LEARNING LANGUAGE AND SCIENCE AT PLAY: THREADS OF MEANING-MAKING AND IDENTITIES

by

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Abstract

In recent years, there has been a staggering increase of forcibly displaced people worldwide. Upon arrival in the host country, migrant and refugee-background children (MRBC) may be particularly at risk due to the challenge of adjusting to a new language, school culture, and sociocultural changes. In this context, this research aimed to shed light on the language and content-area learning of MRBC in a community elementary school in Greater Vancouver, BC. By using an inductive thematic analysis, this multiple-case study sought to understand how three Grade 2/3 learners could enhance academic language proficiency and science learning while foregrounding aspects of their identities through various playful practices. Theoretical frameworks included sociocultural perspectives on literacy, a pedagogy of multiliteracies, conceptions of play, and identity. Data encompassed field notes, photos and videos of in-class activities, artifacts, and interviews with students and their teachers. Findings suggest that the three MRBC learned about the importance of water and its cycle through multimodal meaning-making, which entailed engaging in a meaning-making flow, creating hybrid narratives of new knowledge, and learning collaboratively. The three MRBC also foregrounded aspects of their identities in multimodal productions, such as their sense of belonging, lifeworld experiences and agentic imagined identities. This research responded to a gap in the literature about MRBC’s literacy education in content-area subjects in Canadian mainstream classrooms; it also demonstrated how playful practices can give rise to synesthetic learning and open doorways to MRBC’s wealth of lifeworld knowledge and agentic identities in a science classroom.
Lay Summary

The present study sought to explain the language and science learning of migrant and refugee-background children (MRBC) in Canada, especially considering the challenges that these students face to learn a new language, school culture, and adjust to sociocultural changes upon arrival at school. Specifically, this research aimed to understand how three Grade 2/3 learners could develop their academic language proficiency and science learning while showcasing aspects of their identities through various playful practices. In this context, play provided learners with access to the new academic language and scientific knowledge; it also made it possible for MRBC to strengthen their identities and build their science learning on lived experiences.
Preface

This thesis is the original, unpublished work of the author, Jonathan Feitosa Ferreira. The study reported in this scholarly paper falls under the umbrella of the project funded by the Social Studies and Humanities Research Council and entitled Language and Literacy Learning Among Refugee and Migrant-Background Children and Youth in Canadian Classrooms. The UBC Behavioural Research Ethics Board approved the fieldwork reported in this investigation under the certificate # H19-01074.
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<tr>
<td>ELA</td>
<td>English language arts</td>
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<td>ELL</td>
<td>English language learner</td>
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<td>ESL</td>
<td>English as second language</td>
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<td>MRBC</td>
<td>Migrant and refugee-background children</td>
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<td>NLG</td>
<td>New London Group</td>
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<td>NLS</td>
<td>New Literacy Studies</td>
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<td>SLIFE</td>
<td>Students with little or interrupted formal education</td>
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<tr>
<td>SSHRC</td>
<td>Social Sciences and Humanities Research Council of Canada</td>
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<tr>
<td>TESOL</td>
<td>Teaching English as a second language</td>
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For Mr. Samuel and his students

For warmly welcoming me to their haven

and

For my family

For being my tower of strength
Chapter 1: Introduction

Contextual Background

In recent years, there has been a staggering increase of forcibly displaced people worldwide. Data shows that 79.5 million individuals fled their home countries for fear of life-threatening conflicts or prejudice towards their ethnic backgrounds, gender, religion, or sexual orientation (UNHCR, 2020). Amongst those, almost 26 million people are considered from refugee backgrounds. These individuals have fled their home countries due to war, oppression, or persecution (B.C. Refugee Hub, 2018).

In the pursuit of survival and better life opportunities, Eritreans, Iraqis, Iranians, Syrians, Somalians, Venezuelans, and people from other diverse nationalities seek refuge in countries such as Turkey, Sudan, Germany, Australia, the United States, Canada, and others (UNHCR, 2019). In 2017, for example, 26,980 people considered at risk either for reasons concerning legal or physical threat, medical needs or for being survivors of torture or violence settled in Canada (B.C. Refugee Hub, 2019). In the province of British Columbia, more specifically between July and September 2019, 1,515 refugee claimants arrived, with 208 aged seven to 18 years. (B.C Refugee Hub, 2019).

Recent data shows that 62% of refugee claimants arrive in Canada with the support of private sponsors that assist families for the first year (Barber, 2019). Barber explains that faith-based organizations, groups or private individuals commit to investing CAD $9,000 - $26,000 per year for housing, food, and other basic needs. The federal government also provides help for a year. With the support of the Canadian government, 32% of families are granted permission to migrate. They receive a general orientation, financial assistance for one year, access to services such as medical care and English language classes, and temporary housing until they move into
long-term arrangements (Barber, 2019). Finally, 5% receive a blended visa, which entails assistance from both private sponsors and the federal government for six months each (UNHCR, 2018).

Research Problem

Upon arrival, apart from adjusting to a new language and culture, children and youth from migrant or refugee backgrounds have to overcome interrupted or minimal prior formal education, disruption to family unit, financial stressors, negative stereotypes and discrimination. Unresolved emotional issues associated with displacement and trauma in the past can also interfere with the child’s ability to learn and develop within the school (Hamilton & Moore, 2004).

These issues can be overwhelming and affect children’s and youth’s education in different ways. Learners may demonstrate a lack of engagement, feelings of disempowerment, absenteeism, and failure to establish and sustain trusting relationships. As a result, a combination of these factors can heighten social exclusion and a deteriorating cycle of disadvantage (Block et al., 2014). For example, based on an ethnographic study with Somali Bantu children (Kindergarten to Grade 6), Birman and Tran (2017) found amongst students with limited or interrupted formal education (SLIFE) some patterns of disruptive behaviour, distress, and academic refusal and disengagement. The researchers observed that students could not do any work in class, complained about fatigue, were late for class, cried, or would even hoard food, pencils, and toys. Birman and Tran concluded that such disruption reflected learners’ unfamiliarity with the culture of schooling and the absence of academic background necessary to complete school tasks. Hamilton and Moore (2004) also suggest that such disengagement may
relate to SLIFE’s struggle to preserve a sense of social and psychological stability at a time when there is a simultaneous need to acquire a new language and adapt to a new culture and place.

Adapting to new models of education and learning approaches presents another challenge to children and youth from refugee and migrant backgrounds, mainly to SLIFE. DeCapua and Marshall (2011) define SLIFE as learners who are at least two grade levels below their peers in subject area knowledge, have low or no literacy and numeracy skills, experienced significant interruptions in formal instruction, or are members of collectivistic cultures. DeCapua and Marshall explain that often the first obstacle is adjusting to an individualist approach to learning, particularly for children and youth from refugee backgrounds who are members of collectivistic cultures. That is, they are accustomed to fostering and maintaining group relations. However, such group interdependence is hindered in individualist societies, where “a person’s identity depends primarily on personal attributes, traits, and achievements, and one’s sense of well-being centers on self-actualization and personal accomplishments” (DeCapua & Marshall, 2011, p. 36).

Also, DeCapua and Marshall (2015) argue that a significant number of learners come from oral tradition learning contexts. Thus, adhering to print-based literacy and western-style schooling, in which written language is emphasized, poses an extra difficulty. Furthermore, the researchers state that SLIFE bring a learning orientation that contrasts with the standards-based curriculum and assessment characteristic of formal education in countries such as the United States. For children and youth from migrant and refugee backgrounds, extracting information from print resources and applying structured problem solving and scientific reasoning seems irrelevant unless this knowledge redounds to their benefit outside school grounds.

Lastly, Dooley (2009) argues that the academic challenges for children with little, no, or severely interrupted schooling are formidable. They hustle to learn concepts and school practices
and to master new functions and forms of communication. Apart from language barriers, SLIFE also have to overcome gaps in content-area knowledge. These arise in part from differences of curriculum between countries; years of schooling lost to conflict and flight; and limited resources, especially in schools for children from refugee backgrounds (Arnot & Pinson, 2005). Specifically, the fact that there are historical disjointed instructional approaches to language and science learning can also undermine students’ abilities to meaningfully access the content area texts and complete tasks (Ardasheva et al., 2015). Considering the magnitude of the problems that these students have to deal with, Dooley (2009) contends that not even foundational school practices can be taken for granted, such as holding a pencil or handling a book.

An additional concern is the essentialization of migrant and refugee background learners’ identities. There has been a tendency to institutionally, systemically, and collectively label these learners (Daniel, 2019; Kennedy et al., 2019). Their identities are often defined by an overemphasis on trauma, hardship, and despair, which ultimately leads to disempowerment and lack of agency in the new country (Ryu & Tuvilla, 2018; Shapiro & MacDonald, 2017). This collective labelling may also limit the learning opportunities in which these students can engage and succeed. For example, Bal (2014) witnessed how elementary school SLIFE who did not comply with language learning standards in the United States were pulled out from English Language Arts (ELA) classes to English as Second Language (ESL) rooms, where curricular approaches were not appropriate, and then moved to special education programs because they “did not follow the state’s arbitrary one-year timeline for the acquisition of English […] due to laziness, disability, and/or family neglect” (p. 284). Bal’s study exemplifies how institutional deficit-oriented approaches may exclude SLIFE from accessing certain social and educational spaces and practices. Instead, he advocates for effective culturally relevant pedagogies that
capitalize on the goals, interests, and funds of knowledge that learners bring into schools to facilitate academic achievement, affirm fluid identities, and restrain social inequalities reproduced in schools.

Other practices to assist in the settlement and social integration of migrant and refugee background children and youth in elementary, secondary, and after school programs include building trusting relationships (Brok et al., 2010; Suárez-Orozco et al., 2009), cultural inclusiveness (Due et al., 2016); experiential learning (Bajaj & Bartlett, 2017); translanguaging (García, 2011; Karlsson et al., 2019; Lewis et al., 2012); and family and community engagement (Bajaj & Suresh, 2018). Altogether, Brown (2003) explains that this support should be constant to nurture resilience and provide learners with a place where they feel safe, valued, and secure.

**Research Purpose**

The present study mainly focused on the challenges migrant and refugee-background children (MRBC) face in content-area subjects, specifically science learning. In this context, language is embedded in conceptual knowledge, and English language learners (ELLs) need more than a simple translation of concepts to communicate, represent, and interpret meaning (Miller, 2009). To bridge the existent gap between language learning and science, scholars have explored the affordances of multimodal practices to provide ELLs with opportunities to enact aspects of their identities and harness academic language and literacies, all the while learning about abstract concepts (e.g., Bergen, 2009; Brown et al., 2017; Early & Kendrick, 2017; Fleer, 2019). However, the development of academic language proficiency and scientific knowledge through playful practices of children aged eight to 12 years from migrant and refugee-backgrounds specifically in Canadian mainstream classrooms is still an under-researched area.
Thus, this explanatory multiple-case study attempted to respond to this gap in the literature by examining how Grade 2/3 children from migrant and refugee backgrounds developed their academic language proficiency and scientific knowledge through various playful practices while learning about water, its cycle and importance to the environment and all living things. As well, this investigation sought to understand in what ways these children foregrounded aspects of their identities through playful practices.

Research Questions

More specifically, I examined:

1. How do children from migrant and refugee backgrounds enhance academic language proficiency and science learning through playful practices?
2. In what ways do children from migrant and refugee backgrounds foreground aspects of their identities through playful practices in a science classroom, and how does this enhance their learning?

The rationale underpinning these questions is threefold. First, a focus on playful practices responds to the increased absence of playfulness as students advance in grades, particularly in content-based instruction. As Portier et al. (2019) explain, play is soon overshadowed by a focus on the basics of literacy and content learning. Such hindering is unfortunate, Bergen (2009) argues, considering that play-based activities can develop higher-order thinking skills and serve as an alternative medium when English language proficiency is still emerging.

A second reason lies in the fact that play-based activities can offer students the optimum learning environment, one which is non-threatening; one that accounts for a variety of meaning-making modes; and one which allows risk-taking (Wood, 2019). Just as important, in play, learners can enact their multifaceted identities, imagine and create new meaning supported by
familiar objects, words, actions, or lived experiences (Kendrick, 2005; Sicart, 2014; Vygotsky, 1966; 1978). Particularly for children from migrant and refugee backgrounds, bridging the gap between lifeworld experiences and school practices can be powerful strategies for their resettlement, social integration and formal schooling in the host country.

**Research Context**

The current study was designed under the umbrella of a Social Sciences and Humanities Research Council of Canada (SSHRC) project conducted by Dr. Maureen Kendrick and Dr. Margaret Early, which investigates the language and literacy education of refugee-background youth in Canadian schools. This SSHRC project aims a) to help education systems and community groups understand how to best support refugee-background youth to catch up to their same-age peers in school; and b) to develop innovative policies and pedagogical practices that engage with the digital, multimodal literacy practices of today’s youth. I have collaborated in this investigation by working closely with the two university investigators and two other graduate students. In this context, I started volunteering in April 2019 at New Vista Community School (pseudonym), where I carried out my investigation.

New Vista is an elementary school located in the Greater Vancouver, BC. This institution serves a diverse population of students from countries like Somalia, Eritrea, Syria and Afghanistan. Apart from providing educational instruction, it caters to learners and community members’ welfare by offering several services ranging from food supply, clothing, and after-school programs that promote social inclusion. At New Vista, I conducted this research in a Grade 2/3 classroom with the support of the homeroom teacher, Mr. Samuel, and the school ELL specialist, Mrs. Amelia. In Mr. Samuel’s class, the vast majority of learners spoke more than one language at home. Through classroom observations, I noticed that, while many students were
already highly fluent in English, others, mainly recent newcomers, relied on visual, audio, and gestural modes as coping strategies to participate in the classroom dynamics.

Mr. Samuel and I collaboratively designed an interdisciplinary unit of study centred on the importance of water to all living things and its cycle through the environment. Lessons took place during February and March 2020, and all 21 students in Mr. Samuel’s cohort participated. Eleven learners and their parents or caregivers consented to participation in this study, and I focused on data generated from three MRBC: Hassan (Grade 2), Yusef (Grade 3), and Reem (Grade 3).

The reasons for carefully analyzing these three students’ engagement in playful practices are threefold. First, Hassan, Yusef and Reem spoke a language other than English at home (e.g., Farsi and Tigrinya) and had had between two and three years of formal schooling in Canada when I conducted this study. The three learners received extra ELL support upon arrival at New Vista and, according to the ELL specialist, were not yet meeting grade academic level expectations.

Thirdly, they played pivotal roles in the group. Hassan and Reem were Farsi language brokers. That is, they were responsible for translating instructions and assisting recent Farsi-speaking newcomers with classroom activities. Reem and Yusef, in particular, were special helpers and had a leading part in the classroom. Amongst others, their responsibilities included leading morning meetings (in which students shared highlights of their weekends, for example) and sharing with the group the activities planned for the day.

The three boys’ engagement in class and authentic artifacts also indicate that an in-depth analysis of their practices can foreground the affordances of playful practices in supporting the MRBC’s literacy education in Canadian elementary schools. They widely explored various
multimodal resources to demonstrate their learning and shared aspects of their identities while engaged in rule-bound games, dramatic and constructive play.

For this investigation, data sources include field notes, students’ artifacts, photos and videos of in-class activities, and interviews with students and teachers. It is noteworthy that pseudonyms were used throughout this study to mask teachers’ and learners’ identities.

**Significance of the Study**

MRBC’s language and science learning are worth exploring as this group of learners can be at risk, considering the overwhelming challenges they experience inside and outside school. For these learners, education can be their window of opportunity to advance in society and to have their identities recognized and their voices heard. In this study, I intended to zero in on what these learners can do rather than what they lack. This research sought to demonstrate how invaluable are the diversity of life experiences, culture, identities and forms of communicating and representing meaning in the world that MRBC bring into the classroom. While the results may not be the same, activities implemented in this study may serve as a source of inspiration for other educators in content-area subjects seeking alternatives to help their learners convey conceptual knowledge in multimodal and playful ways.

**Organization of Thesis**

There are six chapters in this thesis. Chapter 2 comprises the theoretical framework, namely literacy as a social practice, the pedagogy of multiliteracies, conceptions of play, and identity. In Chapter 3, I introduce the research site in more detail, describe my research methods, procedures, data generation, data analysis, and research positioning. I also introduce collaborating teachers and research participants and explain recruitment and case selection procedures. In Chapter 4, I present individual case analyses before discussing cross-case findings.
in Chapter 5. Finally, Chapter 6 summarizes my findings, implications and limitations of the study, and offers suggestions for future research.
Chapter 2: Theoretical Framework

Introduction

This chapter is divided into five sections. First, I introduce the concept of literacy as a social practice (Heath, 1982; Street, 1984) as this is the perspective that underpins the literacy practices that were conducted with the participants. This section is followed by a review of the literature that takes into consideration MRBC’s literacy education and the means to promote their formal schooling in the new country (e.g., Block et al., 2014; Hamilton & Moore, 2004; Taylor & Sidhu, 2012).

Then, I present the pedagogies of multiliteracies (New London Group, 1996). For the present research, I considered the pedagogical framework proposed by this theoretical perspective to design activities, and the metalanguage put forward by two members of the New London Group (NLG) to have a first understanding of learners’ multimodal practices. This section is followed by a review of studies that have explored the affordances of a multimodal and multiliteracies approach in science learning with students from diverse backgrounds (e.g., Allison and Goldston, 2018; Cowie and Otrel-Cass, 2011; Goldston et al., 2013).

In the following, I discuss play and its affordances, including the meaning-making potential of playful practices (Kress, 1997; Vygotsky, 1966), their non-threatening environment (Goldstein, 2012), and their ability to engage learners in collaborative and creative learning (Fisher et al., 2017) as this may be an effective approach to enhance MRBC’s academic language and science learning. In the following, a review of literature discusses the part that playful practices have in science classrooms (e.g., Brown et al., 2017; Fleer, 2019; Stagg & Verde, 2019).
Finally, I present the theory of identity (Norton, 2016) as this is the perspective that underpins my analysis of how MRBC foregrounded aspects of their identities through playful practices. Studies that follow this theoretical perspective illustrate the importance of fostering a sense of identity amongst MRBC (Bash and Zezlina-Phillips, 2006; Beauregard et al., 2017; Kennedy et al., 2019) for their social integration in the host country. The last part of this chapter includes a summary of the theoretical perspectives guiding this study. In the following section, I first present historical perspectives of literacy before introducing the notion of literacy as a social practice.

**Literacy as Social Practice**

Literacy is a fluid, dynamic and ever-shifting concept. For this reason, it has been historically challenged and reframed over the years. At present, a dictionary entry will typically define literacy as one’s ability to read and write or one’s primary skill or knowledge of a particular subject. Arguably, both definitions pertain to a traditional view of literacy, which is understood as a mental phenomenon that entails one’s cognitive ability to translate the sounds of speech into the symbolic images of writing (Kalantzis & Cope, 2012). In this sense, literacy is an attribute of individuals (Scribner, 1984).

According to Gee (1996), a traditional view of literacy conceives it as “an asocial cognitive skill with little or nothing to do with human relationships that cloaks literacy’s connections to power, to social identity, and to ideologies, often in service of privileging certain types of literacies and certain types of people” (p. 46). Street (1984) characterizes this view as part of an autonomous model of literacy. Based on it, schooling serves the purpose of transforming individuals from illiterate to literate by focusing on neutral conventions that organized and encoded language (e.g., spelling, capitalization and punctuation, and grammatical
usage) (Street, 2000). When pupils do not learn this code accordingly, they are tagged as having weak language skills and potentially lacking school success (Dyson, 2008). Not surprisingly, Hawkins and Norton (2009) explain that these students who do not tick the boxes of the traditional basics are often marginalized for the minority language they speak, their colour, social or immigration status.

