy for creativity. *Ethnography and Education*, 9(1), 16–34. <https://doi.org/10.1080/17457823.2013.828474>
- Creswell, J.W. (2011). *Education research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson Education, Inc.
- Cromby, J., & Nightingale, D. J. (1999). What's wrong with social constructionism? In D. J. Nightingale & J. Cromby (Eds.), *Social constructionist psychology: A critical analysis of theory and practice* (pp. 1–19). Open University Press.
- Culkin, J. M. (1967). A schoolman's guide to Marshall McLuhan. *Saturday Review*, 51-53.
- Davis, B. (2004). *Inventions of teaching: A genealogy*. Lawrence Erlbaum Associates.

- Denzin, N. K., & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed.) (pp. 1–17). Sage Publications, Inc.
- Dezuanni, M., Dooley, K. T., Gattenhof, S. J., & Knight, L. M. (2015). *iPads in the early years: Developing literacy and creativity* [Routledge Research in Early Childhood Education series]. Routledge. <https://doi.org/10.1177/2042753017731236>
- Dowsett, A., and Jackson, M. (2019). The effect of violence and competition within video games on aggression. *Computers in Human Behavior*, *99*, 22-27.
- DuFour, R., & Dufour, R. (2010). The role of professional learning communities in advancing 21st century skills. In J. Bellanca, & R. Brandt (Eds.), *21st century skills: Rethinking how students learn* (pp. 77–95). Solution Tree Press.
- Dunn, J., Niens, U., & McMillan, D. (2014). “Cos he's my favourite character!” A children's rights approach to the use of popular culture in teaching literacy. *Literacy*, *48*(1), 23-31.
- Dwyer, B. (2016). Developing online reading comprehension. *International handbook of research on children's literacy, learning and culture*, 344-358.
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2007). Participant observation and fieldnotes. In P. Atkinson, A. Coffey, S. Delamont, J. Lofland, & L. Lofland (Eds.), *Handbook of ethnography* (pp. 352–369). SAGE Publications Ltd.
<http://dx.doi.org/10.4135/9781848608337>
- Esch, E. (2012, May 2). Three reasons kids need digital literacy and citizenship education. Beth's blog: How connected nonprofits leverage networks and data for social change.
<http://www.bethkanter.org/kidscomputer/>

- Fahrman, B., Norström, P., Gumaelius, L., & Skogh, I. B. (2020). Experienced technology teachers' teaching practices. *International journal of technology and design education*, 30(1), 163-186.
- Flewitt, R., Messer, D., & Kucirkova, N. (2014). New directions for early literacy in a digital age: The iPad. *Journal of Early Childhood Literacy*, 15(3), 289–310.
<https://doi.org/10.1177/1468798414533560>
- Fortune, T. W., Tedick, D. J., Haneda, M., & Nassaji, H. (2019). Context matters: Translanguaging and language immersion education in the US and Canada. *Perspectives on language as action: Festschrift in honour of Merrill Swain*, 27-44.
- Forzani, E. E., & Leu, D. J. (2012). New literacies for new learners: The need for digital technologies in primary classrooms. *The Educational Forum*, 76(4), 421–424.
<https://doi.org/10.1080/00131725.2012.708623>
- Garcia, A. (2020). Gaming literacies: Spatiality, materiality, and analog learning in a digital age. *Reading Research Quarterly*, 55(1), 9-27.
- Gee, J. P. (1989). Literacy, discourse, and linguistics: Introduction. *Journal of Education*, 171(1), 5–17.
- Gee, J. P. (1996). *Social linguistics and literacies* (2nd ed.). Routledge.
- Gee, J. P. (2004). Discourse analysis: What makes it critical?. In *An introduction to critical discourse analysis in education* (pp. 49-80). Routledge.
- Gee, J. P. (2007). *What video games have to teach us about learning and literacy* (2nd ed.). Palgrave Macmillan.
- Geertz, C. (1973). *The interpretation of cultures: Selected essays*. Basic Books, Inc.

- Gillen, J., Matsumoto, M., Aliagas, C., Bar Lev, Y., Clark, A., Flewitt, R., Jorge, A., Kumpulainen, K., Marsh, J., Morgade, M. and Pacheco, R., (2019). A Day in the Digital Lives of Children Aged 0-3. Full report.: DigiLitEY ISCH COST Action 1410 Working Group 1: Digital Literacy in Homes and Communities.
- Goldman, S. R. (2004). Cognitive aspects of constructing meaning through and across multiple texts. In D. Bloome & N. Shuart-Faris (Eds.). *Uses of intertextuality in classroom and educational research* (pp. 317–351). Information Age Publishing.
- Goldman, S. R., Britt, M. A., Brown, W., Cribb, G., George, M., Greenleaf, C., ... & Project READI. (2016). Disciplinary literacies and learning to read for understanding: A conceptual framework for disciplinary literacy. *Educational Psychologist, 51*(2), 219-246.
- Goodman, K. S. (1965) A linguistic study of cues and miscues in reading. *Elementary English, 42*, 639–643.
- Goodman, K. S. (1986). *What's whole in whole language? A parent/teacher guide to children's learning*. Heinemann Educational Books, Inc.
- Goodman, K. (1990). Managing the whole language classroom. *Scholastic teacher, 99*(6), 26–29.
- Goodman, K. S. (1996). *On reading*. Heinemann.
- Goodman, K. S. (2014). *What's whole in whole language in the 21st century?* Garn Press.
- Görzig, A., & Holloway, D. (2019). Internet use. *The Encyclopedia of Child and Adolescent Development, 1-10*.
- Green, B. (2012). Subject-specific literacy and school learning: A revised account. In B. Green and C. Beavis (Eds.) *Literacy in 3D: An Integrated Perspective in Theory and Practice*. Acer.

- Greenwald, L. (2018) *TBH, This Is So Awkward*. Tegen HarperCollins.
- Gutnick, A. L., Robb, M., Takeuchi, L., & Kotler, J. (2011). *Always connected: The new digital media habits of young children*. The Joan Ganz Cooney Center at Sesame Workshop.
http://www.joanganzcooneycenter.org/wp-content/uploads/2011/03/jgcc_alwaysconnected.pdf
- Hague, C. & Payton, S. (2010). *Digital literacy across the curriculum*. Futurelab.
<https://www.nfer.ac.uk/publications/FUTL06/FUTL06.pdf>
- Halliday, M. A. K. (1969). Relevant models of language. *Educational Review*, 22(1), 26–37.
- Halliday, M. A. K. (1978). *Language as social semiotic: The social interpretation of language and meaning*. Edward Arnold. <https://doi.org/10.1017/S004740450000782X>
- Hammersley, M. (2006). Ethnography: Problems and prospects. *Ethnography and Education*, 1(1), 3–14. <https://doi.org/10.1080/17457820500512697>
- Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms*. Cambridge University Press.
- Henderson, M. & Romeo, G. (Eds.). (2015). *Teaching and digital technologies: Big issues and critical questions*. Cambridge University Press.
- Henrkisen, D., DeSchryver, M., & Mishra, P. (2015). Rethinking technology & creativity in the 21st century transform and transcend: Synthesis as a trans-disciplinary approach to thinking and learning. *TechTrends*. 59(4), 5–9. doi:10.1007/s11528-015-0863-9
- Hinchman, K. A., & O'Brien, D. G. (2019). Disciplinary Literacy: From Infusion to Hybridity. *Journal of Literacy Research*, 51(4), 525-536.
- Hinrichsen, J., & Coombs, A. (2014). The five resources of critical digital literacy: a framework for curriculum integration. *Research in Learning Technology*, 21.

- Hoechsmann, M., & DeWaard, H. (2015). *Mapping digital literacy policy and practice in the Canadian educational landscape*. Media Smarts. <https://mediasmarts.ca/sites/mediasmarts/files/publication-report/full/mapping-digital-literacy.pdf>
- Hohti, R. (2016). Children writing ethnography: children's perspectives and nomadic thinking in researching school classrooms. *Ethnography and Education, 11*(1), 74-90.
- Holloway, D., Green, L., & Livingston, S. (2013). *Zero to eight. Young children and their Internet use*. LSE: EU Kids Online. http://eprints.lse.ac.uk/52630/1/Zero_to_eight.pdf
- Hoong, T. Y., Pakirathan, P. G., & Ling, I. L. H. (2020). The effect of media violence on the verbal aggressive behaviours of Malaysian Chinese independent secondary school students. *e-Academia Journal, 9*(1).
- Howard, S. K., & Mozejko, A. (2015). Teachers: technology, change and resistance. *Teaching and digital technologies: Big issues and critical questions, 307-317*.
- Information Resources Management Association. (2012). *Digital Literacy: Concepts, methodologies, tools, and applications*. IGI Global. <http://www.myilibrary.com?ID=513585>
- IBM Canada K-12 Education. (2015). *Baseline technology assessment: Provincial final report*. Prepared for Alberta Education. Minister of Education. <https://open.alberta.ca/publications/9781460124017>
- Ipri, T. (2010). Introducing transliteracy: What does it mean to academic libraries? *College & Research Library News, 71*(10), 532–567. <https://doi.org/10.5860/crln.71.10.8455>
- Ipri, T., & Newman, B. (n.d.). *Beginner's guide to transliteracy*. Libraries and Transliteracy. <https://librariesandtransliteracy.wordpress.com/beginners-guide-to-transliteracy/>

- Jaeger, P. (2011). Transliteracy—new library lingo and what it means for instruction. *Library Media Connection, 30*(2), 44–47.
- Jardine, D. W., LaGrange, A., & Everest, B. (2004). In these shoes is the silent call of the earth”: Meditations on curriculum integration, conceptual violence and the ecologies of community and place. *The curriculum studies reader, 323-329*.
- Jewitt, C. (2004). Multimodality and new communication technologies. In P. Levine & R. Scollon (Eds.), *Discourse and technology: Multimodal discourse analysis* (pp. 184–195). Georgetown University Press.
- Jewitt, C. (2005). Multimodality, “reading”, and “writing” for the 21st Century. *Discourse: studies in the cultural politics of education, 26*(3), 315–331.
<https://doi.org/10.1080/01596300500200011>
- Johnson, M., Riel, R., & Froese-Germain, B. (2016). *Connected to learn: Teachers’ experiences with networked technologies in the classroom*. MediaSmarts/Canadian Teachers’ Federation. https://mediasmarts.ca/sites/mediasmarts/files/publication-report/full/ycwwiii_connected_to_learn.pdf
- Johnson, N. F. (2019). Dysfunctional devices in the classroom meet the habitus of the new. *E-Learning and Digital Media, 16*(3), 208-220.
- Kinzer, C. K. (2010). Considering literacy and policy in the context of digital environments. *Language Arts, 88*(1), 51–61. <https://www.learntechlib.org/p/65360/>
- Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education, 9*(1), 60–70.
https://tecfalabs.unige.ch/mitic/articles/koehler_mishra_2009_what_is_technological_pedagogical_content_knowledge.pdf

- Kress, G. (1985). *Linguistic processes in sociocultural practice*. Deakin University Press, 1985.
- Kress, G. (1996). Internationalisation and globalisation: Rethinking a curriculum of communication. *Comparative Education*, 32(2). 185–196.
<https://doi.org/10.1080/03050069628830>
- Kress, G. (2000). Multimodality. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 182-202) Routledge.
<https://doi.org/10.4324/9780203979402>
- Kress, G. (2003). *Literacy in the new media age*. Routledge.
- Kress, G. (2010). *Multimodality: A social semiotic approach to contemporary communication*. Routledge.
- Kuhn, T. S. (2012). *The structure of scientific revolutions*. University of Chicago press.
- Kumarasuriar , V., Pangiras , G., Sinnapan, S., and Koran, S. (2011). *A Study on the Relationship between Violent Video Game Playing and Aggression among Adolescents in the Klang Valley, Malaysia*. UniversitiTunku Abdul Rahman, Malaysia. Retrieved from <http://www.ipedr.com/vol20/15-ICHSC2011-M00034.pdf>
- Kvale, S. (1996). *InterViews: An introduction to qualitative research interviewing*. Sage Publications.
- Laidlaw, L., & Wong, S. S. (2016). Complexity, pedagogy, play: On using technology within emergent learning structures with young learners. *Complicity: An International Journal of Complexity and Education*, 13(1).
- Lankshear, C., & Knobel, M. (2003). New technologies in early childhood literacy research: A review of research. *Journal of Early Childhood Literacy*, 3(1), 59–82.
<https://doi.org/10.1177/14687984030031003>