In contrast, the New Literacy Studies (NLS) presents a counterargument to a traditional view of literacy. Street (1984) counterparts the autonomous model of literacy by introducing an ideological one that recognizes a multiplicity of literacies and which conceives the meaning and uses of literacy practices related to specific cultural contexts. From an ideological perspective, Street problematizes literacy as a mental process and conceptualizes it as a set of social practices that are socially, culturally, and historically co-constructed. For this reason, he asserts that it is misleading to think of literacy as a single and unified concept.

Aligned with what he identified in his fieldwork in an Iranian mountain village, Cheshmeh, Street (1984) argues that time and context play a fundamental role in a person’s use of literacy. In his view, literacy is context-dependent and embedded in sociocultural practices “that cannot be isolated or treated as ‘neutral’ or merely ‘technical’” (Street, 1984, p. 1). He claims that literacy is not something you have, but what you do with written language to convey meaning in a particular context and a particular period in time. Scribner (1984) subscribes to this view and explains that an individual learns how to use verbal language “only in the course of participation in socially organized activities” (p. 8).

According to Barton and Hamilton (2000), it is by participating in social activities mediated by written texts (i.e., literacy events) that one can interact with others and make use of the printed word. They contend that “literacy practices are more usefully understood as existing
in the relations between people, within groups and communities, rather than as a set of properties residing in individuals” (p. 8). It is in the course of these social interactions that one can both transform or have their literacy practices (i.e., set of beliefs, feelings and attitudes towards the printed word) changed.

Barton and Hamilton (2000) also claim that “within a given culture, there are different literacies associated with different domains of life” (p. 11). For example, in her ethnographical study, Heath (1982) observed that, within the same culture, there were distinctions between the ways of making meaning from literacy events (e.g., bedtime story reading) that children experienced at home across distinct communities. As a result, these differences directly impacted pupils’ engagement in reading and writing during school activities, especially those learners not raised in neighbourhoods that fostered communicative practices, skills, and knowledge prioritized in educational settings. In the case of migrant and refugee-background children and youth’s formal schooling, the integration between literacy events common to learners’ communities and school practices can result in greater support for their socio-emotional, academic and material needs in the host country (Bajaj & Suresh, 2018).

Considering the diversity of social practices tied in with our life realms, Street (1994) asserts that “whichever forms of reading and writing we learn and use have associated with them certain social identities, expectations about behaviour and social models” (p. 140). In other words, our identities and behaviour can be inferred by the forms of reading and writing that we access. Hence, individuals exposed to an array of literacy events and practices may find themselves in an empowered position to navigate various social domains. By way of example, Norton-Peirce (1995) demonstrates in her study with immigrant women in Canada how Eva felt disempowered when unable to interact in a conversation regarding popular culture. Had she had
access to the literacy event in perspective – a TV show, the Simpsons – she would not have felt like an impostor or an illegitimate English speaker.

For migrant and refugee-background learners, this feeling of disempowerment may surge due to their incipient knowledge about school culture or their interrupted formal schooling experiences, which can hinder their access to mainstream reading and writing practices (Dooley, 2009). As a response, scholarship has shown how embracing learners’ diverse literacy practices (e.g., values, beliefs, and feelings towards learning to read and write) and their intentions to develop literacy skills can result in learning investment and classroom engagement (Due et al., 2016).

According to Barton & Hamilton (2000), engaging in literacy is typically a means to some other end. That is, “literacy practices are purposeful and embedded in broader social goals and cultural practices” (p. 8). More than just breaking a linguistic code, reading and writing may serve to entertain, inform or argue, and make sense of the world. In this context, Freire (1972) argues that reading and writing should not occur in a sociocultural abyss. Doing literacy means drawing connections between the word and the world; it means making sense of the linguistic code concerning one’s life in a sociocultural context.

Finally, Gee (1996) explains that language – and consequently literacies – is closely related to social relations, cultural models, power and politics, perspectives, values and attitudes that have been constituted throughout history. Thus, what it means to do literacy today is the result of many years of dominant political, societal and religious influences. In her lecture, Adichie (2009) illustrates this proposition by narrating how our lives and literacy practices are composed of many overlapping narratives interwoven by one’s own story, schooling experiences, and family memories and beliefs. As Barton and Hamilton (2000) remind us, what
we understand as literacies today has also been shaped along more than 3,000 years of literacy in the world.

**Supporting MRBC’s Literacy Education**

In the previous section, I explained a specific view of literacy that considers the role that sociocultural contexts play in one’s attitudes towards reading and writing. With the following review of the literature, my goal is to clarify what current research demonstrates regarding the impact of adopting a view of literacy as social practice for MRBC’s education.

Studies in the field of language and literacies have focused on accommodating MRBC’s diverse sociocultural backgrounds and caring for their well-being as effective strategies to develop their literacy education in the host country. For example, Block et al. (2014) observed that Australian schools could create an inclusive environment to resettled primary and high-school-aged children and youth by strengthening partnerships with other institutions and with agencies due to the enriching shared knowledge, resources and expertise. They noticed that schools that were more cognizant of the needs of children and youth from migrant and refugee backgrounds prioritized improvements in the curriculum, teaching and learning. For instance, these institutions introduced to their agenda multicultural days and celebration of cultural diversity. As well, they promoted diversity and tolerance into the curriculum and an emphasis on inclusion.

Regarding improvements in the curriculum, Dooley (2009) reports a study conducted in four Australian schools with eight students from Sudan, Eritrea, Burundi and Rwanda and their parents, teachers and other educators. All eight learners had received most if not all of their schooling after their families resettled in Australia. In this study, Dooley explains that, in that context, teachers had to find ways to couple conceptual with pragmatic knowledge (i.e., funds of
knowledge [Moll et al., 1992]) that newcomers arrived with in class. She claims that this link with everyday life experiences helped learners map the new knowledge onto the known.

Along these lines, Hamilton and Moore (2004) describe a series of best practices to support resettled children’s literacy education. They highlight a) strong leadership by school staff; b) a safe school environment; c) a positive attitude towards learners’ strengths; d) comprehensive monitoring of student progress and acquisition of skills; e) and high levels of parental involvement. Also, the authors emphasize the critical role teachers play in the process of acculturation and social inclusion of children upon recent arrival. They show that educators and school staff need to be sensitive and responsive to how children and youth from refugee backgrounds may be affected by their experiences and how their traumatic experiences, loss and grief may appear within the classroom (B.C. Ministry of Education, 2015).

In this regard, in a study with 13 Grade 1-12 teachers in the United States, Brown (2003) learned from these educators that successful practices to promote students from diverse backgrounds’ literacy education include demonstrating care, acting with authority and assertiveness, and using congruent communication patterns to establish a productive learning environment. Ultimately, the key strategy is to embrace these learners’ backgrounds and provide a safe environment. As one of the interview teachers asserted, “the academic stuff is there, but that can’t happen unless students feel safe, valued, and secure” (p. 279).

Another crucial strategy, Morland (2007) contends, is the engagement of the entire family, especially parents or guardians, with learners’ school activities to foster positive and culturally appropriate liaison between schools and families. Promoting this engagement also has the potential to decrease the acculturation gap between parents and learners. As children advance
through school grades, their language proficiency and knowledge on specific content areas improve, thus inhibiting parents’ participation in their learning process due to language barriers.

Taylor and Sidhu (2012) argue in favour of three essential practices to support the language and literacy education of learners who have recently experienced trauma caused by forced displacement: the importance of a welcoming environment, free of racism; the need to meet psycho-social needs, mainly if there are prior experiences of trauma; and linguistic needs. Concerning psycho-social needs, Arnot and Pinson (2005) describe trauma-informed practices that can be adopted at school. These include, for example, a) daily check-ins about school progress and community engagement; b) help with social service applications, health appointments; c) or merely a socio-emotional breather.

These needs fall under the category that Maslow (1988) listed as basic human needs: “physiological needs (to satisfy hunger and thirst), safety needs (to feel safe and secure), belonging and love needs (to belong and be accepted, love and be loved), esteem needs (self-esteem, achievement, independence and competence) and at the higher level is self-actualization (living up to one’s fullest potential)” (as cited in Griggs, 2009, p. 271). Hutchinson and Dorsett (2012) argue that, by nurturing these basic needs, it is possible to foster resilience in every student, but especially on those who have to overcome the possible traumas related to their migration to a new country.

Lastly, supporting MRBC’s literacy education in the host country entails providing trusting relationships and a caring environment so that learners can overcome the challenges related to their current status and develop their abilities and strengths (B.C. Ministry of Education, 2015). For instance, DeCapua and Marshall (2011) put forward the mutual adaptive learning paradigm as a pedagogical approach to support students with little or interrupted
education (SLIFE). Amongst other aims, this approach seeks to establish strong and trusting social relations involving teachers, students, community and family.

In this section, I attempted to discuss the concept of literacy as a social practice and present relevant scholarship that subscribe to this view to support students from migrant and refugee backgrounds. In the next part, I present the pedagogy of multiliteracies, another approach to literacy education that there has been shown to produce positive effects on MRBC’s learning process.

**Pedagogy of Multiliteracies**

A group of scholars in the field of language and literacy education gathered in a hotel in New London, US in 1996 to discuss literacy pedagogy amidst the rapid changes anticipated in the new millennium. The New London Group (NLG) contended that, with the burgeoning array of modes of communication available, the changing technologies, and the emergence of diverse social and cultural contexts, it was necessary to propose a pedagogy that prepared children and youth to make meaning in the globalized world (NLG, 1996). They argued that learners should engage with this multiplicity of communication channels and media and be open to cultural and linguistic diversity once overshadowed by mainstream print-based literacies (Lotherington, 2011). As a result, the group believed that it was a human right for children to have equal opportunities to represent their voices, cultures, histories, feelings and opinions in the medium they felt most comfortable with (Stein, 2008).

The concept of literacy for the NLG aligned with the one defined by New Literacy Studies (NLS) scholars (Perry, 2012). Both groups conceived literacy as a set of social practices associated with different domains of life (i.e., personal, work, citizenship), which are patterned by social institutions and power relationships. However, while NLS scholars focused on literacy
practices mediated by written texts, the NLG favoured a variety of communicative channels “in which written-linguistic modes of meaning are part and parcel of visual, audio, and spatial patterns of meaning” (Cope & Kalantzis, 2000, p. 5). The NLG viewed print-based texts as only one form of representation and meaning-making amongst many others – one that has been privileged above other types in schooling.

Through non-linguistic modes (e.g., image, gaze, gesture, music, speech, sound effects), the NLG believed that different lifeworlds could flourish, and members of subcultures would have more opportunities to have their voices heard (Cope & Kalantzis, 2000). At the same time, they trusted that an abundance of meaning-making modes could cast doubt on conservative concepts of texts, patterns of privilege, and dominant discourses (Early et al., 2015). As Serafini and Gee (2017) elucidate, it was clear that the group intended with their manifesto to intervene politically in debates about capitalism, inequality, and education. For example, they claimed that schools should leave behind the reduced and shrunken role of literacy as mere recodification of signs – alphabetic literacy and numeracy – and assume the position of an institution that “promotes active citizenship, centred on learners as agents in their knowledge processes, capable of contributing their own as well as negotiating the differences between one community and the next” (Cope & Kalantzis, 2009, p. 172).

The NLG also discussed the future of literacy pedagogy with a focus on historical and current trends in economics, and labour (Cope et al., 2018). They believed that literacy education should respond to the changes in students’ future working lives by nurturing a culture of flexibility, creativity, innovation and initiative. For such, schools should foster horizontal relationships of teamwork and promote the worker’s identity as of someone who is multiskilled,
good at critical thinking and problem-solving, and flexible to do complex and integrated work (Cope & Kalantzis, 2009).

Taking these views into consideration, the NLG proposed the pedagogy of multiliteracies. In their manifesto, they elucidated what constitutes this approach to literacy education and provided recommendations on how to put it into practice. A detailed explanation is presented in the next subsections. I first introduce the ‘what’ of the pedagogy of multiliteracies before describing how teachers can operationalize the pedagogical principles put forward by the NLG.

**The ‘What’ of the Pedagogy of Multiliteracies**

In their manifesto, the NLG built on the notion of multimodality to address the shifts in the social and semiotic landscape of Western societies, particularly with the prominence of a variety of modes other than verbal language in many areas of public communication. As well, to account for the increasing salience of cultural and linguistic diversity rising from these various modes and for the active and dynamic process of making meaning, the group proposed the concept of *design*. In what follows, I briefly describe multimodality before discussing *design* and the metalanguage that members of the NLG proposed to analyze learners’ meaning-making processes.

**Multimodality**

Jewitt (2009) defines multimodality based on four theoretical assumptions. First, she contends that multimodality comprises various forms of communication and representation, namely gesture, gaze, and posture. She reinforces that we make sense of the world through multiple ways by arguing that “communication always draws on a multiplicity of modes, all of which have the potential to contribute equally to meaning” (p. 14).
A second proposition brings forward the concept of synesthesia. Jewitt (2009) explains that synesthesia refers to the interweaving of meanings made through the interaction of modes which are co-present and co-operative in a communicative event. Thirdly, she explains that cognition is empowered by a repertoire of modes that do not necessarily depend on verbal language to communicate or represent. From a multimodal perspective, other forms of representation but oral and written language assume a protagonist’s role in social practices. Finally, the last proposition defines images and different non-linguistic modes as unstable, dynamic, fluid and situated. Jewitt (2009) explains that, like speech and writing, visual, audio and other designs are constituted by and within social interactions, thus being deeply rooted in cultural and historical backgrounds.

**Design**

A central argument to what constitutes the ‘what’ of the pedagogy of multiliteracies is the dynamic conception of meaning-making as a process of *design*. On the one hand, the concept of *design* entails the unique patterns and structures that characterize each meaning-making mode (Cope & Kalantzis, 2000). *Design*, used as a noun, can be identified as “nouns and verbs; hyperlinks and navigation paths; visual frames and focal points; the designs of bodies; the designs of objects, spaces, and nature” (Cope & Kalantzis, 2020, p. 70). Members of the NLG have recently revised their original publication and accounted for seven *designs*: oral, written, audio, visual, spatial, gestural, and tactile (Kalantzis et al., 2016).

On the other hand, design can be understood as a transitive verb and a motivated sequence of actions by the designer (i.e., meaning maker) to represent and communicate their intentions and interests. Cope and Kalantzis (2020) assert that neither meanings of design, either a noun or transitive verb, are stable. As the authors contend, “the key to meaning is in the
immediate possibility of movement. Every sense is in the (re) making, and nothing is replicated without change” (p. 73). Arguably this assertion relates to the core definition of literacy as social practice discussed earlier, particularly the fact that this concept changes across time and space. Cope and Kalantzis explain that the process of learning by design is threefold: available design, designing and (re)designed.

First, available design can be best understood as patterns of meaning in found objects (human and natural) and lived experiences. In the agentic act of representation or communication, the meaning maker draws on available patterns of meaning – language, imagery, sound, gesture, touch and space – to communicate, represent or interpret the world. Stein (2008) explains that these available designs are not fixed. Instead, “they are fluid, constantly changing as human beings’ representation needs change” (p. 2). They are shaped within history and culture and its available technologies for representation. In the hold of these designs, we choose the most apt to represent our interests.

Cope and Kalantzis (2020) define designing as the agentic act of transforming meaning “that brings into play patterns of differing, where the new meaning draws from available resources for meaning, nevertheless transforming these” (p. 68). This authentic process of combining and restructuring available designs forms polymorphous reconstructions – hybrid texts (Cope & Kalantzis, 2000). This hybridity in the act of designing opens space to what is intrinsic to some more than other humans, synesthesia. As Kress (2010) explains, synesthesia is the act of translating meaning from one mode to another, for example, from spoken to visual, sound to colour, image to smell, and so on. Kendrick (2016) adds to this view and explains that this transduction or interplay between and across modes is generative and gives rise to different thinking, which makes it possible for the designer to expand their understanding of the world.
Lastly, Kalantzis et al. (2016) assert that designing from available designs is an act of transformation, a process of reworking and revoicing the world as found. As a result, an artifact, an image, an oral utterance or written text is left to the world. This product is unique and may affect another person if and when he or she receives the redesigned meaning. Even if it does not, this new design will have helped the designer see the world afresh. Kalantzis and Cope (2012) explain that “the redesigned – something heard, pictured, written – is returned to the world, and this return leaves a legacy of transformation” (p. 268, my emphasis). That is, the designer leaves a trace of his or her subjectivity that may transform another person’s repertoire of available designs and will undoubtedly transform his or her understanding of the world.

**Functions of Meaning**

The NLG also considered a metalanguage to analyze learners’ meaning-making processes. Drawing on Halliday (1978)’s social semiotic perspective of the functions of a language in available designs (i.e., ideational, interpersonal, and textual), Bill Cope and Mary Kalantzis (2020) have proposed a similar metalanguage to analyze the functions of meaning across various modes of communication. They define these functions as *reference, agency, structure, context, and interest.*

Cope and Kalantzis (2020) explains that *reference* entails “the identification of entities and actions, in particular instances or as general concepts, and their properties, including qualities and quantities” (p. 45). In other words, meanings can refer to persons, things, or states, or actions. *Agency* accounts for the interpersonal relations (speaker/listener, writer/reader, designer/user, maker/consumer, gesturer/observer, and soundmaker/hearer) established in the multimodal text through first/second/third person and direct/indirect speech in verbal language; placement and eyelines in image; and pointing to self, others, and the world in gestural design.
Structure consists of devices used to create internal cohesion, coherence, logic, and boundedness in multimodal productions. These can be text (written design), image (visual design), space (spatial design), object (tactile design), body (gestural design), sound (audio design), and speech (oral design).

Furthermore, analyzing concept involves attending to the surroundings of time and space; it also entails observing how meanings in an artifact related to different settings “through juxtapositions and metaphors, or in words, image, sound or space” (Cope & Kalantzis, 2020, p. 47). Finally, examining interest in multimodal compositions entails an analysis of the designer’s interests and identity aspects that they draw from to make meaning. Overall, referring to these functions of design may serve as a structured outline that researchers can follow to best capture children’s meaning-making processes and literacy development through playful practices.

The next section comprises the explanation of how the pedagogy of multiliteracies can be applied in language and content-area classrooms. Specifically, it focuses on the learners’ cognitive processes that teachers should attend to.

The ‘How’ of the Pedagogy of Multiliteracies

The NLG (1996) also explained how educators could put a pedagogy of multiliteracies into practice in classrooms. The group suggested some orientations rather than a strict sequenced framework. Exley and Luke (2010) explain that the NLG offered a description of pedagogic repertoires to be revisited at different levels across a lesson, unit or project.

There were originally four pedagogical steps: situated practice, overt instruction, critical framing, and transformed practice. These strategies were later revised by two members of the NLG. In their remake, Cope and Kalantzis (2012) drew on traditions of literacy pedagogy, namely didactic, authentic, functional and critical to define the ‘how’ of a pedagogy of design. In
this update, what students do to learn – their thinking-in-action – is in evidence. Cope and Kalantzis (2015) explain that with this reconceptualization they intended to focus on learners’ thinking and understanding; that is, the things they can do in the world to know. They listed four learning processes that teachers should target when planning activities: *experiencing*, *conceptualizing*, *analyzing*, and *applying*.

*Experiencing* means that students can draw connections between the known and the new knowledge. On the one hand, the known entails conscious self-reflection and identification of aspects of lifeworld experiences, belief systems, and environmental conditions that help learners connect with a text. On the other hand, experiencing the new comprises empiric and methodic actions that include observation, recording, describing, measuring, testing, experimenting, interviewing, or surveying. These empirical actions can result in the replacement of uncertainty for facts and evidence.

To know by *conceptualizing* can occur in two ways: by naming or with theory. Invariably, both revolve around the notion of categorization. In *conceptualizing by naming*, students classify the new knowledge by general or universal properties (e.g., properties of water); they state the similarities and differences between the different elements that compose the subject in focus (e.g., tone and pitch of sound effects in audio design). In *conceptualizing with theory*, learners make generalizations by connecting concepts and developing theories. They organize knowledge into schemas and make sense of new information through pattern recognition.