- Lankshear, C., & Knobel, M. (2006). *New Literacies: Everyday Practices and Classroom Learning* (2nd ed.). Open University Press.
- Lankshear, C., & Knobel, M.(2008). *Digital literacies: Concepts, policies and practices*. Peter Lang Publishing.
- Lankshear, C., & Knobel, M. (2011). *Literacies: Social, cultural and historical perspectives*. Peter Lang Publishing.
- Leander, K., & Boldt, G. (2013). Rereading “A pedagogy of multiliteracies” bodies, texts, and emergence. *Journal of Literacy Research*, 45(1), 22–46.
- LeCompte, M. D., & Schensul, J. J. (1999). *Designing and conducting ethnographic research* (Vol. 1). AltaMira Press.
- LeCompte, M. D., Schensul, J. J., & Schensul, S. L. (1999). *Essential ethnographic methods: Observations, interviews, and questionnaires* (Vol. 2). AltaMira Press.
- Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. *Theoretical models and processes of reading*, 5(1), 1570–1613.
- Leu, D. J., Kinzer, C. K., Coiro, J., Castek, J., & Henry, L. A. (2017). New literacies: A dual-level theory of the changing nature of literacy, instruction, and assessment. *Journal of Education*, 197(2), 1-18.
- Levy, R. (2009). ‘You have to understand words... but not read them’: Young children becoming readers in a digital age. *Journal of Research in Reading*, 32(1), 75–91.
- Lewis, M., Flint, A. S., & Van Sluys, K. (2002). Taking on critical literacy: The journey of newcomers and novices. *Language Arts*, 79(5), 382-392.

- Liquète, V. (24–28 June 2012). *Can one speak of an “Information Transliteracy”?* [Paper].
International Conference : Media and Information Literacy for Knowledge Societies,
Moscow, Russia. <https://hal.archives-ouvertes.fr/hal-00841948/document>
- Liu, A. (2005). Understanding knowledge work. *Criticism*, 47(2), 249–260.
- Liu, A. (2009). Digital humanities and academic change. *English Language Notes*, 47(1), 17–35.
- Logan, R. K. (2020). Understanding Human Users: Extensions of Their Digital Media. *New Explorations: Studies in Culture and Communication*, 1(1).
- Lotherington, H. (2018). Mobile language learning: The medium is not the message. *L2 Journal*, 10(2).
- Lovell, M. (2014). *Interactive whiteboard use: Changes in teacher pedagogy in reading instruction in the primary grades* [Unpublished doctoral dissertation]. University of Alberta. <https://doi.org/10.7939/R37M0480G>
- Luke, A. (2004). On the material consequences of literacy. *Language and Education*, 18(4), 331–335.
- Lynch, J., & Redpath, T. (2014). ‘Smart’ technologies in early years literacy education: A meta-narrative of paradigmatic tensions in iPad use in an Australian preparatory classroom. *Journal of Early Childhood Literacy*, 14(2), 147–174.
<https://doi.org/10.1177/1468798412453150>
- Mac Callum, K., & Jeffrey, L. (2014). Factors impacting teachers’ adoption of mobile learning. *Journal of Information Technology Education*, 13.
- Mackey and Jacobson (2011), Transliteracy and Metaliteracy: Emerging Literacy Frameworks for Social Media [Slideshow]. Creativity & Multicultural Communication eClass.
<https://youtu.be/Stnfj9HFbzw>

- Mackey, T. P., & Jacobson, T. E. (2014). *Metaliteracy: Reinventing information literacy to empower learners*. American Library Association.
- Marsh, J. (2006). Global, local/public, private: Young children's engagement in digital literacy practices in the home. In K. Pahl and J. Rowsell (Eds.), *Travel notes from the new literacy studies: Instances of practice* (pp. 19–38). Multilingual Matters.
- Marsh, J. (2014). Researching young children's literacy practices in online virtual worlds. In P. Albers, T. Holbrook, & A. S. Flint (Eds.), *New methods of literacy research* (pp. 196–209). Routledge.
- Marsh, J., & Bishop, J. (2013). *Changing play : Play, media and commercial culture from the 1950s to the present day*. McGraw-Hill Education.
- Marsh, J., Plowman, L., Yamada-Rice, D., Bishop, J., & Scott, F. (2016). Digital play: A new classification. *Early Years, 36*(3), 242-253.
- Martens, P., Martens, R., Doyle, M. H., Loomis, J., & Aghalarov, S. (2012). Learning from picturebooks: Reading and writing multimodally in first grade. *The Reading Teacher, 66*(4), 285–294.
- Martin, A. (2006). Literacies for the digital age. In A. Martin & D. Madigan (Eds.), *Digital literacies for learning* (pp. 3–25). Facet Publishing.
- Mayer, R. E. (2019). Computer games in education. *Annual review of psychology, 70*, 531-549.
- McCloud, C. (2006). *Have you filled a bucket today?* Bucket Fillers Inc.
- McCaskin,
- McGee, L. M., Kim, H., Nelson, K. S., & Fried, M. D. (2015). Change over time in first graders' strategic use of information at point of difficulty in reading. *Reading Research Quarterly, 50*(3), 263–291.

- McLuhan, M., & Fiore, Q. (1967). The medium is the message. *New York*, 123, 126-128.
- McTigue, E. M., & Uppstad, P. H. (2019). Getting serious about serious games: Best practices for computer games in reading classrooms. *The Reading Teacher*, 72(4), 453-461.
- Megwalu, A. (2014). Transliteracy: A holistic and purposeful learning. *The Reference Librarian*, 55(4), 381–384. <https://doi.org/10.1080/02763877.2014.944461>
- Mehan, H. (1982). *The structure of classroom events and their consequences for student performance*.
- Merchant, G. (2015). Virtual worlds and online videogames for children and young people: Promises and challenges. In B. Guzzetti & L. Millinee (Eds.), *The handbook of research on the societal impact of social media* (pp. 291–316). IGI Global.
- Milroy, L., & Llamas, C. (2013). Social networks. *The handbook of language variation and change*, 407-427.
- Moje, E. B. (2015). Doing and teaching disciplinary literacy with adolescent learners: A social and cultural enterprise. *Harvard Educational Review*, 85(2), 254-278.
- Moll, L. C. (2005). Reflections and possibilities. In N. Gonzalez, L. Moll, & C. Amanti (Eds.), *Funds of knowledge: Theorizing practices in households, communities, and classrooms* (pp. 275–288). Lawrence Erlbaum Associates.
- Moll, L. C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, 31(2), 132–141. <https://doi.org/10.1080/00405849209543534>
- Moller, L., Huett, J. B., & Harvey, D. M. (2009). *Learning and instructional technologies for the 21st Century*. Springer Science+Business Media. <https://doi.org/10.1007/978-0-387-09667-4>