There are two paths to interpret meanings conveyed in a design: *analyzing functionally* or *critically*. In *analyzing functionally*, learners examine cause and effect; build logical connections between structure (e.g., genre) and function (e.g., to persuade or inform) of multimodal texts; and
draw inferences and conclusions (e.g., what a hand gesture means). In analyzing critically, students observe perspectives, interests and motives behind a meaning or an action. For such, they take into consideration socio-cultural and historical references.

Finally, applying entails the appropriate and creative application of the new knowledge experienced in a lesson, unit of study or project. Here, students draw on all available modes and elements of meaning to represent and communicate their understanding. This knowledge process is divided into applying appropriately and creatively. While the former entails tasks such as writing, drawing or acting out the new knowledge (e.g., water cycle stage) as presented, the latter involves the use of this knowledge in an innovative way.

Cope and Kalantzis (2015) elucidate that students take intellectual risks to apply this knowledge to a different setting and translate it into hybrid creations in which a variety of modes co-exist. More importantly, the process of applying creatively may “bring to bear the learner’s interests, experiences and aspirations in such a way that the application is uniquely or distinctively ‘voiced’” (p. 181). Thus, this process is never a simple reproduction of what learners have experienced earlier. Instead, it is an act of transformation in which students combine their lived experiences, beliefs, and background knowledge with a variety of multimodal resources to transform themselves and make the world anew.

Warren and Ward (2019) claim that a multiliteracies approach can reconceptualize instruction and assessment to afford all students access to the content-area curriculum and literacies practices at school. They contend that this pedagogical perspective “emphasizes the necessity for educators to shy away from the narrow view of literacy sometimes adopted in educational contexts” (p. 94). Instead, they encourage teachers to treat literacy as a dialogic, multifaceted, and culturally situated social practice.
Considering the case of migrant and refugee-background children (MRBC), a multiliteracies approach can help learners better adapt to the school culture of the host country, access conceptual knowledge in content-area subjects through a variety of modes of communication and enhance their learning by drawing on background knowledge. In the following section, I present recent studies that have investigated the affordances of a multimodality and multiliteracies approach in science learning, with some focusing on the education of students from diverse backgrounds.

**Multimodality and Multiliteracies in Science Learning**

With the prominence of multimodal practices in the 21st century, research in science education has signalled the need to integrate scientific learning and multimodal literacies as crucial for meaning-making and knowledge production in this content area (Prain & Waldrip, 2010). Seeing the emergence of these practices, Prain and Waldrip claim that math and science teachers also have to attend to the multiple ways of knowing, doing, believing and communicating in these subjects.

In this regard, Brown et al. (2013) argue that multimodal representation strategies can support learners’ construction of scientific understandings and potentially extend how they can demonstrate learning. For example, Goldston et al. (2013) illustrate in a unity of study that explored the rock formation cycle how multimodal activities facilitated learning of 5th-Grade students. They engaged in hands-on and inquiry-based activities, watched videos and designed models to explain processes, and relied on various materials, namely crayon shavings, to represent processes such as the formation of sedimentary rocks.

Similarly, Cowie and Otrel-Cass (2011) demonstrate how multimodal practices supported the learning of 5-year-old children in New Zealand in a culturally responsive learning
environment. Students experienced meaningful ways to develop and demonstrate their science knowledge. They learned about animals of the New Zealand forest by drawing, making a clay model, and exploring multiple images and online materials. Along these lines, Allison and Goldston (2018) attempted to understand in what ways multimodal and scientific practices coexist in an elementary classroom. Triangulating classroom observation over six months, focus groups and interviews with teachers and students, the researchers found that multimodality deeply related to science learning. Students planned and carried out research by exploring a variety of modes, developed mathematical and computational thinking, and worked collaboratively on an inquiry-based project to design innovative solutions to resolve an engineering problem given.

Early and Kendrick (2017) also adopted an inquiry-based approach to help Grade 4/5 learners harness complex science knowledge. In an inner-city school in Vancouver with a high percentage of child poverty, students inquired if the water in their school was safe to drink. They touched, shook, and stirred the various substances they tested. Depending on the substance, they discussed how these materials tasted, felt, smelled, and looked like. Visual aids (e.g., diagrams, digital slides, photographs, and gestures) were also employed to communicate complex conceptual knowledge.

More than developing science literacies, students also enhanced their understanding of genres of school, such as argumentative and persuasive texts as they made some recommendation on how to make water at school safe. In the same study, the researchers shared a second vignette that showed how participants learned about bodies of water in their home countries, their importance and cultural significance. Students interviewed relatives in their first language and produced information posters portraying the cultural diversity existing in that
classroom, with references from First Nations, specifically, Hamalco, Lil’wat, and Nuxalk in British Columbia and Cree from central Canada, Vietnamese, Taiwanese, Chinese, Nigerian, Bangladeshi, Cambodian, Icelandic, Central/South American, and Anglo-Canadian peoples.

The multimodal practices described in this chapter can also be realized and observed when children engage in play, a concept that I introduce in the following section and which can also render MRBC an optimum learning space to enhance academic language proficiency and scientific knowledge.

Play

At play, children can imagine and create new meaning supported by objects, actions or words (Vygotsky, 1966). They can think, make hypotheses and anticipate solutions that they immediately verify through a try-and-error method (Farné, 2005). Vygotsky (1978) argues that, while playing, children can achieve higher levels of performance and consequent cognitive development. He asserts that “in play, a child always behaves beyond his average age, above his daily behaviour; in play it is as though he were a head taller than himself” (p. 102). This phenomenon would happen because 1) play can create a zone of proximal development for the different areas of cognitive development; 2) it facilitates the distinction between actions and objects; 3) and it can enhance self-regulation. Vygotsky defined play-based activities by three principles: rule-bounded activities, the creation of an imaginary event, and role-playing.

Lockhart (2010) capitalizes on these principles and identifies four types of play: exploratory, constructive, dramatic, and rule-bound games. The first, exploratory, can be best understood as any activity freely chosen, intrinsically motivated, and personally directed; it has no particular goal other than itself (Goldstein, 2012). Constructive play refers to the act of making things with blocks, clay, paint, as well as digital tools. Bergen (2009) elucidates that,
when children experiment with building objects, they learn more about the physical world and the laws that operate in the planet. For this purpose, children utilize higher-level thinking to solve problems that the construction materials (e.g., wood, clay, metal, and paper) pose. Regarding *dramatic* play, it can be understood as imaginative role-play activities in which children can pretend to be wizards or astronauts, for instance (Lockhart, 2010). Finally, playing *rule-bound games* can open “new doorways into subject learning that might not otherwise have been apparent, encouraging new mindsets, perspectives, practices and possibly new ways into learning” (Fisher et al., 2017, p. 59).

Bruner (1983) explains that when learning unfamiliar subjects through play, “we interiorize the external world and make it part of ourselves” (p. 61). Consequently, we transform ourselves to conform to how the world is structured. In this context, play becomes a space where children can take on new identities and, by doing so, continuously make sense of who they are or who they are not willing to be (Kendrick, 2016).

According to Bergen (2009), engaging in playful practices provides children with a series of benefits. First, she claims that play is a source of communication for those who are not yet articulate in verbal language. Bergen contends that, in the absence of such proficiency, play-based activities can help children convey ideas and accomplish goals before their language skills fully develop. Furthermore, she claims that play enables children to innovate by creating new meanings for existing materials. Lastly, she argues that play can provide a filter that enhances risk-taking. Bergen (2009) continues and argues that play can provide a filter that enhances risk-taking. In other words, “play implies a reduction in the seriousness of the consequences of errors and of setbacks” (Bruner, 1983, p. 60).
As Sicart (2014) contends, through play, we experience the world, we construct it, we destroy it, and we explore who we are and what we can say” (p. 5). Kress (1997) argues that this process of de- and re-construction of the world as we know it reflects our interests and identities. In his words, all learners “act out of a certain interest in the environment in which we are, and that in our making of signs, that interest is reflected in the sign in the best possible way, in the most plausible fashion, in the most apt form” (p. 19). Enacting interests and identities through play, Bergen (2009) concludes, empowers because children feel confident to transmit their innovative ideas. Ultimately, in play, children can find an optimum environment to learn and flourish naturally.

Furthermore, Kendrick (2016) argues that play revolves around essential skills for a child’s development, the same they will need as adults. She explains that play-based activities involve creativity, identity construction, and experiential learning of the world through distinct signs, tools and meaning-making modes. Just as necessary, play can provide a less socially threatening context for learning. In her words, “play offers unique opportunities for experimentation with different modes and communicative practices in a protected space of learning whereby performance precedes competence” (p. 52).

This abundance of communicative practices in play offers opportunities for children to become readers of the world (Wood, 2019). That is, when engaged in playful activities that are either student-led or promoted as pedagogical practices, children can make meaning of the world through cognitive, emotional, and social construction of knowledge. They can also develop a variety of personal and social skills, such as empathy, emotional flexibility, resilience, attention, and inquiry (Goldstein, 2012).
In other words, “in the process of play, children learn both content and how to acquire knowledge, and make discoveries about social boundaries and norms” (Fisher et al., 2017, p. 58). Thus, when creating opportunities for playful experiences in cross-curricular learning, for example, Fisher et al. (2017) contend that teachers can move away from dominant print and text-based literacies and towards the multimodal texts of this century.

Portier et al. (2019), however, alert that despite the affordances of playful learning, play in early childhood education has been hindered by the basics of literacy and standards-based education. They claim that early-years teachers feel strained and struggle to integrate play into pedagogical practices that emphasize the academics to meet curricular expectations. As Bergen (2009) concludes, this disappearance of play in classrooms is especially unfortunate when scientific, mathematical, and engineering fields seek creative and innovative thinkers in their professions.

For MRBC, playful practices can be an appropriate alternative to help them understand the academic language embedded in conceptual knowledge in a less threatening environment, where they can take risks and not feel the pressure of curricular requirements. For this group of learners, a simple translation of concepts to communicate, represent, and interpret meaning is not enough in content-area subjects like science (Miller, 2009). The in- and out-of school challenges that these children face urge teachers to find multimodal strategies to help them harness the academic language, scientific knowledge, and the new school culture. As there are very few studies that specifically examine MRBC’s academic language and science learning in the host country through playful practices, the following review of the literature illustrates how play can be generally explored in a science classroom.

**Play in Science Learning**
Despite such disappearance of play in content-area classrooms that Bergen (2009) highlights, a few studies have explored the affordances of playful practices in these contexts. For example, Abed (2016) claims that dramatic play can improve students’ understanding of scientific concepts as well as sharpen their aesthetic experience in science either through social (e.g., role play, improvisation, debates, and consensus conferences) or physical (i.e., embodied) simulations. He argues that some benefits of merging drama and science learning include affective knowledge through empathy and exploration of physical, biological, and chemical processes.

McGregor and Precious (2010) describe various acting techniques to explore and develop young children’s ideas about science, namely hot seating, spontaneous role-play, freeze frame, acting out mini-historical plays and others of the like. For instance, Stagg and Verde’s (2019) case study demonstrates the potential that an interactive theatre production offered for enhancing appreciation and interest in school science while improving knowledge. Through an interactive theatre performance, thematic singing, humour, visual elements and participatory art activities, students aged nine to 11 years in Devon, UK extended their knowledge of plant reproduction and developed positive attitude towards science learning.

Walan and Enochsson (2019) combined storytelling and drama to teach children aged four to eight years in Sweden about how viruses cause colds. In the study, students learned how immune system cells function when one catches a cold through reading a story, drawings as recalling strategy, and performing scenes of the narrative.

In another study, Bulunuz (2013) developed a comparative study in northwest Turkey to investigate six-year-old children’s understanding of abstract concepts when experiencing science through play versus direct instruction. Scientific content included colors, living/non-living
things, gravity, magnets, existence of air and air related phenomena, floating and sinking, and the phases of water. Learners engaged in play activities that involved experimentation, observation and problem-solving activities. The result of the study indicated that children taught science through play had greater understanding of science concepts than children taught science through direct instruction.

Fleer (2019) argues that there is very little research attention to how imaginative play can be used as a practice that supports abstract learning in science. To respond to this gap in the literature, she draws on the notion of *Playworlds*, an approach that foregrounds a problem scenario (i.e. play inquiry) as part of building a play narrative. In a multicultural preschool classroom in Australia, Fleer’s findings suggest that imaginary scientific situations, collectively building scientific problem solutions, and imagining the relations between observable contexts and non-observable concepts can contribute to the understanding of abstract and conceptual knowledge in science classes.

While the studies in this section are not specific to migrant and refugee background learners, they offer examples of how ludic activities can enhance active learning of conceptual knowledge, increase appreciation for science, and provide meaning-making alternatives for students with limited formal schooling who are adapting to a new country, language and culture. From another point of view, these alternative meaning-making practices may allow MRBC to find in formal schooling powerful ways to express their identities, a construct that I define in the next section.

**Identity**

Language – in whichever form it features – is the medium through which students construct their sense of self (McKinney & Norton, 2008). It is not merely a linguistic system of
words and sentences; instead, it is a social practice in which our subjectivity is negotiated (Norton, 2016). As Norton and Pavlenko (2019) assert, learning a language is an experience of identity; it is “a process of becoming or avoiding becoming a certain person, rather than a simple accumulation of skills and knowledge” (p. 590).

In the same way that language and literacies are dynamic concepts that change across time and space, identity can be defined as a fluid, multiple and dynamic concept that is shaped by how people build their relationships within and across different sites at distinct moments in time (Norton & Toohey, 2011). It refers to how individuals relate to the social world and how they are seen or positioned by others in their plural social, cultural, and linguistic contexts. It can also be understood as one’s sense of belonging to and legitimacy within particular social groups (Duff, 2011). As Norton-Peirce (1995) contends, it is through language that people can enact their identities and are granted access to – or are denied access to – social groups where they have the opportunity to speak legitimately.

Several factors can influence one’s will (or absence of it) to learn a language. Students may decide to invest their efforts to learn a language should they anticipate the acquisition of “a wider range of symbolic and material resources that will increase the value of their cultural capital and social power” (Norton, 2016, p. 476). For example, young adults from a developing country may endeavour to learn English to emigrate to Canada. The intention to leave their home country is directly associated with their envisioning of financial and social prospects in a Canadian province. In the host country, they aim for the sort of stability and the social and monetary gains that their country may never offer. As well, they may aspire to a successful career in Canada and meaningful relationships with other English-speaking residents. In other words, Norton and Pavlenko (2019) elucidate,
We humans are capable, through our imagination, of perceiving a connection with people beyond our immediate social networks. Our orientation toward such imagined communities might have just as much impact on our current identities and learning as direct involvement in communities of our everyday life. (p. 590)

Thus, Norton (2016) concludes that learners’ imagined identities and hopes for the future considerably impact their investment in pursuing language learning. What that means is that, when students invest their time and efforts to learn a language or content-area subjects, their identities are reflected in the creative work they produce.

These products, defined as identity texts, can be displayed in written, spoken, signed, visual, musical, dramatic, or combinations in multimodal form. They can come in writing or other types of cultural production or performance (e.g., art, drama, video creation, etc.) (Cummins & Early, 2011). In other words, Rowsell and Pahl (2007) explain: “identities are formed in the space of practice and, in turn, texts sediment the process.”; they continue and argue that “people learn in praxis, and text as artifacts trace identity making” (p. 393).

Cummins et al. (2015) explain that the construction of identity texts in class is possible when educators encourage learners “to use their multilingual and/or multimodal skills as cognitive tools and to employ a broad range of modalities to create literature and art and to generate insight about social and personal realities” (p. 557). According to Cummins and Early (2011), amongst other benefits, identity texts encourage all students, but particularly those from diverse backgrounds, to connect their in-the-head knowledge and the new information and skills; increase awareness of relationships between home and school language; and motivate participation in school and home literacy activities.
In this section, I attempted to elucidate the notion of identity as a fluid and dynamic concept that changes across time and space. I also discussed how learners can depict aspects of their identities in multimodal productions that are authentic and meaningful to their learning process. In what follows, I review studies that have capitalized on aspects of MRBC’s identities to develop their language and literacy education in the host country.

**Fostering a Sense of Identity amongst MRBC**

Bash and Zezlina-Phillips (2006) explain that, for MRBC, identity enactment can be challenging either due to the feeling of grief toward their place of origin or the cultural diversity that they encounter in the new country. On top of that, there has been a tendency to institutionally, systemically, and collectively label these learners (Bal, 2014; Shapiro & MacDonald, 2017). Their identities are often defined by an overemphasis on trauma, hardship, and despair, which ultimately leads to disempowerment and lack of agency in the new country (Miller et al., 2018; Ryu & Tuvilla, 2018). Instead, teachers, school staff, and stakeholders should affirm children’s and youth’s multiple identities and backgrounds by recognizing the inherent value of their various and powerful social and cultural capitals.

For example, Kennedy et al. (2019) illustrate how 10-year-old ELLs from refugee backgrounds enacted their present and future selves through poetry. The study attended to learners’ ability to navigate across different modes of communication and languages to share their unique experiences – as well as those yet to come – and potentially challenge dominant or stereotypical views of children and youth from refugee backgrounds.

Specifically focusing on primary school-aged children, Due et al. (2016) demonstrate that catering to diversity and a sense of identity in classrooms can create spaces for children to share their knowledge and experience and foster positive interactions with peers. As well, recent
studies have demonstrated that making room for translanguaging in class can cater to learners’ diverse identities. Lewis et al. (2012) assert that the concept of translanguaging relates to similar ideas, such as code-switching and multicompetence. It entails the process of making meaning and shaping experiences through the use of two or more languages. By way of example, García (2011) elucidates how this hybridism of languages happened amongst kindergarten Latino children and their teachers in New York, US:

Translanguaging takes place across teachers and students in four ways: to mediate understanding (e.g. children’s translations and interpretations to mediate with others and themselves); to co-construct and construct meaning (when children make use of the other language for understanding); to include (being responsive to perceived interlocutor’s language use); to exclude (that is, other children from interaction) and to show knowledge (e.g., by trying out the words they know). (p. 33)

As well, Karlsson et al. (2019) report a longitudinal study in a multicultural primary science classroom in Sweden with Arabic-speaking students where teachers created space for translanguaging. Results indicate that the interweaving of languages constituted a resource in joint negotiations of the scientific knowledge and its related language; it also benefitted students’ ability to relate and contextualize the science content to lived experiences.

Some studies have considered multimodal resources as a means that people have available to voice their individualities. For instance, in a single case study, Beauregard et al. (2017) explain how drawings helped a 9-year-old Palestinian boy express himself concerning the trauma lived during his migration and eventual resettlement in Canada. The researchers argue that this medium of communication allowed the child to voice his thoughts and build a meaningful and integrated sense of identity. In other words, they say that, through drawings, he
was able to redefine, reconstruct and reorganize adverse experiences in a meaningful way. As well, the child disclosed crucial personal information that he was not necessarily conscious of or for which he did not have enough linguistic resources to share.

Regarding social identities, Lotherington (2017) reports a Grade 5 cross-curricular social justice project in an elementary school project that took place in Toronto, Canada, in a school where approximately 2/3 of learners spoke a primary language other than English at home. For this study in particular, some Canadian-born students whose parents had recently immigrated engaged in the activities proposed. By drawing on social studies, math, ELA, and art knowledge, the students designed their own countries while thinking about language as a civic right and a building block in nation-building structures. They also made meaning of geopolitics involving nation-building; developed, interpreted and instituted constitutional laws; and developed global diplomacy. Although these seem overwhelming for elementary school students, every learning stage comprised ludic activities, collaborative work, and fruitful exchange of cultural and linguistic knowledge. As a result, Lotherington observed that students enhanced their literacy through doing and making. Their learning was multimodal, collaborative, agentic, and purposive towards understanding civic engagement. Students shared their language knowledge as part of the production and engaged in play-based activities in which learning, civic responsibility and action were embodied.

The studies reported in this section illustrate how students can enact their identities through poetry, translanguaging, drawings, peer interaction and ludic learning. Next, I provide a summary of the theoretical threads presented in this section and point to their significance when analyzing the development of MRBC’s academic language proficiency and scientific knowledge.
Weaving Theoretical Threads

The circumstances underlying MRBC’s integration to mainstream classrooms are exceptional. Some were forced to leave their home countries behind in fear of persecution or ongoing wars while others experience disruption to the family unit and financial hurdles in the first years in the host country (Barber, 2019). Depending on their migration process, they may arrive with interrupted or minimal prior formal education. As a result of their unfamiliarity with the culture of schooling in the new country and the absence of the academic background necessary to complete school tasks, some MRBC may demonstrate a lack of engagement, feelings of disempowerment, absenteeism, and failure to establish and sustain trusting relationships (Birman & Tran, 2017; Block et al., 2014). In light of the challenges that MRBC face in mainstream classrooms, the theoretical threads that underpin this study foreground different perspectives to investigate their literacy practices and enhance their academic language and science learning.

First, the concept of literacy as social practice highlights the importance of understanding the adverse circumstances that led MRBC’s families to leave their home countries and acknowledges as assets the wealth of knowledge and diverse lived experiences that these children bring to the classroom. Secondly, the pedagogy of multiliteracies conceptualizes pedagogical repertoires that can be applied to place MRBC as agents of their learning processes, with the ability to (re-/de-) construct meaning in available texts to leave their legacy of transformation in the world. The third theoretical perspective considers the affordances of play in language and science learning. For MRBC, play can be a non-threatening learning environment and an optimum source of communication for those who are not yet articulate in verbal language. Lastly, understanding identity as a fluid, multiple and dynamic concept that is shaped within and
across different sites at distinct moments in time can challenge the essentialization of MRBC in the host country, where their lived experiences can be seen as deficits rather than learning assets.

In the following chapter, I describe the methods I applied in this study. The chapter entails a description of the research context and site, participants, and the methodological approach that I adopted in this investigation.
Chapter 3: Methodology

Introduction

This explanatory multiple-case study investigates how Grade 2/3 MRBC can enhance academic language proficiency and science learning, and how they may foreground identity aspects through playful practices. Specifically, it addresses the following research questions:

1. How do children from migrant and refugee backgrounds enhance academic language proficiency and science learning through playful practices?
2. In what ways do children from migrant and refugee backgrounds foreground aspects of their identities through playful practices in a science classroom, and how does this enhance their learning?

In this chapter, I first describe the context and the elementary community school where I developed this research. Then, I provide some information about collaborating teachers and how I invited them to participate in this investigation. Next, I describe the classroom where I carried out this study, present student demographics, and introduce the learners whose engagement in playful practices are analyzed. In what follows, I explain research procedures and give a detailed account of the unit of study and play-based activities designed for the present study. Finally, I describe data generation and analysis before providing my research positionality.

Research Context and Site

As discussed in Chapter 1, this study was designed under the umbrella of a Social Sciences and Humanities Research Council of Canada (SSHRC) project coordinated by Dr. Maureen Kendrick and Dr. Margaret Early. This SSHRC research examines the language and literacy education of refugee-background children youth in Canadian schools. As a participant
researcher of this investigation, I started volunteering in April 2019 at New Vista Community School, where I carried out my study.

New Vista Community School (pseudonym) is in a diverse neighbourhood in the southern corner of Burnaby, British Columbia. The surrounding area has long been considered one of the lowest socioeconomic areas of the city. This school is renowned for its efforts to promote multicultural education, tolerance and diversity for students coming from diverse nations, such as Afghanistan, the Congo, Ethiopia, Iraq, Somalia, Sudan, Syria, Uzbekistan and others. During recent history, New Vista has played a critical role in supporting MRBC. In 2011, six out of 10 students attending New Vista spoke a primary language other than English; eight out of 10 did not speak English at home; and 1/3 of students came from refugee backgrounds, arriving at New Vista at the age of 10, 11, or 12 years of age with no or minimal formal schooling.

My role of a volunteer at New Vista consisted of supporting Grade 6/7 learners in ELA and maths, either by reading with them or solving equations, for example. I also designed and taught a few Grade 2/3 science classes as a means to build rapport with both teachers and students. Being a volunteer was an important step to strengthen trusting relationships at New Vista; in addition, it provided me with opportunities to learn about school practices with different age groups, particularly Grades 2/3 learners. I first started collaborating twice a week with a Grades 6/7 teacher who had already participated in a focus group interview with Dr. Maureen Kendrick and Dr. Margaret Early as part of the SSHRC project. Naturally, my presence at New Vista on a weekly basis helped me connect with other teachers and staff members.
Recruitment of Collaborating Teachers

For this study, I worked closely with two New Vista teachers, Mr. Samuel, the Grade 2/3 homeroom teacher, and Mrs. Amelia, the ELL specialist. Mr. Samuel is a caring educator graduated as a primary and ELL teacher from the University of British Columbia. He also holds a bachelor’s and master’s degrees of Science from the University of Plymouth, UK and the University of Venice, Italy, respectively. Mr. Samuel has lived, worked, and studied in four different countries: Sri Lanka (country of origin), Italy, the United Kingdom, and Canada, thus being able to speak five languages: English, Sinhalese, Italian, Hindi and Punjabi. His pedagogical approaches draw on the Reggio Emilia approach (Edwards et al., 1998), particularly the role of education in structuring a community mindset amongst learners.

Mrs. Amelia has many years of experience working with students from diverse backgrounds and plays a vital role in helping her students and families adapt to life in Canada. As a child of immigrant parents, she understands the importance of fostering the relationship between parents and educators. Mrs. Amelia holds a Graduate Diploma in Education from Simon Fraser University, a Diploma in Teaching English Language Learners and a Bachelor of Education Degree from the University of British Columbia. At school, she enjoys mentoring and collaborating with newer teachers and is exceptionally proud as her students blossom in acquiring English and confidence.

Before December 2019, I invited Mr. Samuel to participate in this research. He suggested designing a science unit of study revolving around the importance of water to the environment and all living things. He signed consent before we started working together. In parallel, I invited Mrs. Amelia to provide support because of her vast experience with MRBC at New Vista. I also provided her with a letter of consent before this investigation began.
Mr. Samuel’s Classroom

Mr. Samuel’s classroom was spacious and bright, and all elements combined revealed an in-nature ambiance (Appendix B). The room often had its large windows wide open, with the curtains being closed only when sunlight interfered with in-class activities. The room was decorated with LED strings, lamps, and two lines of dim lights hanging from both ends of the room to replace the brightness of fluorescent lights. On the left end, there was a fish tank, which students were responsible for cleaning and for feeding the fish. This activity was just one of many other assigned roles in class. There were also teacher’s helpers, special helpers, librarians, language brokers, and the like. Every week, Mr. Samuel rotated their parts so that every learner could contribute to the classroom dynamics. At the back, below the windows, Mr. Samuel had a collection of storybooks and games that learners were welcome to use during ‘choices’. During this time, they could choose what they wanted to do and play before the end of a school day. Mr. Samuel was particularly fond of his LEGO blocks collection, and students also enjoyed playing with the plethora of cubes and figures available.

There were five tables where students found crayons, erasers, and pencils placed in the middle, inside a round container. These tables were all labelled with important animals present in First Nations worldviews: salmon, raven, bear, orca, wolf. Each animal represented a personal or social trait: salmon is a careful and curious thinker; the raven denotes creative thinkers; the bear shows respect for self and others; orcas know about themselves; and wolves are good communicators (Appendix B). This reference to nature in Mr. Samuel’s classroom relates to the educational suggestions by the Ministry of Education in British Columbia to include Indigenous worldviews, history, experience, stories, imagery, and ecology in the curriculum (B.C. Ministry of Education, 2015).
Furthermore, as you enter the room and even more when you are part of the school practices, it is clear how Mr. Samuel explored the affordances of multimodal resources. For instance, there were days the scent of mint provided a calming ambience. Even his strategies to call for attention were multimodal. For example, his verbal command ‘waterfall’ triggered a hushing from students.

There were 21 students in Mr. Samuel’s classroom, eight girls and 13 boys. Eight students were in Grade 2 and the remainder in Grade 3. Although half of the group was born in Canada, the vast majority were from migrant backgrounds. Countries like Afghanistan, England, Eritrea, Iran, and Syria were represented in the classroom. Amongst the students in that cohort classroom, five learners were from refugee backgrounds.

After volunteering for a month in Mr. Samuel’s class and co-designing the unit of study for this project, Mr. Samuel and I agreed to start the project in February 2020. Before that, I contacted the principal of New Vista to be advised on how to best proceed with this delivery. As per his suggestions, I met with the community school coordinator, who provided some general information about students and families. At the beginning of February, I sat with Mr. Samuel’s students and explained the objectives of the research project, as well as the activities we would do. Before handing out letters, I answered all learners’ questions concerning the research. Specifically, I reinforced that their decision to participate or not would have no effect on how the lessons or their standing in class. Mr. Samuel and I sent letters of consent to parents and guardians to request their child’s participation in the project.

Regarding possible and likely queries, Mr. Samuel volunteered to talk to parents and provide further clarification. Students were asked to bring the signed letters within the week. To mask learners’ identities, I utilize pseudonyms throughout this study.
Research Methodology

According to Yin (2018), a case study encompasses in-depth analyses of complex social phenomena in a bounded system in terms of time, space and participants. He contends that this research design relies on multiple sources of evidence, “with data needing to converge in a triangulating fashion” (p. 15). Stake (1995) explains that case study research seeks to refine understanding about a phenomenon rather than generalize its findings. Specifically, “the real business of case study is particularization, not generalization. We take a particular case and come to know it well, not primarily as to how it is different from others but what it is, what it does” (p. 8).

Merriam and Tisdell (2016) explain that there must be a unit of analysis in a case study. They argue that a unit of analysis is not the topic of investigation; instead, it refers to the particularity, the bounded system. In their words, a case is “a thing, a single entity, a unit around which there are boundaries” (p. 27), and it can be a person, a program, a group, or a specific policy. In this research, the unit of analysis consists of MRBC’s playful practices in science learning during a three-week science unit of study in Mr. Samuel’s cohort.

In terms of design, there can be single-case or multiple-case studies. Concerning the nature of the study, although some authors refer to this by using different terminologies, Yin (2018) outlines three: exploratory, explanatory and descriptive. The present study falls under the category of the explanatory multiple-case design. As Yin explains, a case of explanatory nature is data-driven and seeks to thoroughly understand, in a specific research environment, phenomena that lack detailed preliminary research. For the current investigation, I examine Grade 2/3 MRBC’s engagement in various playful practices in a science classroom, a gap in the literature discussed in Chapter 1. As for multiple-case inquiry, Yin defines it as the selection of
two or more cases with exemplary outcomes and that are believed to be literal replications. For this study, I considered three student’s engagement in playful practices because they resulted in similar multimodal artifacts, though each presented their singularities. Each student’s productions were analyzed independently as single cases before the cross-case discussion.

**Case Study Participants**

Three students were selected to participate in this case-study investigation after parents’ consent. From the 11 students who consented to participation, I considered those available for interviews and whose multimodal artifacts I was able to collect. Table 1 outlines the criteria for inclusion and exclusion. Taking these criteria into account, I selected three students to examine their engagement in playful practices and multimodal productions: Hassan, Yusef and Reem.

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Academic progress below Grade-level expectations as informally assessed by teachers (i.e., debrief interviews);</td>
<td>• Letters of consent or assent missing;</td>
</tr>
<tr>
<td>• A primary language other than English spoken at home;</td>
<td>• Absence of key data sources (e.g., interviews and multimodal artifacts).</td>
</tr>
<tr>
<td>• Migrant or refugee backgrounds;</td>
<td></td>
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<tr>
<td>• Participation in ELL extra support at some point in the past two years;</td>
<td></td>
</tr>
<tr>
<td>• Roles played in the classroom (e.g., language brokers or special helpers);</td>
<td></td>
</tr>
<tr>
<td>• Multimodal productions reflected lifeworld experiences.</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Inclusion/Exclusion Criteria

**Hassan**

Hassan was an 8-year-old Grade 2 Afghani student when the study began. He had more than two years of schooling in Canada and arrived at New Vista with very low proficiency in English. Hassan showed great passion for Afghani culture, and Farsi was the predominant language in his household. Hassan showed great discipline and was a highly motivated student. In Mr. Samuel’s cohort, he was one of the Farsi language brokers. He supported recent newcomers, as he once was, by translating instructions, playing with them, and welcoming new learners to the classroom.

**Yusef**

Yusef was 9 years old at the time of the study and enrolled in Grade 3 at New Vista. Although his student files indicated that he was Eritrea and born in Ethiopia, Yusef claimed to be Canadian. Tigrinya is the predominant language in his household that includes both his parents and two siblings, with him being the middle child. According to documents provided by the community school coordinator, Yusef’s family arrived in Canada under a refugee-claimant status. He first lived in Chilliwack, BC, where he attended Kindergarten. Upon arrival at New Vista, Yusef also received extra ELL support. Yet, teachers still considered his academic progress yet to meet Grade-level expectations, which is understandable given the number of years that it takes on average for an ELL to catch up with their peers. In class, he was a very communicative learner who actively participated in activities and whole-group discussions. As well, he was one of the teacher’s helpers in the classroom.

**Reem**

At the time of the study, Reem was a 9-year-old learner enrolled in Grade 3. Farsi was the language spoken in his household. Although he was born in Canada, his family migrated
from Afghanistan. In Mr. Samuel’s cohort, he played a significant leading role. At the beginning of the school year, Reem was assigned as a special helper. This position involved responsibilities that exceeded his role of a student in the classroom. He assisted both the teacher and peers regularly, either setting up the schedule of the day or serving as a language broker to recent newcomers. As he was a fluent Afghani and English speaker, Reem supported students who could not yet fully communicate in English. He was also a role model in the classroom. Students relied on him when it came to language use and math, for example. Reem also received extra ELL support at some point and was informally assessed as yet to meet Grade-level expectations.

**Procedures**

In the integrated unit of study, students participated in diverse multimodal activities two to three times a week. Upon the completion of their multimodal projects, I interviewed students in a separate room at New Vista. For such, I used a semi-structured interview (Appendix A) to learn more about their interests, home literacies, their multimodal projects, as well as their school practices. I also conducted debrief interviews with collaborating teachers throughout the study at the end of lessons. On April 1, as New Vista was closed due to the coronavirus Covid-19 pandemic, I met Mr. Samuel and Mrs. Amelia via video conference for a member-checking interview where I collected extra information about Hassan, Yusef and Reem and presented findings after the first round of analysis.

**Unit of Study**

Mr. Samuel and I co-designed the unit about water and its cycle through the environment according to the pedagogic repertoires proposed by the pedagogy of multiliteracies. Activities in this unit intended to activate different thinking-in-action processes, namely experiencing, conceptualizing, analyzing, and applying (Kalantzis et al, 2016). The lessons addressed
curricular competencies and content objectives outlined in the new BC curriculum for Grades 2/3 English language arts and science (British Columbia, n.d.). For example, regarding ELA, the unit intended to help students understand that language and stories can be sources of creativity and joy, and that narratives and other texts connect us to ourselves, our families, and our communities. For this aim, we relied on various resources, namely images, illustrative diagrams, online videos, movie excerpts, and picture books to raise learners’ interest and engagement. We selected materials considering students’ backgrounds, places of origin and interests previously shared during informal conversations. As for science, amongst others, curricular competencies included: a) transfer and apply learning to new situations and b) generate and introduce new or refined ideas when solving problems.

Concerning the content objective in science, the aim was to help students understand that water is essential to all living things, and that it cycles through the environment. For this purpose, we designed play-based and arts-based activities to afford learners multifarious chances to enhance the meaning-making of academic language and science concepts. Examples of ELA content objectives included: a) know how to use illustrations and prior knowledge to predict meaning and retell a story; b) identify word patterns; and c) use simple and compound sentence structures.

Regarding language objectives, students learned specific vocabulary to define and describe the water cycle and its stages, namely bodies of water (e.g., golf, sea, lake, pond, waterfall, fjord, river, groundwater), condensation, precipitation, evaporation, collection, infiltration, and others. Three textual genres were emphasized: explanatory, argumentation, and narrative.
For the first one, students explained the water cycle and used elements of an explanation for such (e.g., sequencers). For narratives, they read a nonfictional story based on the life of William Kamkwamba, an African teenager who relied on his scientific knowledge to design a windmill to collect groundwater and save his community from the worst drought in Malawi in recent years. Lastly, inspired by William’s efforts to support his family and community, students were asked to design a LEGO model representing how they could and would like to help their real or imagined community. For such, students produced a problem-solution argument in which they exposed real-world issues and provided appropriate solutions. Throughout this unit of study, learners utilized all language skills (i.e., speaking, listening, writing, viewing, and representing) to make sense and extend their understanding of the importance of water to all living things, and their citizen roles in society.

In the following, Table 2 provides a timeline for this unit of study followed by a more comprehensive description of what happened over such time period.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Lesson Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 24, 2020 (morning)</td>
<td>The dice game</td>
</tr>
<tr>
<td>February 26, 2020 (afternoon)</td>
<td>The fortune teller game</td>
</tr>
<tr>
<td>February 27, 2020 (morning)</td>
<td>The Water Cycle Tableau</td>
</tr>
<tr>
<td>March 2, 2020 (morning)</td>
<td>Read aloud</td>
</tr>
<tr>
<td>March 2, 2020 (afternoon)</td>
<td>LEGO model design</td>
</tr>
<tr>
<td>March 4 to 6, 2020 (afternoon)</td>
<td>Scrapbook project</td>
</tr>
<tr>
<td>March 9, 2020 (morning)</td>
<td>Scrapbook project – focus on writing</td>
</tr>
<tr>
<td>March 10 – 11, 2020 (morning)</td>
<td>Interview with students</td>
</tr>
<tr>
<td>April 1, 2020 (online)</td>
<td>Interview with Mr. Samuel and Mrs. Amelia</td>
</tr>
</tbody>
</table>
Table 2. Unit of Study Timeline

On February 24, Mr. Samuel was absent, and Mrs. Amelia and I co-taught the lesson. First, I linked a story that students had read earlier, *The Water Princess* (Verde et al., 2016) and the new narrative they would read on the fourth day of instruction, *The Boy Who Harnessed The Wind* (Kamkwamba et al., 2012), to situate the practice and access their background knowledge. Then, I introduced four stages of the water cycle, evaporation, condensation, precipitation and runoff, with the support of a diagram.

When introducing water cycle stages like precipitation, for example, we displayed photos of a snowstorm in Newfoundland and Labrador in January 2020, and a picture of the effects of torrential rain and floods in Brazil in February 2020 to connect local knowledge to global knowledge. The idea behind bringing these issues into perspective was also to discuss the consequences of human action on Earth. Other natural disasters were also presented, such as droughts in India (July 2019) and wildfire in Australia (September 2019). To draw on background knowledge, we also displayed bodies of water from some students’ home countries, namely lake Assad in Syria and Farza waterfall in Afghanistan.

Students engaged in two play-based activities to conceptualize new academic language. First, students practiced the stages kinesthetically by watching an animated story that depicted the water cycle\(^1\). While viewing, group tables stood as they noticed the water cycle stages. Each group reacted to a different phase according to instructions displayed on the whiteboard. After this kinesthetic exercise, students played with the dice set designed for this lesson (Appendix C). It was a matching exercise in which students had one die with definitions and another with images to match. Finally, Mrs. Amelia handed out a worksheet in which students were asked to

\(^1\) Available at [https://www.youtube.com/watch?v=IZCB2PrOkuY](https://www.youtube.com/watch?v=IZCB2PrOkuY). Video was played up to 1:25 minutes.
write their own definitions for each water cycle stage. Sentence starters were provided as well as the key academic vocabulary.