- Neumann, M. M., & Neumann, D. L. (2014). Touch Screen Tablets and Emergent Literacy. *Early Childhood Education Journal*, 42(4), 231–239. <https://doi.org/10.1007/s10643-013-0608-3>
- New London Group (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, 66(1), 60–93.
- OECD (2011), *PISA 2009 results: Students on line: Digital technologies and performance* (Vol. VI). <http://dx.doi.org/10.1787/9789264112995-en>
- O'Mara, J., & Laidlaw, L. (2011). Living in the iworld: Two literacy researchers reflect on the changing texts and literacy practices of childhood. *English Teaching: Practice and Critique*, 10(4), 149–159.
- O'Rourke, R. (2005). *Creative writing: education, culture and community*. Niace.
- Otheguy, R., García, O., & Reid, W. (2015). Clarifying translanguaging and deconstructing named languages: A perspective from linguistics. *Applied Linguistics Review*, 6(3), 281-307.
- Owocki, G., & Goodman, Y. (2002). *Kidwatching: Documenting children's literacy development*. Heinemann.
- Pahl, K. H., & Rowsell, J. (2011). Artifactual critical literacy: A new perspective for literacy education. *Berkeley Review of Education*, 2(2), 129–151. <https://doi.org/10.5070/b82110050>
- Pahl, K. H., & Rowsell, J. (2012). *Literacy and education: Understanding the new literacy studies in the classroom*. Sage
- Papert, S., & Harel, I. (1991). Situating constructionism. *Constructionism*, 36(2), 1-11.

- Parry, R., Burnett, C. & Merchant, G. (Eds.) (2016). *Literacy, media, technology: Past, present and future*. Bloomsbury.
- People for Education (2019). *Connecting to Success: Technology in Ontario Schools*. Toronto, ON: People for Education.
- Phillips, M. (2015). Digital technology integration. In M. Henderson, & G. Romeo (Eds.), *Teaching and Digital Technologies: Big issues and critical questions* (pp. 318–331). Cambridge University Press.
- Power, B. M. & Hubbard, R. S. (2001). Learning How to Research Language in Your Classroom. *Language development: A reader for teachers* (2nd ed.). Prentice-Hall, Inc.
- Pressley, M., Wharton-McDonald, R., Allington, R., Block, C. C., Morrow, L., Tracey, D., ... & Woo, D. (2001). A study of effective first-grade literacy instruction. *Scientific studies of reading*, 5(1), 35-58.
- Purcell-Gates, V. (Ed.). (2007). *Cultural practices of literacy: Case studies of language, literacy, social practice, and power*. Lawrence Erlbaum Associates Publishers.
- Razfar, A., & Yang, E. (2010). Digital, hybrid, & multilingual literacies in early childhood. *Language Arts*, 88(2), 114-124.
- Rideout, V., and Robb, M. B. (2019). *The Common Sense census: Media use by tweens and teens, 2019*. Common Sense Media
- Rideout, V. (2017). *The Common Sense census: Media use by kids age zero to eight*. Common Sense Media.
- Rideout, V. J. (2015). *Common Sense census: Media use by tweens and teens*. Common Sense Media. <https://www.commonsensemedia.org/research/the-common-sense-census-media-use-by-tweens-and-teens>

- Rideout, V. (2013). *Zero to eight: Children's media use in America, 2013*. Common Sense Media. <https://www.commonsensemedia.org/research/zero-to-eight-childrens-media-use-in-america-2013>
- Rippl, G., & Etter, L. (2013). Intermediality, Transmediality, and Graphic Narrative. *From Comic Strips to Graphic Novels: Contributions to the Theory and History of Graphic Narrative*, 37, 191-218.
- Rob, M., & Rob, F. (2018). Dilemma between Constructivism and Constructionism: Leading to the Development of a Teaching-Learning Framework for Student Engagement and Learning. *Journal of International Education in Business*, 11(2), 273-290.
- Rosenblatt, L. M. (1969). Towards a transactional theory of reading. *Journal of Reading Behavior*, 1(1), 31–49.
- Rosenblatt, L. (1978). *The reader, the text, the poem: The transactional theory of the literary work*. Southern Illinois University Press.
- Rosenblatt, L. M. (1982). The literary transaction: Evocation and response. *Theory into Practice*, 21(4), 268–277. <https://doi.org/10.1080/00405848209543018>
- Rosenblatt, L. M. (2005). *Making meaning with texts: Selected essays* (pp. 62–71). Heinemann Educational Books.
- Rowell, J., & Walsh, M. (2011). Rethinking literacy education in new times: Multimodality, multiliteracies, & new literacies. *Brock Education: A Journal of Educational Research and Practice*, 21(1), 53–62.
<https://journals.library.brocku.ca/brocked/index.php/home/article/view/236>
- Rowell, J. (2013). *Working with multimodality: Rethinking literacy in a digital age*. Routledge.

- Ryan, M. L. (2004). Introduction. *Narrative Across Media: The Languages of Storytelling*.
Narrative across Media: The Languages of Storytelling, 1-40.
- Saxena, S. (2013, December 20). *Top 10 characteristics of a 21st Century classroom*.
EdTechReview. <http://edtechreview.in/news/862-top-10-characteristics-of-a-21st-century-classroom>
- Schutz, K. & Rainy, E. (2020). Making sense of modeling in elementary literacy instruction. *The Reading Teacher*, 73(4), 443-451.
- Serafini, F. (2011). Expanding perspectives for comprehending visual images in multimodal texts. *Journal of Adolescent & Adult Literacy*, 54(5), 342–350.
- Serafini, F. (2015). Multimodal literacy: From theories to practices. *Language Arts* 92(6), 412-423.
- Shanahan, T. (2019). Disciplinary literacy in the primary school.
- Shagrir, L. (2017). *Journey to ethnographic research*. Springer International Publishing.
<https://doi.org/10.1007/978-3-319-47112-9>
- Siegel, M. (2012). New times for multimodality? Confronting the accountability culture. *Journal of Adolescent & Adult Literacy*, 55(8), 671–681.
- Silva, E. (2009). Measuring skills for 21st Century learning. *Phi Delta Kappan*, 90(9), 630–634.
- Simpson, A., & Walsh, M. (2012). The impact of technology on reading practices for 21C learners. *Scan: The Journal for Educators*, 31(1), 34–39.
- Singer, L. M., & Alexander, P. A. (2017). Reading on paper and digitally: What the past decades of empirical research reveal. *Review of educational research*, 87(6), 1007-1041.
- Smagorinsky, P. (2007). Vygotsky and the social dynamics of classrooms. *The English Journal*, 97(2). 61–66. <https://doi.org/10.2307/30046790>