On February 26, Mr. Samuel was present and started leading the class. He began by using the dice set (Appendix C) to check what students remembered about the water cycle. Some learners read the definitions, and the whole group responded in chorus. Then, I presented a model of a fortune teller artifact. Each student received a pre-made origami fortune teller and wrote on the outside bodies of water (e.g., gulf, fjord, sea, lake, river, pond, waterfall, glacier) and on the inside the different stages and components of the water cycle (e.g., evaporation, condensation, precipitation, runoff, groundwater, clouds). Once everyone finished, pupils played with their fortune tellers for the remainder of the class.

On the third day of instruction, Mr. Samuel started leading the class again. This time, he chose an online animated video to revise the water cycle. Then, I presented examples of the tableau, a drama activity in which performers freeze on different occasions to represent scenes. Next, students were grouped and worked collaboratively to plan their performance. We grouped students according to their level of language proficiency, similar home language, and by considering who consented to participate in the study. This division resembled how Mr. Samuel organized his cohort, and it aimed to increase collaboration amongst learners.

During rehearsals, students negotiated what bodies of water to act out, how to represent the water cycle stages, and the roles each group member would play. Meanwhile, Mr. Samuel and I roamed around the room and assisted groups by brainstorming ideas and rehearsing. Lastly, groups presented their tableau performances. At the end of each presentation, the audience guessed the stages and components of the water cycle, and performers explained their tableau.
On March 2, Mrs. Amelia joined the class and read the picture book *The Boy Who Harnessed the Wind*. I first started to contextualize the story by building on background knowledge. After that, I introduced a new stage of the water cycle (infiltration) to talk about groundwater and how to access it. I then introduced William, the main character, and elicited how he was able to help his community by building a windmill.

Next, Mrs. Amelia read the story aloud and engaged readers by eliciting predictions and clearing out some academic vocabulary; for example, the difference between harvest and harness. Students also watched an excerpt of the movie adaptation of this story available on Netflix. As a lead-in for the following class happening in the afternoon, I asked students to brainstorm in pairs ways to support their real or imagined community. For such, I provided a few examples, namely planting trees; improving school grounds; collecting school supplies, food and clothes; and forming a litter patrol in the community.

For the second part of the day, students first shared their ideas of how they could contribute to their community with the whole group. They decided whether to work in pairs or individually and soon launched their projects – a LEGO model. Only two groups chose to co-design a project. When they were done, learners presented their creation and responded to questions posed by peers and teachers during a gallery walk.

From the 4 to 11 of March, students designed their scrapbooks. In these artifacts, students represented what they had learned about water and its cycle. Students were given photos of their performance and LEGO design, their fortune teller game, stickers, pebbles, wool that resembled water, beads, ribbons, and other papercraft supplies to design their scrapbooks.

Mr. Samuel and I presented two models with one demonstrating a possible sequence that they could follow. On six pages, students created a diagram of the water cycle and included
characteristics of water and how important it is to living things. They also provided more information about their productions (i.e., LEGO design, tableau performance, and fortune teller) by using verbal and non-verbal language. Particularly on March 9, Mrs. Amelia joined the class to help learners write on their scrapbooks.

It is worth mentioning that students would have had an opportunity to present their work to their school community in the original research design. However, this research occurred amid the coronavirus pandemic. As the situation increasingly deteriorated in early March 2020, Mr. Samuel and I decided to anticipate the conclusion of this unit of study and end it before Spring break 2020. Yet, on March 12, students received their parents in the class and showed the results of their work during the term. In this student-led conference, learners presented their productions. Finally, on April 1, after the first round of analysis, I met via video conference with both Mr. Samuel and Mrs. Amelia (as schools were still closed during this time) for a member checking interview in which I sought to collect further information about students and confirm first findings.

In this section, I provided a detailed description of the procedures taken during the unit of study about water and its cycle. What follows is a brief summary of the playful practices included in this study.

**Playful practices**

I analyze learners’ engagement in five playful practices in this study: the dice game, the fortune teller game, the tableau performance, the LEGO model and scrapbook design, which are described in the next section.
The Dice Game

For this activity, students played with a set of dice to connect concepts with definitions. Drawing on a picture book about the water cycle (Barnham, 2018), In this rule-bound play, students threw the dice simultaneously, read the written definitions and checked whether they matched with the image on the other die (Appendix C). Players would miss their turn if unable to pair the dice. This activity afforded multimodal reading as students read images and print while practising target language and conceptual knowledge.

The Fortune Teller Game

This rule-bound game consisted of a fortune teller origami which learners played with to practice the new language and concepts orally. Pupils completed origamis by writing bodies of water on the outside and the water cycle stages on the inside. Next, students started playing with peers. One would call out a body of water and the number of times the peer had to fold the origami. The peer would then enquire “What’s condensation?”, for example, and the other would define the stage. Figure 1 shows Reem playing with his origami.

Figure 1. The Fortune Teller Game
**The Water Cycle Tableau**

For this dramatic play, students performed the water cycle by exploring the affordances of gestural design. They decided which gestures, body positioning and facial expressions to represent bodies of water, water state, and the different stages of the cycle. Figure 2 shows Hassan (in black, kneeling on the left) and his group performing the water cycle.

![Figure 2. The Water Cycle Tableau](image)

The first three playful practices were intended to provide students with opportunities to use academic language and science concepts about water and its cycle. For such, they named and defined stages by playing with the dice and the fortune-teller games. Content objectives included transferring and applying learning to new situations and learning about word patterns and sentence structures. Language goals comprised the use of nouns with the suffix -tion and action verbs (e.g., melt, precipitate, evaporate). Students also constructed simple and compound sentences to define new concepts. The explanatory textual genre was in evidence across these three activities.

**LEGO Model**

After reading *The Boy Who Harnessed the Wind*, students considered the needs and demands of their communities in Canada, home countries or elsewhere to design a LEGO model.
that represented how they imagined they could support their neighbourhoods. It is worth mentioning that projects did not necessarily have to relate to a water problem. The rationale behind this activity was to foster problem-solving and communication skills. While some learners connected their designs with issues concerning water scarcity, others focused on housing and shelters, communication, recycling, and ways to feed the community. Figure 3 shows Reem designing his LEGO model.

![Figure 3. LEGO Model](image)

This constructive play required constructing an argument as students presented a problem in their real or imagined communities and provided a solution to the issue. The BC Curriculum content competency focused on generating and introducing new or refined ideas when problem solving. Language aims were the same as the other activities already presented.

**Scrapbook**

As a final multimodal practice for this unit of study, each group table received a box with papercraft and arts supplies (e.g., beads, stickers, pebbles, ribbons, etc.) that learners used in the design of authentic scrapbooks about what they learned and did during the unit of study. Besides the cover, students designed five other pages. For the first, they chose a body of water and were
asked to write characteristics and/or general information about water. Then, learners produced a diagram with the water cycle stages. They completed the remaining pages with their fortune teller origamis and pictures of their tableau performance and LEGO models. For these last three pages, learners were encouraged to write captions to their pictures and decorate the pages as they wished. Figure 4 shows one page of the model I designed to explain this playful multimodal practice.

Figure 4. The Scrapbook Model

After summarizing playful practices included in the unit of study about water, the following sections encompass information about data generation and analysis.

Data Generation

Duff (2008) claims that case studies have to follow an in-depth data generation cycle involving multiple sources of information rich in context. Merriam (1998) reinforces this argument when she explains that a robust case study should entail data from various sources to capture the complexity and entirety of the case under examination. For this present study, data includes field notes, photos and videos of in-class activities, artifacts (e.g., scrapbook, LEGO
design, videos of water cycle tableau performances), debrief interviews with Mr. Samuel and Mrs. Amelia, and a semi-structured interview with students at the end of the unit of study.

I recorded field notes at the end of each class in a T-chart fashion. On the left side of the page, I would write what happened in class and on the right my interpretations. As I played the role of researcher and teacher simultaneously, I relied on a memory-checking device to capture data more effectively. I audiotaped classes with consent of both teachers and students and utilized these recordings to complete field notes. As well, I categorized photos and videos of in-class activities and artifacts by lessons and case-study participants.

While I played a teaching role, Mr. Samuel or Mrs. Amelia took responsibility for capturing moments. I also had my smartphone handy and recorded some interactions and playful practices. These media were then triangulated with other data sources. Informal conversations and semi-structured interviews were used as a resource to gain more insight into participants’ backgrounds and life experiences, as well as their thinking-in-action.

For the semi-structured interviews, learners’ scrapbooks and videos of their tableau performance led to questions such as, “What were you doing here?”, “Tell us about your LEGO construction”, “Why did you choose to include this information?”, “How does this relate to your life?”, and the like. Students were interviewed in pairs and conversations lasted no more than 20 minutes.

Yin (2018) introduces a series of guiding principles for data generation in case study research. One of them is the creation of a database, which he argues, increases the reliability of the investigation. For the present study, all documents and data points were organized with the support of a computer-assisted qualitative data analysis software (CADQAS), Atlas.ti 8. Data points were categorized by type (e.g. field note, interview, artifacts, etc) and date of retrieval.
Data Analysis

Merriam and Tisdell (2016) explain that qualitative data analysis involves consolidating, reducing, and interpreting data points. They contend that “every analysis consists of moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation” (p. 202). The result of this iterative process constitutes the research findings. These can be in the form of organized descriptive accounts, themes, or categories. They can also be shaped as models or theories that explain the data (Merriam & Tisdell, 2016). For this study, I adopted an inductive thematic analysis to interpret learners’ academic language and science learning and identity enactment through playful practices in a science classroom.

In case-study research, Yin (2018) argues that one of the strategies to analyze data is by relying on theoretical orientation. He explains that theoretical propositions can help organize the analysis and point to relevant contextual conditions or explanations to be explored. My initial interpretation of learners’ playful practices and multimodal artifacts was guided by the five functions of meaning – reference, agency, structure, context, and interest – operating across various modes (oral, written, visual, audio, spatial, tactile, and gestural) (Cope & Kalantzis, 2020).

Using Atlas.ti 8, I first categorized students’ artifacts (LEGO model and scrapbook pages), photos and videos of classes by a) what the artifacts represented (Reference), b) how learners interacted and positioned themselves and others during playful practices (Agency), c) and how they structured their productions across various modes of communication (Structure). I then referred to interview transcripts to make sense of their intentions and motivations (Interests) and to discern the contexts (Context) in which they situated their learning. Finally, I analyzed
teachers’ interview transcripts as another step taken in data triangulation to consolidate my first understanding of learners’ practices.

From this initial interpretation of data, themes were generated inductively to account for the ways in which students made sense of academic language and science concepts through playful practices, and how Hassan, Yusef and Reem directed attention to aspects of their identities. Individual-case themes were divided into two categories, meaning-making in science and identity performance. Then, cross-case themes emerged from individual-case analyses and were separated into the categories of science learning and identities. The final section of this chapter comprises my research positionality.

**Researcher Positioning**

I am a Latin-American, middle-class male born and raised in northeastern Brazil. I acknowledge that my background and life experiences differ significantly from learners from migrant or refugee backgrounds. I have always had access to education and means to support myself, and my family and social status have never suffered any significant alterations. I have lived in two different countries besides Brazil, the United States and Canada. In both contexts, I willingly decided to experience the language and culture of these countries as a high school and later as a graduate student, respectively. I am fluent in Portuguese and English; I can also communicate in French and have a basic understanding of Spanish.

During data generation in Mr. Samuel’s classroom, I played the role of a teacher and a researcher. Both parts are familiar to me. I graduated from Universidade Federal da Paraíba in English Language and Literature in 2018 and was a teacher for seven years in Brazil before moving to Canada, where I have been tutoring elementary and secondary school students since
September 2018. While volunteering at New Vista, students learned about my teaching background and related to me as a teacher and a researcher.

I recognize that my conduct as a teacher and researcher at New Vista is influenced by my experiences, assumptions and biases (Merriam & Tisdell, 2016). Over these years teaching diverse groups of ELLs, I have drawn on the principles of multiliteracies and multimodality. Consequently, my understanding is that learners enhance their learning when they can map the new knowledge onto their lifeworld experiences through various channels of communication. I also draw on the principles of critical literacies (Freire, 1972). I believe that pedagogical practices should focus on creating meaningful opportunities for students to learn the language and content-area subjects, as well as applying the new knowledge in their lives outside school grounds. More importantly, regardless of the subject, students should engage dialogically and discuss questions of access, power relations, social inclusion and citizenship that are related to the new knowledge.

Chapter 4 is a thematic analysis of Hassan’s, Yusef’s and Reem’s meaning-making through playful practices during a science unit. I first introduce students’ backgrounds in more detail before analyzing data sources for each case individually.
Chapter 4: Individual-Case Findings

Introduction

This chapter comprises the analyses of three case studies that document how Hassan, Yusef, and Reem, the participating Grade 2/3 MRBC, developed an understanding of academic language and science concepts, and in what ways they foregrounded aspects of their identities through playful practices. The boys engaged in five play-based activities: the dice game, the fortune teller game, tableau performance, LEGO model and scrapbook design. More specifically, I examine:

1. How do children from migrant and refugee backgrounds enhance academic language proficiency and science learning through playful practices?
2. In what ways do children from migrant and refugee backgrounds foreground aspects of their identities through playful practices in a science classroom, and how does this enhance their learning?

Data sources include students’ artifacts, photos and videos of classes, field notes, and interview transcripts. In this chapter, I present the themes generated inductively from each of the cases. Themes are divided into two categories, meaning-making in science and identity performance. The first explains how learners enhanced their meaning-making of language and science concepts while engaged in playful practices. This category includes the following themes: a) embodied learning, b) hybrid narratives of new knowledge, c) peer interaction, and d) meaning-making flow. The second category comprises aspects of learners’ identities foregrounded in their playful practices. Themes include a) sense of belonging, b) lifeworld experiences, and c) imagined identities. Although these themes appear in each case presented in this section, they did not emerge equally as Hassan, Yusef and Reem actualized them in
unique and authentic ways. In this section of the thesis I illustrate these actualizations separately, and in Chapter 5 I discuss cross-case findings.

In this chapter, subheadings are organized according to these two categories and their respective themes. I first introduce findings about Hassan’s engagement in playful practices before presenting Yusef’s and Reem’s cases. To mask students’ identities, figures where their names showed have been edited, and I used pseudonyms throughout the text to refer to all students’ and teachers’ names. Written excerpts from their scrapbook pages are in italics, whereas interview excerpts are cited within quotation marks. In what follows I provide a more detailed account of Hassan before explaining aspects of his meaning-making process through various playful practices.

**Hassan’s Design**

Hassan was a Grade-2 eight-year-old Afghani student with more than two years of schooling in Canada when this study was conducted. Upon his arrival at New Vista community school, Hassan claimed to know very little English. He stated, “I didn’t know English that much. I just know hey, and in Kindergarten I was just doing actions. They were saying, ‘what do you want?’ and I was like [gesturing]” (Interview, March 10, 2020). Hassan was highly interested in Afghani culture in general. He elucidated: “I just search for Afghani songs and cartoons. Afghans stuffs” (Interview, March 10, 2020). Farsi was the predominant language in his household. As he explained, English was only spoken at school or when his father helped him with homework.

Hassan was an intrinsically motivated and driven learner. Concerning his studying hours at home, he asserted: “As soon as I get home I play on my iPad, some one or two hours and then three hours I do homework” (Interview, March 10, 2020). Online, Hassan was interested in
Roblox games (https://www.roblox.com), Fortnite, and card games. He added that puzzles with Afghani words were also of his interest (field notes, March 10, 2020).

Regarding Hassan’s academic progress, Mrs. Amelia asserted: “Hassan was a complete level 1 beginner in Kindergarten and has done extremely well with his English and overall academics since K” (interview, April 1, 2020). Hassan’s eagerness to participate was also noticed by Mr. Samuel when he explained, “Hassan pays attention when asked questions because he wants to answer them” (field notes, March 2, 2020). Mr. Samuel also talked about how Hassan had been making progress in working independently:

Hassan, he doesn’t need as much support as like (name) and other students, but like, when he struggles in some area, I know you and I went back and forth. I helped him a few times. Somehow he managed to finish. He gets work done. You know, he was the third one to finish the writing. That’s great. He needs a little bit of support, you know, kind of gradually he’ll get there” (Interview, February 26, 2020, my emphasis).

Hassan was one of the Farsi language brokers in Mr. Samuel’s classroom. Whether translating instructions, playing with newcomers, or clarifying the meaning of classroom activities, Hassan had an essential supporting part. During his interview, he explained how he helped his peers, especially those who had recently arrived in the country:

In Mr. Sam’s class, I really like about…we invite new people who are not new to our community. We make sure they have fun. We keep them… we’ll be nice to them. We’ll keep like…we’ll respect them. We’ll be responsible for them. We give them stuff that they need, and we ask them what they need (Interview, March 10, 2020, my emphasis).

Peer support was a common and valued practice in Mr. Samuel’s classroom as I observed while volunteering and during the unit of study. Specifically, after students’ water cycle tableau
performances, I shared with Mr. Samuel my enthusiasm for the amount of support that I noticed during rehearsal, and while learners acted out their roles (field notes, February 27, 2020).

In the following section, I explain how Hassan made meaning of the water cycle through playful practices. Then, I illustrate how he built on his lived experiences and background knowledge to engage in constructive play.

**Meaning-making in Science**

Hassan enhanced his understanding of the importance of water and its cycle through various playful practices. In this section, I selected the most salient examples of how he embodied language and science concepts, created hybrid narratives, and interwove modes of communication to transfer and apply the new knowledge. Subheadings are aligned with the themes identified: a) embodied learning, b) hybrid narratives of new knowledge, and c) meaning-making flow. I begin by first explaining how he embodied academic language and science concepts in dramatic play.

**Embodied Learning**

“*We’re river water.*”

Figure 5 illustrates Hassan’s rehearsal for the water cycle tableau and how he embodied academic language and science concepts. This dramatic play activity entailed a group presentation of the water cycle in which students decided which gestures and facial expressions could best denote the elements that comprise the water cycle through the environment. Hassan captioned this image in his scrapbook as *Reem is the sun. Me and Nimra are the water. Reem is making the water evaporate* (scrapbook excerpt).
Hassan’s gestures denoted a state of being, and transitive and intransitive actions related to the water cycle and its stages. As a state of being, Hassan explained that Reem was the sun and that he and the Nimra were the water. As an ensemble, they were a pond and rain. In terms of transitive actions, Hassan clarified that he and his peers formed a body of water in the runoff stage (a pond), Reem made the water evaporate, and the group embodied rain and snow.

Hassan was actually describing intransitive actions (i.e., it rains, it snows). However, as he acted out the cycle with his peers, the intransitive verbs *rain* and *snow* became transitive. Likewise, Hassan transformed the transitive/intransitive verb *evaporate* into a causative verb – *Reem is making the water evaporate* (scrapbook excerpt). These linguistic modifications that he made to explain his group’s performance demonstrate how he embodied the understanding of the cycle of water through the environment by performing actions – “we formed as a pond”, “we fell down as rain”, “Reem is making the water evaporate” – and states of being – “we’re river water”, “Reem is the sun” (Interview, March 10, 2020).

In this dramatic play (the water cycle tableau), Hassan actively transformed an explanation (i.e., a type of non-fiction text that explains a process) with its embedded academic language and
scientific concepts into a performance in which solely gestures, body language and facial expressions signified his intentions as a meaning maker. On the one hand, Hassan assimilated the new knowledge through embodied learning by engaging in playful practices. On the other hand, Hassan and his group’s drama performance may have rendered their audience – a diverse multilingual group of students – a multimodal experience of the new language and science concepts.

In this section, I explained how Hassan embodied an explanatory text by acting out bodies of water and the water cycle stages. In the next part, my goal is to discuss how he combined elements of different genres to produce authentic multimodal texts.

**Hybrid Narratives of New Knowledge**

“This is a fish saying cool.”