- Spencer, M. M. (1983). *Achieving literacy: Longitudinal studies of adolescents learning to read*. Routledge & Kegan Paul.
- Spindler, G. D. (1982). *Doing the ethnography of schooling: Educational anthropology in action*. Holt McDougal.
- Spiteri, M., & Rundgren, S. N. C. (2020). Literature review on the factors affecting primary teachers' use of digital technology. *Technology, Knowledge and Learning*, 25(1), 115-128.
- Spradley, J. P. (1979). *The ethnographic interview*. Holt, Rhinehart & Winston.
- Statistics Canada. (2017, November 14). The Internet and Digital Technology. <https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2017032-eng.htm>
- Stevens, E. A., Park, S., & Vaughn, S. (2019). A review of summarizing and main idea interventions for struggling readers in grades 3 through 12: 1978–2016. *Remedial and Special Education*, 40(3), 131-149.
- Street, B. (1984). *Literacy in theory and practice*. Cambridge University Press.
- Street, B. V. (Ed.). (2001). *Literacy and development: Ethnographic perspectives*. Routledge.
- Street, B. (2013). New Literacy Studies. In M. Grenfell (Ed.) *Language, ethnography, and education: bridging new literacy studies and Bourdieu*. New York: Routledge.
- Sukovic, S. (2014). iTell: Transliteracy and digital storytelling. *Australian Academic & Research Libraries*, 45(3), 205–229.
- Sukovic, S. (2015). Transliterate Reading. *Scholarly and Research Communication*, 6(4).
- Sukovic, S. (2017). *Transliteracy in complex information environments*. Chandos Publishing.
- Taylor, D. (1983). *Family literacy: Young children learning to read and write*. Heinemann Educational Books Inc.

- Taylor, S. V., & Leung, C. B. (2020). Multimodal Literacy and Social Interaction: Young Children's Literacy Learning. *Early Childhood Education Journal*, 48(1), 1-10.
- The New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard educational review*, 66(1), 60-93.
- Thomas, S. (2013). Making a space: Transliteracy and creativity. *Digital Creativity*, 24(3), 182-190. <https://doi.org/10.1080/14626268.2013.806332>
- Thomas, S., Joseph, C., Laccetti, J., Mason, B., Mills, S., Perril, S., & Pullinger, K. (2007). Transliteracy: Crossing divides. *First Monday*, 12(12). <https://doi.org/10.5210/fm.v12i12.2060>
- Thorndyke, P. W., & Hayes-Roth, B. (1982). Differences in spatial knowledge acquired from maps and navigation. *Cognitive psychology*, 14(4), 560-589. [https://doi.org/10.1016/0010-0285\(82\)90019-6](https://doi.org/10.1016/0010-0285(82)90019-6)
- Teo, P. (2019). Teaching for the 21st century: A case for dialogic pedagogy. *Learning, Culture and Social Interaction*, 21, 170-178.
- Trans. (n.d.) In Dictionary.com. Accessed May 1, 2020 from <https://www.dictionary.com/browse/trans>
- Transliteracies Project. (n.d.). Research in the technological, social, and cultural practices of online reading. <http://transliteracies.english.ucsb.edu/category/about/index.html>
- Valentine, G., & Holloway, S. L. (2002). Cyberkids? Exploring children's identities and social networks in on-line and off-line worlds. *Annals of the association of American Geographers*, 92(2), 302-319. <https://doi.org/10.1111/1467-8306.00292>
- Van Dijk, J. A. (2017). Digital divide: Impact of access. *The international encyclopedia of media effects*, 1-11.

- Van Maanen, J. (1988). *Tales of the Field*. University of Chicago Press.
- Vaughn, M., Premo, J., Sotirovska, V., & Erickson, D. (2020). Evaluating agency in literacy using the student agency profile. *The Reading Teacher*, 73(4), 427-441.
- Vega, V., & Robb, M. B. (2019). *The Common sense census: Inside the 21st Century classroom*. Common Sense Media. <https://www.common sense media.org/research/the-common-sense-census-inside-the-21st-century-classroom-2019>
- von Heyking, A. (2019). *Alberta, Canada: How Curriculum and Assessments Work in a Plural School System*.
- Voogt, J., & Roblin, N. P. (2012). A comparative analysis of international frameworks for 21st Century competences: Implications for national curriculum policies. *Journal of curriculum studies*, 44(3), 299–321.
- Vygotsky, L. (1978). *Mind in society: The development of higher mental processes*. Harvard University Press.
- Walsh, M. (2011). *Multimodal literacy: Researching classroom practice*. Australia: Primary English Teaching Association.
- Warschauer, M. (2007). The paradoxical future of digital learning. *Learning Inquiry*, 1(1), 41–49.
- Web 3.0. (2019, February 25). In *Techopedia*. Retrieved from www.techopedia.com/definition/4923/web-30
- Wong, S. S. H. (2015). Mobile digital devices and preschoolers' home multiliteracy practices. *Language and Literacy*, 17(2), 75–90.

Wong, S. S. (2016). *A complex inquiry into preschoolers' multiliteracy practices at home*.

[Unpublished doctoral dissertation]. University of Alberta.

<https://doi.org/10.7939/R3862BH3G>

Yelland, N. (2008). Becoming multiliterate in contemporary times. In N. Yelland, L. Lee-

Hammond, M. O'Rourke, & C. Harrison (Eds.), *Rethinking learning in early childhood education* (pp. 28-45). Open University Press/McGraw-Hill Education.

Yelland, N. J. & Gilbert, C. L. (2013). iPossibilities: Tablets in early childhood contexts. *Hong*

Kong Journal of Early Childhood, 12(1), 5–14.

Youngs, S., & Serafini, F. (2011). Comprehension strategies for reading historical fiction

picturebooks. *The Reading Teacher*, 65(2), 115–124.

Appendices

Appendix A: Information Letter to Accompany Consent Forms

Appendix B: Parental or Legal Guardian Informed Consent Form

Appendix C: Teacher Informed Consent Form

Appendix D: Minor Assent Form

Appendix E: Typical Features of Good Field Notes

Appendix F: Ethnographic Interview Questions

Appendix G: Transliteracy Survey for Students

Appendix A: Information Letter to Accompany Consent Forms

Study Title: An Ethnographic Study of How Multiliteracies Support Transliteracy in Primary School

Dear Families,

My name is Jacqueline Filipek Part of my program includes a research study and dissertation. My research interests are in language and literacy education.

I am writing to share specific details on my study so that you can make an informed decision about participating and so that you can better understand why further study in this area is important. I also want to point out that up to this point my study has been approved by a committee of examiners at the University of Alberta, has received ethics consent from the University research ethics board, and has been approved by the school board Cooperative Activities Program. Participation in this study is voluntary and you will have the opportunity to withdraw at any point up until the end of data collection.