Hassan created hybrid narratives as he combined elements of an explanation and a story to demonstrate his language and science learning. For example, Figure 6 shows how he depicted a waterfall in Afghanistan in his scrapbook, thus establishing a meaningful setting in his home country.

*Figure 6. Hassan’s Waterfall*
By relying on written design, he narrated a conflict in this visual text. Hassan captioned a causative relation with a transitive action – if the boat fall down – and a likely outcome of this action – they will be died. Although Hassan did not indicate the reference to the subject pronoun they, it is possible to say that the use of such a pronoun suggests the presence of participants in this narrative. As well, he placed a sticker of a girl as a spectator at the bottom of the waterfall.

In terms of an explanatory text, he depicted a body of water and the water cycle stages. For instance, he drew on the paper towel, which denoted clouds, to indicate the agglomeration of water droplets. He also drew four long dots to indicate precipitation. On the top left corner, he placed the sun, which can be interpreted as his attempt to depict evaporation. In this sense, Hassan applied the new knowledge while designing a narrative representation with a meaningful setting, characters, and a story conflict. Another example of a hybrid narrative of his language and science learning is illustrated on his scrapbook cover, as seen in Figure 7.

![Hassan’s Scrapbook Cover](image)

Figure 7. Hassan’s Scrapbook Cover

J: Go Hassan. Tell me what you have there.

H: This is my scrapbook. This is like a waterfall, these are bubbles, this is some rain falling. This is hail. This is a fish saying it’s cool.
J: So it’s like nemo speaking.

H: Yeah (Interview, March 10, 2020, my emphasis).

As an explanation, Hassan depicted condensation by dotting the cotton balls, and precipitation by referring to a water state discussed in class (hail). Regarding narrative features, Hassan relied on a visual resource (a speech bubble that characterizes verbal representations) to denote a fish expressing contentment – “this is a fish saying cool!” Cool is a homonym adjective and may also refer to slightly cold temperatures or a calm state of being. In this sense, Hassan’s verbal representation in his cover can be interpreted differently.

Either way, the expression of contentment, calmness or body sensation by a non-human character demonstrates how Hassan utilized a literary device – personification – to apply his learning through a visual narrative. Rather than simply completing a matching exercise to practice the target language and concepts, Hassan created a multimodal narrative with the new knowledge in this constructive play. On another scrapbook page (Figure 8), Hassan utilized the same verbal representation (speech bubble) to depict a non-human character narrating the water cycle.

*Figure 8. Hassan’s Water Cycle Diagram*
On the one hand, Hassan depicted an explanation by describing the water cycle process through written and visual design (i.e., arrows indicating a sequence of events for each cycle stage in this diagram). On the other hand, Figure 8 also illustrates an element of a narrative. In the middle of the page, Hassan placed a mermaid sticker saying *the water clay* [cycle]. This character may relate to his interest in cartoons that he shared earlier. As he explained: “I just search for Afghani songs and cartoons. Afghani stuffs” (Interview, March 10, 2020).

In this picture, Hassan produced a hybrid text where visual and verbal resources juxtaposed to convey his understanding of the water cycle. Consciously or not, he interwove two written genres, a narrative and an explanation by combining modes of communication. While analyzing his written text, it is possible to see that some linguistic elements are still challenging, such as the spelling of four/five-syllable nouns ending in *-tion*, and homonyms (e.g. buy vs by). However, the way Hassan spelled these words did not interfere with communication. Instead, from an assessment perspective, his water cycle representation directed attention to some linguistic elements that teachers can address in subsequent classes.

The new BC curriculum for Grades 2/3 ELA places a great emphasis on the role of stories in language learning and literacies development (British Columbia, n.d.). The curriculum highlights how stories can be a source of creativity and joy. For Hassan, stories were also a source of academic language and science learning. He relied on multimodal resources such as speech bubbles, manipulated a variety of materials (e.g., wool, stickers, pebbles, cotton, papercraft and the like), and navigated various modes of communication (e.g., oral, written, visual, tactile) to make sense of academic language and science concepts through hybrid narratives. In the following account, I elucidate the meaning-making flow that Hassan engaged in while at play to enhance his academic language proficiency and science learning.
Meaning-making Flow

“I really like waterfalls because they like have water going down.”

Hassan enhanced his understanding of the water cycle by engaging in a flow of meaning-making across different playful practices. With each activity, he had different opportunities to conceptualize and apply the new knowledge through distinct modes of communication. First, he defined the target academic language and science concepts while playing with the dice and fortune teller games. Then, for the water cycle tableau presented earlier, Hassan and his group applied their new knowledge by acting out a diagram of the water cycle. Through these activities, Hassan could understand what words like evaporation or condensation meant by manipulating materials, verbalizing concepts, and relying on solely gestures to make his audience (his classmates) understand what bodies of water and phases of the water cycle he and his peers embodied.

For the last multimodal practice, the scrapbook, a meaning-making flow across modes can be seen on the page where Hassan depicted his waterfall in Afghanistan (Figure 6). He captioned it as Waterfalls in Afghanistan is beautiful. If boat fall they will be died (scrapbook excerpt). He drew, wrote a causative action, cut papercraft, and repurposed paper towel to represent clouds. Thus, he relied on visual, tactile and written designs to express his intentions. Hassan also explained his motivation to depict a waterfall – “I really like waterfalls because they like have water going down” (Interview, March 10, 2020, my emphasis).

Hassan’s cover page (Figure 7) is another example of how meaning flowed across written, visual, and tactile designs. In this collage, he utilized a variety of materials, namely pebbles to represent rocks and wool strips to illustrate a waterfall. To denote precipitation, Hassan glued white beads on the green sheet, whereas to symbolize cloud formation with water
droplets sticking together, he glued blue beads and coloured cotton balls with blue dots. He also placed animal stickers below a strip of blue wool representing the body of water. Lastly, Hassan utilized a visual resource (a speech bubble) to depict a dialogue. Inside, he wrote what the fish said: “it’s cool!” (scrapbook excerpt).

Hassan’s water cycle diagram (Figure 8) is another example of how he made sense of academic language and abstract concepts by combining modes. He utilized visual resources (arrows) to indicate movement (water vapor rising to clouds) and sequence (from condensation to evaporation). As his group table had run out of cotton balls, Hassan glued some paper towel as clouds. He also used different drawings to represent water states (rain and hail). As well, Hassan wrote an explanation for every water cycle stage. For instance, he wrote *this is condnitansh. Big dorplets fall down* to describe condensation (scrapbook excerpt).

In summary, Hassan’s made sense of the cycle of water by embodying, drawing, writing and visually depicting the stages and elements that comprise this natural event. It can be argued that his understanding of how water cycles through the environment moved from one playful practice to another, with each activity giving rise to different language structures and verbal and non-verbal forms of conceptualizing and applying the new knowledge. In the following section, I present how Hassan foregrounded aspects of his identity through play during a science unit of study.

**Identity Performance**

Through playful practices, it is also possible to see how Hassan developed literacies and learned academic language and science concepts by designing identity texts. Hassan’s identity texts can be translated into how he foregrounded his sense of belonging to Afghanistan, how he drew on his lifeworld experiences to design multimodal ensembles, and how he imagined
identities to direct attention to what is of paramount importance to him when it comes to providing for his community: safety. Subsections are organized according to the themes identified for the second research question: a) sense of belonging, b) lifeworld experiences, c) imagined identities. I begin by first describing how he deepened a sense of belonging while developing his academic language and science learning.

**Sense of Belonging**

“Waterfalls in Afghanistan is beautiful.”

Hassan is an Afghani-culture enthusiast. At home, Farsi is the only spoken language; it is also the language he claimed to like the most. Hassan elucidated his language use at school and at home:

J: And then English is only here?

H: Yeah, English is only here. Because I really like Farsi, but not that much English.

J: Oh, why not?

H: Because it’s too…it’s like if you don’t know a word and if you know it in Farsi how are you going to commu…

J: Communicate.

H: Exactly. Like that. (Interview, March 10, 2020).

When I asked about what he read and browsed on the internet for leisure, Afghani culture was top of the list. Hassan shared that he enjoyed searching for Afghani songs, cartoons, and other “Afghani stuffs”. When I asked what he appreciated in Mr. Samuel’s class, Hassan explained: “and also, I really like playing with Afghani people a lot” (Interview, March 10, 2020). Considering this appreciation for his home country, Hassan’s identity texts demonstrate
how he situated the playful practices that he engaged in to foreground his sense of belonging to Afghanistan.

For example, one of Hassan’s scrapbook page portrayed a waterfall in his home country. He captioned this image as *The waterfalls in Afghanistan is beautiful. If boat fall down they will be died* (scrapbook excerpt). Hassan further explained his production during interview:

H: This is my body of water with the golden fish. *The water in Afghanistan is beautiful.* There are lots of beautiful. They also have some flowers in it.

J: Why did you choose the waterfall?

H: I really like waterfalls because they like have water going down (Interview, March 10, 2020, my emphasis).

Hassan’s intention to depict a waterfall specifically in his home country is an example of how he attempted to enact aspects of his identity in play. He capitalized on the opportunity to contextualize his multimodal text and opted for situating it in his homeland, where he held a stronger sense of belonging. Although Hassan utilized his school language to complete his scrapbook, he found a strategy to bridge the gap between home and school while engaged in constructive play. It was by situating his multimodal production in his beloved Afghanistan that Hassan strengthened his sense of belonging to his homeland. What follows is an explanation of how Hassan drew on his lifeworld experiences to develop his academic language proficiency and science learning.

**Lifeworld Experiences**

“Their still have wars in Afghanistan.”

Hassan drew on his lifeworld experiences and knowledge about Afghanistan to design his LEGO model. For example, Hassan and his classmates read *The Boy Who Harnessed the Wind.*
This picturebook told the story of an African teenager, William, who overcame the challenge of water scarcity during the worst drought that Malawi had recently experienced by designing a windmill to pump groundwater. With his invention, William was able to apply his knowledge creatively and assist his people. After reading William’s story, students brainstormed ideas to support their real or imagined communities.

Besides specific vocabulary to describe their models, learners used cause/effect conjunctions and infinitive verbs to indicate purpose to explain the solution to a real-world issue that their models addressed. Figure 9 shows Hassan’s LEGO model. He captioned it in his scrapbook as *I can help my community buy by making a house. And a van. It free. A wapenis [weapons] keep you safe* (scrapbook excerpt).

*Figure 9. Hassan’s Haven in Afghanistan*

For this multimodal artefact, Hassan demonstrated some awareness of the ongoing wars in Afghanistan and proposed a project that could protect his compatriots. As he explained, “I wanted to build a big house that is super invincible because they still have wars in Afghanistan” (Interview, March 10, 2020). He designed a LEGO model that represented a haven or fortress with an action figure and some weapons on the inside. Whether he lived armed conflicts or was
aware of those in his home country, Hassan relied on this knowledge to direct attention to what is of paramount importance to him when it comes to providing for his community: safety. In this exercise, he enacted imagined identities, which I describe in the following section.

**Imagined Identities**

“I had some swords to protect the people.”

Hassan tried out different imagined identities while developing literacies in constructive play. As presented earlier, he was a conscious community member aware of people’s needs in Afghanistan. He explained, “I wanted to build a big house that is super invincible because they still have wars in Afghanistan”. In this excerpt, as a community member, Hassan expressed concern about his compatriot’s safety. To protect them, he played the role a builder and a protector; he searched for material resources to build a haven or which could serve as weapons. As he elucidated, “I kept looking for pieces that can connect, I had some swords to protect the people. And I got a van and a house for free” (Interview, March 10, 2020). Whether as a student, a community member, a protector and/or a builder, Hassan ascertained his Afghani identity by directing attention to a real problem in his home country and offering a solution to protect his people.

Hassan’s engagement in playful practices afforded him a myriad of meaning-making opportunities in science. He enhanced his learning by embodying academic language and science concepts, creating hybrid narratives, and engaging in a meaning-making flow across diverse modes of communication. As well, he foregrounded aspects of his identity, such as his sense of belonging to Afghanistan and his lifeworld experiences to enhance his problem-solution argumentation.
In the following section, I present Yusef’s case to illustrate how he enhanced his academic language proficiency and science learning and enacted aspects of his identity through playful practices. I begin by providing a more detailed account of his sociocultural backgrounds.

**Yusef's Design**

Yusef was a 9-year-old boy enrolled in Grade 3 at New Vista when the study began. He asserted that, even though Tigrinya was his home language, he was not a keen speaker because he was born in Canada. He explained:

J: When you mentioned your mom, do you speak English with your mom?

Y: No. I speak my language.

J: What is your language?

Y: Tigrinya.

J: Do you like speaking Tigrinya?

Y: Not a lot because I was born in Canada.

J: You were born here, but then at home your mom speaks Tigrinya with you.

Y: Yeah.

J: Is it just your mom?


However, his student file identified his country of origin is Eritrea. Based on documents provided by the community school coordinator, Yusef’s family arrived in Canada under a refugee-claimant status. This information was also confirmed by Mrs. Amelia and Mr. Samuel (Interview, April 1, 2020). Before coming to New Vista at Grade 1, Yusef attended Kindergarten in Chilliwack, BC. Mrs. Amelia mentioned that Yusef still talked about visiting and having
sleepovers with friends in Chilliwack, a place he held fond experiences and memories of (Interview, April 1, 2020).

Yusef’s household includes both parents and two brothers; he is the middle child. At home, Yusef mentioned he watched streaming movies and read both on the internet (Raz-kids.com) and physical books. Online games were also of his interest. As for all other kids interviewed, Roblox was his favourite online gaming channel. Yusef also shared he liked being outside playing with his little brother and neighbours. He elucidated:

J: Yusef, when you are not at school, what do you like doing at home?


J: Yeah.

Y: I ask my mom and she like no, just go watch on the laptop. And then, like, she says that when it’s summer I could play outside (Interview, March 11, 2020).

The outdoors is indeed one of his interests. When I asked about what he liked in Mr. Samuel’s class, he commented on the decoration and its reference to nature – “it’s like made out of wood” (Interview, March 11, 2020). Here, Yusef referred to decoration sets around Mr. Samuel’s room that resembled chopped branches. Yusef also stated that the calm atmosphere in class helped him concentrate – “I liked how they all concentrate and not talking, ‘cause I only get to concentrate too” (Interview, March 11, 2020).

Concerning his academic progress, Mrs. Amelia shared that, despite continuous but slow progress, Yusef was below grade level expectation in most subject areas. Mr. Samuel confirmed this information and claimed: “[…] Yusef is still developing his writing. He just copies, he relies on, he looks what you wrote on the board, but he got the motivation to participate” (Interview, February 26, 2020).
The following section comprises an analysis of how Yusef developed his academic language proficiency and science learning, and how he foregrounded aspects of his identity through playful practices. I begin by explaining his meaning-making process in the science unit of study about water and its cycle through the environment.

**Meaning-making in Science**

Yusef’s engagement in playful practices reveals how he enhanced his learning by embodying academic language and science concepts, creating hybrid narratives, interacting with his peers, and interweaving a plethora of designs to convey his intentions. Subheadings are organized according to the following themes: a) embodied learning, b) hybrid narratives of new knowledge, c) peer interaction, and d) meaning-making flow. I first discuss how he embodied abstract concepts and explained his water cycle tableau performance.

**Embodied Learning**

“The hands, and like the clouds, like they form a big cloud.”

As a third playful multimodal practice (students had already played with dice set and fortune teller origami), Yusef performed the water cycle with three other classmates. Figure 10 illustrates his performance. Through gestures, they embodied a body of water and the water cycle.
During our interview, he explained their production:

J: Can you tell me what’s happening? […] What’s happening there?

Y: Ah, that’s condensation.

J: You mean condensation here? [I paused video and pointed to one of the scenes in which students had their arms raised, hands together, and fingers waggling].

Y: Yeah.

J: How did you try to represent this, with the hands?

Y: The hands, and like the clouds, like they form a big cloud.

J: I thought you were trying to do the water droplets sticking together. But no, it’s just the clouds forming. And then, why did you remain here?

Y: It’s because me and (name) were at the top and (name) and (name) were the water.

(Interview, March 11, 2020, my emphasis).

In this excerpt, Yusef clarified what his and his group’s hand gestures and positioning referred to. Whereas I thought they were trying to represent water droplets sticking together, Yusef elucidated that their hands depicted cloud formation, and that the stance was an illustration of a waterfall. They devised their tableau performance by dramatizing the water cycle through
gestures solely. For such, Yusef and his group embodied states of being and actions related to the target language and science concepts. For instance, when he explained that their hands “like they form a big cloud”, Yusef described a transitive action – to form. Furthermore, when he elucidated that his peers “were the water”, he referred to a state of being. Like Hassan and his group, Yusef and his peers actively embodied an explanatory text by performing the water cycle through gestures and body language. Next, I elucidate Yusef’s meaning-making of new knowledge by combining his prior knowledge of popular culture and the storyline of the picture book read in class to create an authentic hybrid narrative.

**Hybrid Narratives of New Knowledge**

“This one is a StarWars spaceship because of the top.”

As an active meaning maker, Yusef redesigned existent narratives to put forward a solution to a possible water problem in his community. After reading *The Boy Who Harnessed the Wind*, students played with LEGO blocks and designed models to represent the ways they could help their real and imagined communities. Many built houses and apartment complexes to shelter the homeless or those in need. This is not at all surprising. In her comprehensive report on the current integration of migrant/refugee-background groups in Surrey and Greater Vancouver, BC, Barber (2019) indicates that one of the major issues is housing shortage. Rentals are unaffordable for recent newcomers and some large households (i.e., four people or more) have to share a one-bedroom apartment.

Yusef’s source of inspiration, however, travelled far beyond the physical boundaries of his classroom, New Vista, or even his neighbourhood. Figure 13 illustrates his LEGO model. He captioned it as *I build a spaceship to explore space to see if there is any water* (scrapbook excerpt).
His plan consisted of building three spaceships for interplanetary travels in search of water sources. After learners finished their LEGO models, they gathered around each other’s artifacts to observe and inquire about their creations. When asked to further explain the rationale behind his model, Yusef clarified that the three ships would extract water from the ground and carry it home. However, in case they were attacked, one would return to supply his community with water (field notes, March 2, 2020). I was intrigued by his idea and inquired whether his spaceships were in reference to *Star Wars* movies. Yusef confirmed:

J: […] and then you created your project there. Can you tell me about it?

Y: Hum, *The Boy Who Harnessed the Wind*?

J: Your project there.

Y: Oh, this one? I build, like, a spaceship to ah, wait, to explore space to see if there is any water.

J: If there is any water out there. Do you watch any StarWars, or any movies?

Y: Yeah.
J: So maybe, is it from there where the idea came from for the spaceship?

Y: *This one is a StarWars spaceship because of the top* (Interview, March 11, 2020, my emphasis).

In this sense, Yusef’s hybrid narrative consisted of combining two available narratives that he knew and designing a unique text featuring both his interest in StarWars and the new knowledge. His specific knowledge about interplanetary battles can be seen in his description of the ships – “This one is a StarWars spaceship because of the top” – and his escape plan should the crafts be attacked. On the other hand, his idea to extract water from the ground relates to the water cycle stage infiltration that he was introduced to during read aloud of *The Boy Who Harnessed the Wind*.

It is important to highlight that, in the creation of his hybrid narrative, Yusef repurposed materials to enact his intentions as a meaning maker. For instance, he gathered blocks of different sizes to construct the spacecrafts shaped according to his StarWars knowledge. Specifically, the third and smallest spaceship that he presented is in fact a toy car that he redefined its original meaning to represent his intentions.

In this section, I explained how Yusef created a hybrid narrative by combining two available designs. In what follows, I demonstrate how peer interaction played a role in his development of academic language proficiency.

**Peer Interaction**

“Did you build stairs?; How many rooms does it have?”

Every day, Mr. Samuel started off instruction by gathering students on one of the carpets in his classroom. For the first 15 minutes or more he would ask, ‘How are you today?; ‘How was your weekend?, ‘Were you safe?’ (field notes, February 26, 2020). When I collaborated and
played a teaching role, I also started by sharing highlights of my weekend and interacting with pupils. On all occasions, Yusef always had his hand raised to participate, for instance, telling the group that he had gone bowling or to church on the weekend (field notes, February 24, 2020). As well, while engaged in play, Yusef managed to interact with peers. For example, after groups finished their tableau performance, the whole class attempted to interpret their actions and gestures. Eagerly, Yusef contributed and called out the stages of the water cycle, bodies of water, and water states (field notes, March 27, 2020).

On the day after the tableau performances, students designed their LEGO models to represent how they could help their communities. Once they finished assembling models, learners did a gallery walk and asked and answered questions about projects. For this activity, Yusef was inquisitive and queried almost every group. For example, after Hassan presented his haven in Afghanistan, Yusef was curious to know if people needed a key, or whether they could drive without one. For the many shelters that students built, Yusef always had a prompt question: “Did you build stairs?; How many rooms does it have?” After a group presented their community garden, Yusef’s sense of curiosity sparkled again: “Is it supposed to be green or blue?” (field notes, March 2, 2020). What is interesting about these conversations is how realistic they sounded. In this make-believe play, Yusef was not simply manipulating LEGO blocks or interviewing peers’ imaginary designs. Instead, he was learning through dialogue and in exchange of knowledge.

Two guiding principles in the ELA curriculum for Grades 2/3 in British Columbia are “curiosity and wonder lead us to new discoveries about ourselves and the world around us” and “using language in creative and playful ways helps us understand how language works” (British Columbia, n.d.). Moreover, one of the competencies that students are expected to develop at
these grade levels entails the exchange of perspectives to build shared understanding by “offering ideas related to the problem, asking relevant questions to find out and clarify others’ views, sharing opinions supported by reasons” (British Columbia, n.d.). In this regard, Yusef’s interactions in play demonstrates how his curiosity and wonder led to language use (e.g., question formation) and exchange of ideas. He asked relevant questions that helped him interpret peers’ LEGO models. Arguably, his questions may have also assisted other students make sense of such artifacts. The next section comprises an explanation of Yusef’s engagement in a flow of meaning-making across various playful practices.

**Meaning-making Flow**

Yusef’s engagement in play illustrates how he enhanced his academic language and science knowledge by interweaving various modes of communication across playful practices. By doing so, he managed to better understand new concepts and structure his multimodal productions. Figure 11, for example, shows Yusef attentively reading images and written definitions on the dice set.

*Figure 12. Yusef and the Dice Game*
On the occasion, Yusef manipulated the dice set (tactile design), read definitions aloud to his group table peers (oral and written designs), and interpreted images that illustrated the cycle stages and other elements such as groundwater and clouds (visual design). During this activity, one mode evoked and complemented the other and contributed to Yusef’s conceptualization of the new academic language and scientific knowledge. For instance, meanings conveyed through images helped him make sense of written definitions and vice versa. To continue playing the dice game, he had to understand how these two distinct modes referred to the same concepts (i.e., the water cycle stages) before interacting with his group-table members.

Yusef’s water cycle tableau (Figure10) is another example of a meaning-making flow across playful practices. Like Hassan and his group, Yusef and his peers orally planned their tableau performance and embodied a diagram of the water cycle. They acted out a body of water (a waterfall), water states, and stages such as evaporation, condensation, precipitation and runoff.

Finally, Figure 12 shows another example of how the interplay of multiple modes contributed to Yusef’s language and science learning. On this scrapbook page, Yusef depicted a diagram of the water cycle. He utilized various multimodal resources to denote his intentions as a meaning maker, namely papercraft (representing a body of water), stickers (representing sea animals), a foam sticker that he cut to best signify the sun, drawings (representing sunrays, clouds, precipitation, and a pond), arrows (sequencing the stages), and pebbles around a pond.
In this artefact, Yusef manipulated materials of distinct textures and sizes (e.g., pebbles, foam, stickers) and relied on visual resources to transfer and apply his knowledge. Meaning was established on a white page that composed his scrapbook, and, by exploring the affordances of visual and tactile designs, Yusef made reference to the new knowledge, structured his multimodal text in a sequence, and enacted his intentions as a meaning maker.

Yusef’s engagement in playful practices illustrates how he interwove visual, written, gestural, and tactile designs to access new knowledge and represent his intentions as an active meaning maker. Each mode offered new possibilities to learn about the water cycle. While playing a rule-bound game, Yusef conceptualized the new academic language through the interplay of visual and written resources. Through dramatic and constructive play (i.e., the water cycle tableau and scrapbook construction), he applied the new science concepts appropriately and creatively. In this sense, a combination of playful practices allowed meaning to flow from one mode of communication to another, thus helping Yusef enhance his academic language proficiency and science learning. In the next section, I present how Yusef brought aspects of his

*Figure 13. Yusef’s Water Cycle Diagram*
identity into perspective through playful practices, which helped him develop his academic language proficiency and science learning.

**Identity Performance**

Yusef produced identity texts that foregrounded his sense of belonging to Canada and his lifeworld experiences. His multimodal productions demonstrate how he enacted imagined identities to direct attention to what he considered critical in supporting a community: water security. Subheadings in this section are organized according to themes identified for the second research question: a) sense of belonging, b) lifeworld experiences, and c) imagined identities. I begin by illustrating how he showcased his sense of belonging to Canada through constructive play.

**Sense of Belonging**

“We went hiking and there a big waterfall.”

Although Yusef was born in Eritrea, he claimed to be Canadian during our interview. Upon his arrival in British Columbia, he lived in Chilliwack, and, according to Mrs. Amelia, who provided him with extra ELL, Yusef often reminisced about his experiences in nature and the friends he made there (interview, April 1, 2020). It can be argued that this acceptance and identification with the host culture can be seen as evidence of his adjustment in the new country. By analyzing Yusef’s meaning-making during unit of study, it is possible to see how he attempted to reinforced his sense of belonging to Canada.

In designing his scrapbook (a constructive play activity in which students transferred and applied their language and science learning), Yusef may have connected his lived experiences in Chilliwack and his understanding of the importance to water and its cycle through the environment. For example, Figure 14 illustrates his scrapbook cover and its first page. Yusef
captioned them as *Water is good for the plants* and *Waterfall is important because people and animals can drink*, respectively (scrapbook excerpt).

![Figure 14. Yusef’s Waterfall](image)

When developing literacies, meaning makers always have a point of departure, a set of social practices (i.e., beliefs, values and attitudes) that contextualize their act of doing literacy. In observing Yusef’s scrapbook pages, it is possible to infer that the meanings he conveyed there were intertwined with his lived experiences in Canada.

For instance, when I asked what he liked doing after school, Yusef asserted that he liked being outside. He then added: “I ask my mom and she like: ‘No! Just go watch on the laptop’. And then, like, she says that, when it’s summer, I could play outside” (Interview, March 11, 2020). In a way, this verbatim conversation makes the connection between his multimodal productions and life in the host country. When allowed outside, Yusef enjoyed playing with his neighbours and younger brother. As he stated:

J: Do you play with your siblings outside or when you go outside is just you?

Y: I just play with my neighbours and also my little brother (Interview, March 11, 2020).

To refer to these outdoors experiences in Canada, Yusef depicted waterfalls in two of his scrapbook pages. In describing his productions, he shared a hiking adventure when he came across a waterfall: “When I went to Chilliwack, I used to live there, and then there was a big
waterfall, we went hiking and there a big waterfall” (Interview, March 11, 2020). On the other hand, for the days he was not allowed out, his mother suggested that he watched streaming videos on her laptop. In this context, Yusef’s LEGO model of StarWars spacecrafts (Figure 11) can be understood as reference to the kind of popular culture that he accessed while inside. In describing his artefact, he demonstrated his specific understanding, “This one is a Star Wars spaceship because of the top” (Interview, March 11, 2020).

In this section, I discussed how he showcased his sense of belonging to Canada. In what follows, I explain how Yusef drew on his lifeworld experiences to develop his problem-solving argument while engaged in constructive play.

**Lifeworld Experiences**

Yusef’s engagement in playful practices directed attention to his lifeworld experiences in Canada. As presented earlier, he referred to his hiking experience in Chilliwack, BC, a place he held fond memories of, to contextualize the product of his constructive play (i.e., scrapbook pages, Figure 14).

As well, his production of a hybrid narrative (Figure 11), in which he proposed an interplanetary solution to water scarcity, demonstrates how he drew on his prior knowledge of popular culture (i.e., StarWars) to develop his problem-solution argument. On the one hand, he brought forward his knowledge of StarWars movies by referring to the specific design of spacecrafts and the storyline of an interplanetary battle. On the other hand, regarding his understanding of The Boy Who Harnessed the Wind, Yusef’s plan to tackle water scarcity was associated with the story read in class: extract groundwater to provide for the community.

Both examples illustrate how connecting lifeworld experiences and prior knowledge in constructive play rendered Yusef meaningful possibilities to enhance his academic language
proficiency and science learning. Next, I elucidate Yusef’s identity enactment in constructive play. I illustrate how he played different imagined roles to put forward his problem-solving argument.

**Imagined Identities**

In designing his LEGO model and explaining the rationale behind it, Yusef assumed different imagined identities. He was a community member concerned about water scarcity; a space engineer who designed spacecrafts to find water sources; and he was an astronaut and an interplanetary explorer in search of an essential element to support his community. Like Hassan, Yusef was also a provider and a protector. He designed three spacecrafts to explore unknown planets to supply his people with water. For this exercise, he lived imagined identities all the while learning in praxis.

In the following section, I present Reem’s case. I begin by providing some background information about him before analyzing his engagement in playful practices.

**Reem’s Design**

Reem was a 9-year-old Grade 3 student during the study. He was born in Canada, but his family had migrated from Afghanistan recently. At home, he shared he enjoyed drawing and playing with his baby sister. He added he was also keen on playing online games, but asserted, “I usually do math before I go on any electronics” (Interview, March 11, 2020). When talking to Mrs. Amelia, she disclosed that Reem attended extra one-to-one reading support for three months in Grade 1 and that his language competencies were not yet at grade level (interview, April 1, 2020).

In Mr. Samuel’s class, Reem played a leading role in supporting his peers. Besides being a special helper, he was one of the Farsi language brokers in the classroom. Newcomers who
were not yet proficient in English counted on him to translate instructions. Reem was proud of his role in the classroom and explained:

   J: And how do you feel about helping your friends in Mr. Samuel’s class?
   R: I feel proud and happy about myself.
   J: How do you help them?
   R: I help them by writing or if they don’t know what to do, I tell them what they should do. And if they’re alone, I play with them (Interview, March 11, 2020).

The next sections encompass the analysis of Reem’s engagement in playful practices. I first explain his learning of academic language and science concepts. Then, I illustrate how he foregrounded aspects of his identity through playful practices. Findings are divided into two categories, meaning-making in science and identity performance through play.

*Meaning-making in Science*

Reem engaged in various playful practices to apply his learning about water and its cycle through the environment. He embodied the new language and concepts and interwove modes of communication to transfer and apply the new knowledge. He also produced a hybrid narrative of new knowledge. As a language broker in the classroom, he supported his classmates while learning about the water cycle. Subheadings are organized according to the themes identified for the first research question: a) embodied learning, b) hybrid narratives of new knowledge, c) peer interaction, and d) meaning-making flow. I begin by describing how he embodied academic language and science concepts during the water cycle tableau activity.

**Embodied Learning**

“We were a lake and a sun to make evaporation”
Reem was in Hassan’s group for the tableau performance. In this dramatic play, Reem and his peers embodied the water cycle stages and their elements. He captioned his photo of the water cycle tableau in his scrapbook as *The water tableau* [tableau]. *We were a lake and a sun to make evaporsin* [evaporation] (scrapbook excerpt). Later during our interview, he explained: “I’m the sun and the stage is evaporation, and they were a lake. We made a circle to form the clouds” (Interview, March 11, 2020, my emphasis).

Among the competencies in science that Grades 2/3 students should develop are the ability to co-operatively design projects and communicate observations and ideas using oral or written language, drawing, or role-play (British Columbia, n.d.). Like Hassan and Yusef, Reem developed these competencies while in play and by embodying the target language. He explained how he embodied a state of being – “I’m the sun” – and how he acted out with his peers a water cycle stage – “we made a circle to form the clouds” (Interview, March 11, 2020). In the following section, I illustrate Reem’s hybrid narratives of new knowledge through which he blended distinct genres of school to enhance his academic language proficiency and science learning.

**Hybrid Narratives of New Knowledge**

> “This is an island with a map. And treasure down into the water”

In his scrapbook, it is possible to see how Reem managed to combine different textual genres in a multimodal ensemble. Figure 15 shows his scrapbook cover. There, he referred to the water cycle and situated it by depicting a deserted island. During our interview, he presented his production to me and a classmate, Nick.
J: Do you want to show yours, Reem? Tell us about it.

R: I kinda made the water cycle. Evaporation, precipitation, condensation, and this is runoff. This is an island with a map and treasure down into the water.

J: Do you play any games in which you have islands and treasures to find?

R: Yeah.

J: You do?

N: Which clouds is this?

J: This is not the cloud. This is like the island.

N: Snowy island.

R: Yeah.

J: It’s in the Antarctica, this island (Interview, March 11, 2020).

Reem represented the water cycle and its elements in the most appropriate way. As he elucidated, “I kinda made the water cycle. Evaporation, precipitation, condensation, and this is runoff.” The visual resources he used clearly denote evaporation (blue beads moving up), condensation (blue dots on clouds indicating water droplets), precipitation (larger blue beads
descending from clouds), and collection (blue woven fabric strips and sea life). To contextualize his production, he placed a round-shaped cotton strip on the bottom right corner representing an island that was then interpreted as a snowy island by Nick. In this sense, Reem blended an element of an explanatory text (a diagram) and one of a narrative (a setting) to apply his new knowledge creatively. As this was a hybrid construction where distinct textual features co-occurred, Reem’s multimodal ensemble can be interpreted either as an explanation or a narrative. Nevertheless, his scrapbook cover is evidence of how he interwove visual resources to communicate his intentions.

For this multimodal ensemble, Reem considered the modal affordances of the materials he had to hand (e.g., cotton, pebbles, stickers) to situate and apply his new knowledge. His intentions with his cover, however, were interpreted differently by other texts users. For instance, Nick was intrigued by the cotton ball on the bottom corner and interpreted it as a cloud. I explained that it was an island considering Reem’s justification – “This is an island with a map and treasure down into the water.” In the end, the three of us left with novel interpretations of Reem’s construction. His scrapbook cover became a representation of the water cycle situated in a snowy island in Antarctica.

During our interview, I also attempted to better understand Reem’s motivations to depict an island with a treasure map hidden underneath. As he had mentioned that he played online games after school, I asked, “Do you play any games in which you have islands and treasures to find?” Although he confirmed that he did play games with such setting, he did not provide any specific information about his favourite games. Thus, it is only possible to infer a tenuous connection between his gaming knowledge and his scrapbook cover.
Next, I describe Reem’s peer interactions at play. Findings demonstrate how he enhanced his learning through dialogue and by providing support to recent newcomers still developing fluency in English.

Peer Interaction

“And if they’re alone, I play with them.”

Reem was one of the Farsi language brokers in the classroom and supported his peers in different ways. He elucidated: “I help them by writing or if they don’t know what to do, I tell them what they should do. And if they’re alone, I play with them” (Interview, March 11, 2020). These constant interactions afforded Reem opportunities to learn the target language and science concepts while supporting his classmates.

His learning through peer interaction can be noticed, for example, while he played the dice game with Nimra, a recent Afghani newcomer, and other group table members. For this rule-bound game, Reem took turns with his peers to throw the dice. At each round, he and his classmates interpreted images and read definitions to connect with concepts. More than a player in the group, he was also a language broker.

During the dice game, Nimra strongly counted on Reem to check instructions or written definitions. While they played, translangauging occurred as Reem and Nimra switched between Farsi and English to clarify meaning of images and the written word (field notes, February 24, 2020). In this peer interaction, the cooccurrence of English and Farsi benefitted both students’ conceptualization of the water cycle. While Reem learned by translating definitions to support his peer, Nimra enhanced his understanding and even rebutted Reem’s translation by asking a third person, myself, to check information.
Another example of how playful practices offered Reem opportunities to apply the target academic language and science knowledge through peer interaction happened during the fortune teller game. This practice happened on the third day of this study. Students played with an origami that they completed by writing on it the target vocabulary (i.e., bodies of water and water cycle stages). Figure 16 shows a video screenshot of Reem playing the fortune teller game with his classmate Nick. It illustrates Nick folding the origami and Reem asking “What’s evaporation?” (Video, February 27, 2020).

![Figure 16. Reem and the Fortune Teller](image)

While Nick attempted to define evaporation, Reem queried the role of the sun in this process. When satisfied with Nick’s response, Reem nodded and the game proceeded. In this exercise, learners exchanged ideas to build a shared understanding of the water cycle. They enhanced their learning of language (e.g., sequencers, and compound sentences) and science concepts (e.g., water cycle stages) by asking each other questions. During our interview, they replicated the fortune teller game:

J: Ok, go Reem, choose.

R: Number seven.

J: What is number seven, waterfall?

R: Waterfall.
N: 1, 2, 3, 4, 5, 6, 7.
J: Clouds.
N: Clouds?
[brief interruption as we had to switch rooms].
J: You were going to answer. What are clouds?
R: *When two water droplets connect together and then form the clouds.*
N: Yeah.
J: Many water droplets, right? Many water droplets that connect (Interview, March 11, 2020, my emphasis).

Reem defined clouds – when two water droplets connect together and then form the clouds.” Here, he attempted to form a compound sentence with the support of the subordinating conjunction *when* at the beginning of the clause “when two water droplets connect together.” Reem also included the sequential coordinating conjunction *and then*. Regarding science knowledge, Reem attempted to explain cloud formation as “when two water droplets connect together.” Overall, Reem developed his academic language and scientific knowledge by navigating English and Farsi to support his classmate’s learning and by engaging in dialogue all the while in the context of play. Next, I elucidate Reem’s engagement in a flow of meaning-making across different playful practices.

**Meaning-making Flow**

“*Because I like how it sounds and how it looks.*”

Like Hassan and Yusef, Reem also enhanced language and science by interweaving modes of communication across playful practices. Reem’s water cycle tableau performance is an example of how meaning flowed between two or more modes of communication. First, Reem
and peers discussed which gestures and body positioning to perform during their presentation. At this point, there was verbal negotiation with the three parts offering ideas and exemplifying with gestures. Once arriving at a decision, students then rehearsed before presentations (field notes, March 27, 2020). Finally, they presented the water cycle tableau only counting on gestures and body language to convey the intended meaning. In this exercise, meaning moved from oral to gestural design, rendering Reem distinct chances to think about how water cycles through the environment and to be innovative when applying this new knowledge.

His scrapbook is another example of how meaning flowed across modes. Figure 17 depicts his second scrapbook page. He captioned it as *My Body of water is a waterfall*. During interview, he explained his production.

![Figure 17. Reem’s Waterfall](image)

J: What else do you have there, Reem?
R: My body of water is the waterfall.
J: Why did you choose the waterfall?
R: *Because I like how it sounds and how it looks.*
J: Have you seen a waterfall?
R: I’ve seen in pictures but not in real life (Interview, March 11, 2020, my *emphasis*).

For this multimodal production, Reem construed meaning across a variety of modes and was motivated by multiple senses. On this page (Figure 17), he referred to a waterfall and utilized a variety of materials to structure his artefact. He wrote a caption and depicted his body of water by repurposing a variety of materials. Also, he utilized pebbles to represent rocks found in waterfalls, and, as his group table had run out of cotton, he utilized paper towel to show clouds.