The title of my research is *An Ethnographic Study of How Multiliteracies Support Transliteracy in Primary School*. Below is how I understand three of the major parts of my research: ethnography, multiliteracies, and transliteracy

Ethnography is the research methodology that guides how I will do research. Ethnography involves learning from people through being immersed in their everyday lives. That means that I will spend a lot of time in the classroom (between the months of ___ to ___) observing and participating in what the students are doing. I will take notes, called field notes, to record what I see and hear. I will also record certain activities using a video camera and a voice recorder. I will always let students know when they will be recorded. A large part of my research will also involve interviewing the people in the classroom. I will use both formal interviews and informal conversations. I will record interviews when possible. I might also ask students if I can photograph their work or take a copy of it. To understand the information I collect, I will use all of the sources (field notes, interviews, conversations, schoolwork, and recordings) to look for patterns or common themes.

Multiliteracies include reading, writing, speaking, listening, viewing, and representing/creating. Multiliteracies also include multimodal texts, such as a book with both pictures and words or a video with sounds and moving images. Multiliteracies can also involve digital literacies like using computer apps, online activities, or digital devices.

Transliteracy involves using multiple resources for learning, like books, online information, videos, and includes working with others to communicate ideas in several different ways (such as creating a digital storybook or a short video).

I am interested in understanding how young children use multiple resources across the whole school day to learn and become more literate. Years ago, literacy was just considered to be the ability to read and write but multiliteracies theory has shown us that we can be literate in

many other ways, too. Especially with the influx of digital technologies (like smart phones, the internet, smartboards, iPads and apps) we in fact use many different modes, (such as hearing, viewing, touching) to make sense of what we learn. This has shifted how we teach in schools, as we have moved doing reading and writing in a paper-based way to using all sorts of media, contexts for learning, and devices. Even young children are participating in creating videos, or multimedia presentation, playing reading games on iPads or on internet game sites.

I feel my study is significant because it has become important to understand how children, who have grown up in a culture that relies heavily on technology, learn in school, and how and why learning happens. I think researching with the idea of transliteracy in mind can be helpful to show how literacy learning happens across media, activities, and in collaboration with others. I think that many children do look to multiple ways to learn because they live in a time when there are many options available for learning. It is also important, then, to understand how children deal with that multitude of options.

In my study, I also want to highlight the successes that are happening in primary classrooms. As I watch my own young children navigate through devices, media, multimodal books (that have pictures, sounds and words) I am reminded of how capable younger children are in a transliterate way using multiliteracies and I think that research not only needs to share this, but can also inform teachers about how they can teach these learners who have the skills and dispositions required to learn in many contexts (both digital and traditional) and in many multimodal ways.

When I am in the classroom my role will be as a participant-observer. That means that there will be times that I sit and just watch what is happening but there will also be times that I move among the students and ask them questions or participate in what they are doing. I will do my best to not disrupt their learning at school. There may be certain times when I ask a student for a short interview, but I will work with the teacher to plan the most appropriate time to do it. I will not ask students to miss their breaks, like recess or lunch, to participate in my study, however, I might observe them during those times. There are no risks or benefits to this study beyond those encountered in everyday life.

As the teacher, you can expect that I will have many questions for you. I am interested in the instructional decisions you make and would like to interview you from time to time. I do not want my presence to be a burden to you so we can work together to find quick times to talk with each other. I am also open to other forms of communicating as well such as emails and phone conversations. At times, I may ask you to confirm some of the things I notice in the classroom. Additionally, it is important that you know that I will never record your real name or the school you work at. I will keep your identity and the things you tell me confidential.

Ethnographic research is typically done over a long period of time, so I thank you for considering having me “hanging around” your classroom.

If at any time you have questions or concerns, please contact me or my graduate supervisor, Dr. Heather Blair. I appreciate your time and your contribution to literacy research!

Sincerely, Jacqueline Filipek

Appendix B: Parental or Legal Guardian Informed Consent Form

An Ethnographic Study of How Multiliteracies Support Transliteracy in Primary School

INTRODUCTION

My name is Jacqueline Filipek and I am a doctoral student at the University of Alberta studying language and literacy in elementary education. Your child has been invited to join my research study as a participant that looks at how multiliteracies support transliteracy in primary school.

Multiliteracies include reading, writing, speaking, listening, viewing, and representing/creating. Multiliteracies also include multimodal texts, such as a book with both pictures and words or a video with sounds and moving images. Multiliteracies can also involve digital literacies like using computer apps, online activities, or digital devices.

Transliteracy involves using multiple resources for learning, like books, online information, videos, and includes working with others to communicate ideas in several different ways (such as creating a digital storybook or a short video).

I am also interested in how children learn through multiliteracies and transliteracy. Please take whatever time you need to discuss the study with your family and friends, or anyone else you wish to. The decision to let your child join, or not to join, is up to you.

WHAT IS INVOLVED IN THE STUDY?

In this research study, I am using a methodology called ethnography. Ethnography involves spending a significant amount of time in a place to learn about what people do there. The means I will use to collect information include:

- observations and taking detailed notes
- video and audio recording
- taking photographs or photocopies of students' work
- conducting short interviews with the students and the teacher
- having informal conversations with students about what they are doing
- accompanying them to other places in the school such as the gym, music room, or library and on fieldtrips or visits to other classrooms

It is known that young children growing up in digital environments have different learning needs and expectations for learning. As there is little information on young children, I hope to find out more about what they draw on to learn and if they seek multiple platforms for learning (like watching a video on YouTube **and** reading a nonfiction book about a particular topic). I also hope to understand how they show what they have learned in multiple ways and how they work with others to learn.

CONFIDENTIALITY

Your child's name will not be used when data from this study are recorded or published. Every effort will be made to keep research records, notes, and other personal information confidential.

Data files kept on a computer will require a password for getting onto the system and into the files directly. Other data, such as field notes and recordings, will be kept in a locked file cabinet.

INCENTIVES

There are no incentives given to participate. Participation is voluntary; however, this ethnographic research cannot take place unless a majority of the students have consent to participate.

RISKS AND BENEFITS

There are no risks or benefits to this study beyond those encountered in everyday life.

YOUR CHILD'S RIGHTS AS A RESEARCH PARTICIPANT

Participation in this study is voluntary. Your child has the right not to participate at all or to leave the study at any time. Deciding not to participate or choosing to leave the study will not result in any penalty and it will not harm his/her relationship with the school or classroom teacher.

If your child decides to leave the study, the procedure is to contact the classroom teacher or Jacqueline directly.

CONTACTS FOR QUESTIONS OR PROBLEMS? (removed)

I understand that:

- My child is not obligated to participate in the study.
- My child may withdraw from the study at any time until the end of the data collection period without penalty.
- My child will be photographed and video and audio recorded but these images, sound, or videos will not be used in sharing the research publicly without my further written consent.
- All information gathered will be treated confidentially. There will be no identifying information about my child recorded except for his/her age and gender. A pseudonym will be used instead of your child's name.
- The information collected will be analyzed as part of Jacqueline Filipek's doctoral research and dissertation at the University of Alberta.
- The data collected may be used for scholarly writing following the completion of the study and will be securely stored on a password protected computer drive. Jacqueline may use the data she gets from this study in future research, but if she does, it will have to be approved by a Research Ethics Board.

PERMISSION FOR A CHILD TO PARTICIPATE IN RESEARCH

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form. I will receive a copy of this consent form after I sign it.

As parent or legal guardian, I authorize _____ (child's name)
to become a participant in the research study described in this form.

Parent or Legal Guardian's Signature

Date

Name (printed) and Signature of Person Obtaining Consent

Date

As the parent or legal guardian, you will receive a copy of this form and the original will be held in the researcher's record.

The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office.

Appendix C: Teacher Informed Consent Form

An Ethnographic Study of How Multiliteracies Support Transliteracy in Primary School

INTRODUCTION

My name is Jacqueline Filipek and I am a doctoral student at the University of Alberta studying language and literacy in elementary education. Thank you for being a participant in my research study that looks at how multiliteracies support transliteracy in primary school.

Multiliteracies include reading, writing, speaking, listening, viewing, and representing/creating. Multiliteracies also include multimodal texts, such as a book with both pictures and words or a video with sounds and moving images. Multiliteracies can also involve digital literacies like using computer apps, online activities, or digital devices.

Transliteracy involves using multiple resources for learning, like books, online information, videos, and includes working with others to communicate ideas in several different ways (such as creating a digital storybook or a short video).

I am also interested in how children learn through multiliteracies and transliteracy and it is important for me to explore what you do as a teacher in terms of the activities you choose for your students and your approaches to literacy education.

Please take whatever time you need to discuss the study with your family and friends, or anyone else you wish to. The decision to join, or not to join, is up to you.

WHAT IS INVOLVED IN THE STUDY?

In this research study, I am using a methodology called ethnography. Ethnography involves spending a significant amount of time in a place to learn about what people do there. The means I will use to collect information include:

- observations and taking detailed notes
- video and audio recording
- taking photographs or photocopies of students' work
- conducting short interviews with the students and the teacher
- having informal conversations with students about what they are doing
- accompanying them to other places in the school such as the gym, music room, or library and on fieldtrips or visits to other classrooms

It is known that young children growing up in digital environments have different learning needs and expectations for learning. As there is little information on young children, I hope to find out more about what they draw on to learn and if they seek multiple platforms for learning (like watching a video on YouTube **and** reading a nonfiction book about a particular topic). I also hope to understand how they show what they have learned in multiple ways and how they work with others to learn.

CONFIDENTIALITY

Your name will not be used when data from this study are recorded or published. Every effort will be made to keep research records, notes, and other personal information confidential. Data files kept on a computer will require a password for getting onto the system and into the files directly. Other data, such as field notes and recordings, will be kept in a locked file cabinet.

INCENTIVES

There are no incentives given to participate. Participation is voluntary; however, this ethnographic research cannot take place unless you and a majority of the students have consent to participate.

RISKS AND BENEFITS

There are no risks or benefits to this study beyond those encountered in everyday life.

YOUR RIGHTS AS A RESEARCH PARTICIPANT

Participation in this study is voluntary. You have the right not to participate at all or to leave the study at any time. Deciding not to participate or choosing to leave the study will not result in any penalty and it will not harm your relationship with the school.

If you decide to leave the study, the procedure is to contact Jacqueline directly.

CONTACTS FOR QUESTIONS OR PROBLEMS? removed

I understand that:

- I not obligated to participate in the study.
- I may withdraw from the study at any time up to end of the data collection period without penalty.
- I will be photographed and video and audio recorded but these images, sound, or videos will not be used in sharing the research publicly without my further written consent.
- All information gathered will be treated confidentially. There will be no identifying information about me recorded except for my gender. A pseudonym will be used in place of my name.
- The information collected will be analyzed as part of Jacqueline Filipek's doctoral research and dissertation at the University of Alberta.
- The data collected may be used for scholarly writing following the completion of the study and will be securely stored on a password protected computer drive. Jacqueline may use the data she gets from this study in future research, but if she does, it will have to be approved by a Research Ethics Board.

PERMISSION TO PARTICIPATE IN RESEARCH

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form. I will receive a copy of this consent form after I sign it.

Signature

Date

Name (printed)

You will receive a copy of this form and the original will be held in the researcher's record.

The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office.

Appendix D: Minor Assent Form

Project Title: How Multiliteracies Support Transliteracy in Primary School

Researcher: Jacqueline Filipek

I am a student at the University of Alberta and I am doing a research study about how the children in your classroom use lots of different ways and tools to learn. I am really interested in how you use different tools like iPads or computers, books, videos, music, or drawings to learn about and use literacy. I am also curious about why and when you might use them.

I will be spending a lot of time in your classroom and we will have time to get to know each other. I will visit between the months of November to May of this school year. I might spend some of my time watching what is happening in your classroom or I might try to do what you are doing. You might also see me writing notes about what I see or using a video camera or picture camera.

If you decide that you want to be part of this study, you will be asked to talk with me sometimes about what you are doing or about some of your favourite parts of learning at school. I might also ask you about things you read or write about, computer games or apps you play, and if you like and know about computers. I might ask you if I can take a copy or picture of your work and it is okay if you don't want me to. You can also ask me questions at any time.

When I am finished with this study I will write about what I learned. This writing will not include your name, the name of your school or friends, or that you were in the study. We can use a made up name for you when I write about you and your classroom. You do not have to be in this study if you do not want to be. If you decide to stop after we begin, that's okay. There are no risks or benefits to this study beyond what you experience in your everyday life. Your parents know about the study too. Before you say **yes or no** to being in this study, I will answer any questions you have. If you join the study, you can ask questions at any time.

- Yes, I will be in this research study. No, I don't want to do this.

Child's name	Signature	Date
--------------	-----------	------

Person obtaining Assent	Signature	Date
-------------------------	-----------	------

I have discussed this research study with _____ using language which is understandable and appropriate for the participant. I believe that I have fully informed him/her of the nature of the study and its possible risks and benefits. I believe the participant understood this explanation and assent to participate in this study.

Appendix E: Typical Features of Good Field Notes
(from LeCompte and Schensul, 1999, p. 119)

Features of Good Field Notes:

- Exact quotes are included with selected words to convey to the readers a sense of being there and meeting the actors in the scene
- Pseudonyms or unique identities (numbers/letters) are used throughout to ensure anonymity and confidentiality
- The observation notes describe the activities in the sequence in which they happened
- The researcher describes appearances of the participants
- Notes include relevant history related to incidents or individuals to situate the event
- The researcher differentiates her own summary of the events and conversation from the direct quotes of the speakers
- The date, time, place, and name of the researcher are recorded at the top of the set of notes
- Notes are compiled with observations and interviews into a database
- Notes are content coded by domains, factors, and variables and analyzed by seeking associations among units, patterns, and structures

Appendix F: Ethnographic Interview Questions

Written Response Questions for Teachers:

1. How long have you worked as a teacher? How long at this school?
2. Do you have any post secondary education in addition to your BEd?
3. How many schools and districts have you worked at?
4. When did you switch from using the whiteboard and dry erase to using the smartboard to write agenda message?
5. What do you like about teaching?
6. What is challenging about teaching?
7. What devices do you use? OS?
8. How do you create your lessons and activities (google docs?)
9. How do make decisions about what to teach with given the number of choices.
10. How do learn about new teaching ideas and resources?
11. How often do you change your books in the red bins at the back of the room? Who chooses those books?
12. Tell me about how you see learning?

Focal Student Interview Questions:

1. Do you have a cell phone at home? Is it your own phone?
2. Do you have an iPad or tablet?
3. Do you have a computer?
4. How often do you get to use a phone, computer or tablet?
5. What do you play when you use a device?
6. Does anyone play with you?
7. What do you read at home?
8. Who reads at home with you?
9. If you have free time, what do you choose to do? Why?
10. How do you learn best?
11. What are some barriers or challenges to learning the way you learn best?
12. If you wanted to learn more about your favourite animal how would you find information?

**Appendix G: Transliteracy Survey for Students –
Using Survey Planet, 25 students, no teachers**

What is your gender?

Girl	14
Boy	11

Do you know how to use a computer?

Yes	21
No	0
Just a little bit	4

At what age did you learn to use a computer?

Baby	0
Toddler	1
Preschool	4
Kindergarten	8
Grade 1	9
Grade 2	3
Grade 3	0

What devices do you own? (yourself, not your parents). Select as many as you have.

iPad/tablet	24%	12
cell phone	24%	12
television	16%	8
iPod	14%	7
laptop/ computer	22%	11

4 unanswered

Do you use Symbaloo at home?

Yes	9
No	16

How many devices do you own?

0 devices	4
1 device	7
2 devices	4
3 devices	6
4 devices	3
5 devices	1

What devices are you allowed to use at HOME? Select as many as needed.

iPad/tablet	76%
cell phone	56%
television	76%
iPod	40%

laptop/ computer	72%
---------------------	-----

What devices are you allowed to use at SCHOOL? Select as many as needed.

iPad/tablet	80%	20
cell phone	12%	3
television	0%	0
iPod	4%	1
laptop/ computer	92%	23
Smart board	64%	16
Document camera	64%	16

1 unanswered

When you are looking for information, where do you find it?

Google	23	92%
Books	6	24%
Teacher	3	12%
Computer	2	8%
Friend	6	24%
Symbaloo	8	32%
Wikipedia	3	12%
Library	3	12%
I don't know	1	4%
YouTube	2	8%
Edge	1	4%

If you want to write something (like a story), what do you write it on?

Computer	10	40%
Paper	5	20%
Both	10	40%

What is the best thing about learning at SCHOOL?

You learn something new everyday	1
That we will have a job/ so you can get a job	2
It is amazing/ awesome	2
It helps in the future and it's PHUN	1
It is PHUHHHHHHHHN!!!!!!	8
gym	1
I like learning about science and sometimes social/ so I can be a chemist	2
It helps your brain grow	1
Having fun and getting smarter	1
Games/ math, recess, to learn how to play games, some science, how to read	2
I don't need to be boring!!!	1
Writing and phun	1
Art	1
When you do some work you sometimes get something good	1
When I learn it makes me think that I'm a teacher and that's what I wanna be when I grow up	1

What is the hardest thing about learning at SCHOOL?

At recess no one wants to play with you	1
Sometimes things are hard to catch up with	1
I get wearwrey/ I get frustrated/ sometimes things are very frustrating/ getting sad and frustrated	7
Math/ mostly science sometimes math	7
Sometimes everything/ everything but art	2
Division and multiplication	1
New things	1
I can't understand English	1
Sometimes I get mad at the wifi	1
Sometimes doing reading theory (online site)	1

1 unanswered

What websites do you like to visit?

Abcya Dance mat typing Reading theory Mathletics	3
Cool math games	4
Pridtg	1
Scince social	1
Code monsters	1
Dogonew	1
Symbaloo star fall coolmath games	2
Google	2
Games like roblox, animal jam, abcya	2
Abcya google drive	2

How do you practice spelling and reading at HOME?

Spelling homework read before bed write a lot/ I read chapter books and have spelling homework	5
I use technologies	3
I read books/ BY READING BOOKS!!!!!!!!!!	4
My parents quiz me sometimes	2
Reading and writing	3
I play roblox	1
Ask a parent or big sister-big brother to help you	1
homework	1
I don't	2
I read everyday before I go to bed and I do crossword puzzles. I also play games	1

How do you practice spelling and reading at SCHOOL?

Spelling tests, secret mission reading, writing/ Spelling test and reading time	8
I go to storylineonline	1
Spelling test & Spelling homework/ library	4
By reading math book	1
Read and write	1
We go to spelling city and reading theory/computer quizzes	3
Think more and you can find out – look for help	1
Writing workshop	1
Books/ reading books in my free time	3

What is research and how do you do it?

Research is when you want to know something and you search it up	5
I write things down from the site	1
Research is something you find	1
I use search on google	4
I do it	1
I use sbyaloo	2
I ask a question and ask around and get the answer/ think of a question and answer it	2
I don't know	1
You want to learn	1
Look on different websites	2

What can you tell me about learning?

When you first start something it is hard but in the end it is usually easy/ its going to be helpful along the way/ you need it for when you grow up	3
That learning is good/ awesome	2
Learning is something you learn	1
It helps you so you don't struggle	1
1+1=2 2+2=4 4+4=8/ use it to do math	2
It's phun/fun	10
Learning makes you smarter	1
It's fun and hard	5
It helps me become my best	1