Regarding his motivation to depict a waterfall, Reem’s senses, sight and hearing influenced his act of design. As he elucidated, although he had never seen one in real life, he liked how waterfalls sounded and looked. In this sense, meaning flowed from a sensing experience (i.e., hearing and sight) to a visual text, in which words and multimodal resources co-exist. It can be argued that this interplay of auditory, visual, tactile, and written designs afforded him creative possibilities to apply the target vocabulary (e.g., bodies of water).

On another page (Figure 18), Reem depicted a water cycle diagram. He utilized wool strips and paper towel to represent the water cycle elements. While wool strips characterized bodies of water, water vapor and droplets, paper towel symbolized clouds. He also drew the sun and water droplets. Regarding written text, Reem produced a title to this page, *This is water cycle*; labelled the stages as 1) *evapareson* [evaporation], 2) *condisason* [condensation], 3) *prsutason* [precipitation] and 4) *run off*; and described the stages, 1) *when the water trins in to* [turns into] *gas*, 2) *when the water trins* [turns] *into clowds* [clouds], 3) *when it rains rain snow or hail*, 4) *when the water gos udergroud* [goes underground].
In this production, his understanding of how water moves through the environment flowed from visual and tactile to written design. While explaining the stages in text rendered Reem opportunities to work on the spelling of 5-syllable words like evaporation and precipitation, manipulating wool strips, paper towel and drawing on a white sheet afforded him opportunities to demonstrate his new knowledge creatively. In the following section, I explain how Reem brought into perspective some aspects of his identity through playful practices, and how this can have helped him enhance his learning.

**Identity Performance**

In his LEGO model, Reem shared his sense of belonging to Canada and drew on his lifeworld experiences to propose a solution to a real-world problem. In this context, he enacted imagined identities to support his community and direct attention to food safety, an issue of importance to him. The following subheading accounts for the themes identified for the second research question: a) sense of belonging, lifeworld experiences and imagined identities altogether.
Sense of Belonging, Lifeworld Experiences and Imagined Identities

“I made a plant and then after when it’s growing you could pick up the seeds and maybe make food out of it.”

Figure 19 illustrates Reem’s flowerpot. In his scrapbook, he captioned it as How I can help my community. I made a plant so after they can plant the seeds of the plant to make food (scrapbook excerpt). During our interview, he further explained his production.

Figure 19. Reem’s Flowerpot

J: […] How about you, Reem? Tell us about your project.

R: I made a plant and then after when it’s growing you could pick up the seeds and maybe make food out of it.

J: And then when you thought about this project, did you think about your community here in Vancouver, did you think about your community in…where do you come from again? I forgot.

R: Afghanistan.
J: Did you think about your community in Afghanistan, here, what was the idea?

R: Here [referring to Canada] (Interview, March 11, 2020).

Reem’s LEGO model is an illustration of constructive play in which the meaning maker transformed materials to communicate his intentions. For the construction of his flowerpot, he gathered blocks of similar sizes and shaped them into a coherent ensemble. Then, he organized the pieces in a circle to represent a round pot. To characterize a flower, he used green and red cubes that denoted the idea of a flower stem and petals, respectively. These green and red blocks were centred and higher than those characterizing the flowerpot. In this sense, spatial organization (i.e., spatial design) and colour (i.e., visual design) played a key role in his visual representation.

Reem’s multimodal design makes reference to the practice of harvesting. When presenting his project in class, he explained that his LEGO model was a flowerpot which could inspire more people to plant. These flowers “maybe could turn into food” (field notes, March 2, 2020). To a certain extent, Reem, consciously or not, proposed a solution (harvesting) to a social issue in his community in Canada (food insecurity). According to a report produced by the Provincial Health Services Authority (PHSA) and the British Columbia Centre for Disease Control (BCCDC), over one in 10 BC households (11.8%) experience some level of food insecurity, and approximately 16% of children under the age of 18 reside in households experience some level of food insecurity (PHSA; BCCDC, 2016).

For this exercise, Reem played more than just the role of a student engaging in a school practice. He was a protector, a community member preoccupied with food safety; he was also a gardener, a role he played in his own household. As he disclosed in class, there was a plant pot in every room of his house, and he helped to water and look after them (field notes, March 2, 2020).
In summary, Reem’s LEGO model illustrates how he enacted imagined identities that would allow him to actively provide his community in Canada with food security. In this exercise, he assembled this model by drawing on his in-the-head knowledge of gardening, a common practice in his household. Consciously or not, by designing his LEGO model, Reem positioned himself as a citizen acting in the world beyond school grounds.

The following chapter entails a cross-case discussion of Hassan’s, Yusef’s, and Reem’s engagement in playful practices. I present cross-case themes that link the individual-case findings to the theoretical frameworks underpinning the present research and the recent studies reviewed in Chapter 2.
Chapter 5: Cross-Case Discussion

Introduction

Hassan, Yusef and Reem are Grade 2/3 children from migrant and refugee backgrounds who actively engaged in several playful practices during a science unit of study about water and its cycle through the environment. They played with a dice set made with images and definitions of the water cycle stages, designed a fortune teller origami to play with peers while using the target language and science knowledge, acted out the water cycle through gestures, created LEGO models and explained how they could support their real and imagined communities in withstanding hardship, and produced scrapbooks where they demonstrated their academic language and science learning.

In this chapter, I present a cross-case discussion after analyzing students’ engagement in playful practices separately. I build on the concept of literacy as a social practice (Barton & Hamilton, 2000), the pedagogy of multiliteracies (Kalantzis et al., 2016), conceptions of play (Bergen, 2009; Vygotsky, 1978; Wood, 2019), and identity (Norton, 2016) to better understand how Hassan, Yusef and Reem enhanced their understanding of academic language and science concepts through playful practices. I also examine how they foregrounded aspects of their identities through play. More specifically, I investigate:

1. How do children from migrant and refugee backgrounds enhance academic language proficiency and science learning through playful practices?
2. In what ways do children from migrant and refugee backgrounds foreground aspects of their identities through playful practices in a science classroom, and how does this enhance their learning?
The organization of the cross-case discussion in this chapter emerges from inductive themes identified in individual cases. Two categories, which align with the study’s research questions, encompass the cross-case themes: 1) playful threads of science learning and 2) playful threads of identities. They respond to each research question respectively. Table 4 illustrates how the cross-case themes are divided into the two categories, and how they relate to the individual-case findings.

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Table 3. Cross-case Themes Overview

This chapter is divided into three sections. As the act of doing literacies is not neutral or isolated, I begin by explaining how the combination of the activities proposed for this research and the classroom environment that Mr. Samuel created played a significant role in how Hassan, Yusef and Reem developed their academic language and science learning before discussing the
cross-case themes. This section is entitled ‘A Nurturing and Stimulating Learning Environment.’ In the next two parts, I introduce categories with their corresponding cross-case themes as described in Table 4. For each cross-case theme, I present a discussion of findings in light of the theoretical framework guiding this research and relevant research studies focused on MRBC.

A Nurturing and Stimulating Learning Environment

The lessons Mr. Samuel and I designed subscribed to Street’s (1984) ideological model of literacies that considers the act of doing literacies as context embedded. In this respect and considering MRBC’s education, Due et al. (2016) stress the importance of a caring environment where MRBC can see their identities and experiences fostered in school practice. Taking this into account, it seems relevant to describe where this investigation of MRBC’s children’s learning occurred beyond that provided in Chapter 3.

This research took place at New Vista, a community school on Canada’s west coast that makes every effort to promote multicultural education, tolerance and diversity to students coming from diverse nations. More specifically, I co-designed lessons with Mr. Samuel, in whose classroom the vast majority of students are from migrant and refugee backgrounds. In his lessons, I observed how he embraced diversity, fostered collaborative work and explored the affordances of multimodal resources. Mr. Samuel also encouraged self-regulation and autonomy in his classroom. As he elucidated, “So, they regulate themselves […] I don’t want them to depend. I want them to be more independent […]” (Interview, March 2, 2020).

Naturally, students noticed his efforts to create a welcoming and stimulating atmosphere. Yusef, for example, mentioned how he liked the in-nature decoration – “It’s like made out of wood” – as he referred to the chopped branches around the room (Interview, March 11, 2020). He also stated that the calm atmosphere in class helped him concentrate – “I liked how they [his
peers] all concentrate and not talking, ‘cause I only get to concentrate too’” (Interview, March 11, 2020). It can be argued that this nurturing environment played a key role in how Hassan, Yusef, and Reem learned science. It was a place where their individualities were valued and their diverse backgrounds praised.

Regarding MRBC’s education in the host countries, Tapia (2020) asserts that contextualization of science education can merge learners’ prior knowledge and lived experiences with challenging scientific concepts that are not visible to the naked eye (e.g., cloud formation or liquid water turning into gas). In this sense, the lessons we designed drew on multiple literacies and intended to foreground learners’ background knowledge, social identities, and learning expectations. During unit of study, their act of doing literacies was not “isolated or treated as ‘neutral’ or merely ‘technical” (Street, 1984, p. 1). Instead, their engagement in playful practices foregrounded subjectivities.

Considering that the act of doing literacies does not happen in a sociocultural abyss (Freire, 1972), I argue that a combination of Mr. Samuel’s classroom settings and his management, together with multimodal stimulating activities that we proposed for the unit of study about water rendered Hassan, Yusef and Reem opportunities to contextualize their science learning and bring into perspective their sociocultural backgrounds and lived experiences.

As well, as literacy is a dynamic concept that changes across time and space (Gee, 1996), how the three boys learned about the importance of water to all living things and its cycle through the environment cannot be replicated in the same way anywhere else and at any other time in history. Their interactions and shared literacy practices are unique and pertain to the contexts they were immersed, that is, New Vista Community School and Mr. Samuel’s cohort. However, the lessons learned from investigating Hassan’s, Yusef’s, and Reem’s language and
science learning in such contexts can serve as an example of how nurturing and stimulating learning contexts can play a central role in the education of children from migrant and refugee backgrounds. Next, I respond to the first research question while explaining how the three boys enhanced their academic language and science learning through playful practices.

**Playful Threads of Science Learning**

In this section, I use the metaphor threads to convey the idea of fibers that interweave to form a complete textile. Hassan’s, Yusef’s and Reem’s learning of academic language and science concepts is the textile. While engaged in play, they enhanced and made their understanding of the water cycle distinguishable by weaving three threads: 1) a playful flow of meaning-making, 2) hybrid narratives of new knowledge, and 3) collaborative learning. These threads are the cross-case themes that entitle the following subheadings.

**A Playful Flow of Meaning-making**

Individual-case findings show that Hassan, Yusef, and Reem embodied academic language and abstract concepts and engaged in a meaning-making flow to enhance their understanding of the water cycle through rule-bound games, dramatic and constructive play. As discussed in Chapter 4, meanings flowed from one play activity to another giving rise to multiple modes of communication.

To explain this movement, I will draw a parallel with a literary device, enjambment. In poetry, enjambment is defined as the moving of a thought, sense, phrase or clause from one line to another without a terminating punctuation mark (Baldick, 2015). In the following, I quote an excerpt of Keats’ romance *Edymion* (1818) to explain this literacy device.

A thing of beauty is a joy for ever:

Its loveliness increases; it *will never*
Pass into nothingness; but still will keep

A bower quiet for us, and a sleep

Full of sweet dreams, and health, and quiet breathing. (p. 3, my emphasis)

In the first verses of this poem, the poetic persona claims that joy never ceases to be, and that it cares for us in times of hardship. In this excerpt, lines two, three, and four have no punctuation separating them. The thought in the end of one line runs on to the next (e.g., it will never pass; still will keep a bower quiet for us; a sleep full of sweet dreams), thus creating a sense of natural motion. There are no boundaries impeding meaning to flow across lines.

As discussed in Chapters 2, synesthesia entails the transduction, the interplay between and across modes through which meaning is construed (Jewitt, 2009; Kress, 2010). As if a poem written with enjambment lines, in which one sentence runs into the next without sense coming to a halt, Hassan’s, Yusef’s, and Reem’s meaning-making of academic language and scientific knowledge moved from rule-bound games to dramatic and then to constructive play without interruption. At each playful practice, students navigated a plethora of designs to experience and conceptualize the new knowledge and represent their intentions as meaning makers.

First, rule-bound games, namely the dice and fortune teller game, juxtaposed visual, written, oral and tactile designs. For example, when Yusef played with the dice set (Figure 11), he manipulated artifacts (tactile design), read definitions aloud (oral and written designs), and interpreted images of the water cycle (visual design). Meaning travelled across these designs, with the visual completing the written word and vice versa.

With the support of the same dice, Reem utilized the target language and concepts to help a recent newcomer, Nimra, participate in the dice game. In this exercise, both students advanced their understanding in science through translanguaging. While Reem interpreted a visual text,
read written words in English and orally explained science concepts in Farsi to support his peer, Nimra was able to actively engage in the dice game with his home language, rather than an impediment, being a powerful meaning-making tool.

In another episode, while Reem played the fortune teller with another classmate, Nick, he managed to ask questions about the water cycle and exchange ideas to build a shared understanding (Figure 16). In this peer interaction, meaning travelled from tactile to written and then to oral design. As they played, Reem and Nick read on their fortune teller origamis bodies of water and stages of the water cycle before naming these concepts. As a result of this meaning-making flow, they enhanced language learning (e.g., by utilizing sequencers and compound sentences) and scientific knowledge (e.g., water cycle stages).

In dramatic play, Hassan, Yusef and Reem embodied science concepts and an explanatory text (gestural design) for the water cycle tableau performances (Figures 5 and 10). For this activity, meaning moved from oral to gestural design as group members first discussed what body and hand gestures would best convey their intended meaning. For example, Hassan explained the stages and water states the group embodied: “We’re falling down as snow. This is runoff. We formed as a pond” (Interview, March 10, 2020). Yusef elucidated his groups’ performance, specifically what their hands signified: “The hands, and like the clouds, like they form a big cloud” (Interview, March 11, 2020). Finally, Reem explained how he and his group embodied a state of being and a transitive action: “I’m the sun and the stage is evaporation, and they were a lake. We made a circle to form the clouds” (Interview, March 11, 2020).

In building LEGO models, Hassan, Yusef and Reem transferred and applied their academic language and science concepts to new situations; they also imagined possible ways to resolve problems afflicting their real and imagined communities. The interplay of modes in this
activity helped the three boys put forward their problem-solution arguments. For example, Hassan considered war conflicts in Afghanistan and gathered blocks (tactile design) with the intention to create a haven to protect his people (Figure 9). He explained his production orally (oral design) during gallery walk and again during our interview upon the completion of the unit of study. He also wrote a caption (written design) in his scrapbook to describe his production.

Meanwhile, Yusef merged his specific knowledge about *StarWars* movies and what he learned about *The Boy Who Harnessed the Wind*, especially the process of extracted groundwater to design his unique narrative of water exploration in space (Figure 11). For this exercise, he referred to distinct plots (written design) and manipulated blocks (tactile design) of different sizes, shapes and colours (visual and spatial design) to build his unique LEGO model. Finally, he shared his narrative during gallery walk, all the while interacting with peers who asked him questions about the project (oral design).

In the same context, Reem designed a flowerpot and explained that more people could plant and grow food to support his community (Figure 19). He organized cubes of different colours and sizes (tactile, spatial, and visual designs) to represent a flower stem and its petals, and a round pot sheltering his plant. During gallery walk, he explained his model (oral design) and, later, captioned his multimodal construction (written design).

Regarding the construction of scrapbooks, Hassan’s depiction of a waterfall is an example of the interplay of modes in the design of this visual text (Figure 6). When asked about his motivation to depict this body of water, Hassan asserted: “I really like waterfalls because they like have water going down” (Interview, March 10, 2020, my emphasis). More than moving from one mode to another to understand science concepts, Hassan’s senses (e.g. sight) guided his
multimodal production. He translated a sensation into a hybrid text in which the interweaving of written and visual resources conveyed the intended meaning.

Likewise, Reem’s sight and hearing can have influenced him to draw a waterfall in one of his scrapbook pages (Figure 17). He justified his choice for this body of water: “because I like how it sounds and how it looks” (Interview, March 11, 2020). On other pages, Reem blended visual, tactile, and written modes to explain the water cycle. For instance, he drew and used wool strips and paper towel on his diagram (Figure 18). He completed this multimodal ensemble by describing the process in text. He also added a title to this page, labelled and described the stages (Reem’s scrapbook excerpt). Finally, in his scrapbook, Yusef combined visual resources, such as arrows, beads, pebbles, wool strips, and stickers to represent the importance of water to the environment. He also relied on written design to caption two of his scrapbook pages – Water is good for the plants and Waterfall is important because people and animals can drink (Yusef’s scrapbook).

Considering MRBC’s science education, Miller (2009) contends that a simple translation of abstract concepts is not enough to support ELLs from diverse backgrounds because of gaps in content-area knowledge that arise in part from, for example, the years of schooling lost to conflict and flight. She advocates for the inclusion of multimodal practices that can potentially help learners communicate, represent, and interpret meaning. Specifically, an array of modes, Cowie and Otrel-Cass (2011) explain, can expand the entry points for all primary school-aged students into school science, regardless of their backgrounds. In this context, play can have a significant role in the the learning of MRBC in a science classrool because it “implies a reduction in the seriousness of the consequences of errors and of setbacks” (Bruner, 1983, p. 60). In other words, play can render MRBC who are still developing proficiency in English chances
to make sense and apply their understanding of scientific knowledge through modes that they have access with ease (e.g., gestures and visual texts) in contexts where they do not fear not knowing how to express their thoughts in a yet unfamiliar language.

In this sense, my findings demonstrate the affordances of play in a science classroom, particularly with migrant and refugee-background children. As Fisher et al. (2017) contend, playful practices can be new doorways into subject learning that might not otherwise have been apparent; they can also encourage new mindsets, perspectives, practices and possible new ways into learning. The authors also assert that, through play, teachers are able to move away from dominant print and text-based literacies, and towards the multimodal texts of this century. In engaging in a playful flow of meaning-making, Hassan, Yusef and Reem conceptualized the new academic language and scientific knowledge through different modes, each offering a novel way of making sense of how the water cycles through the environment. Meaning flowed across playful practices (as if in enjambment lines) with learners naming and embodying concepts through games, drama, and arts.

According to the tenets of the pedagogy of multiliteracies, learning by design entails having access to a repertoire of available patterns of meaning – language, imagery, sound, gesture, touch and space – to communicate, represent or interpret the world (Kalantzis et al., 2016). These modes, Jewitt (2009) claims, assume distinct roles in one’s meaning-making process and help designers get their message across. As well, Kendrick (2016) explains that the interplay between and across patterns of meaning (i.e., modes) gives rise to different thinking and makes it possible for the designer to interpret the world through different modes. In this sense, it can be argued that the playful practices that the three boys engaged in opened room for modes to flow into one another, which allowed Hassan, Yusef and Reem to understand the water
cycle through a combination of visual, written, gestural, spatial, and tactile patterns of meaning. Each available design offered distinct entry points to meaning-making. Abstract concepts that cannot be captured with the naked eye, such as the transformation of water droplets into gas, were drawn, written and acted out, thus providing learners different opportunities to develop academic language proficiency and scientific knowledge.

Engaging students in a playful flow of meaning-making may redound to every learner’s academic language and conceptual knowledge in a science classroom, in particular to MRBC adapting to a new culture of schooling, an unfamiliar language, and a novel sociocultural reality. In this meaning-making flow, new science concepts can be introduced in natural motion, with one mode of communication moving on to the other smoothly, thus resembling human’s synesthetic way of learning about the world. At the same time, such playful flow of meaning-making has the potential to transform science learning into a less threatening and perhaps more stimulating learning environment.

**Hybrid Narratives of New Knowledge**

In the last section, I discussed how the three boys engaged in a flow of meaning-making, with new knowledge moving naturally from one play activity to another. While engaged in this flow, Hassan and Reem also produced hybrid multimodal ensembles that featured distinct genres – explanatory texts and narratives – to enhance their learning about the water cycle. Yusef, on the other hand, created an original story by blending two available designs, *Star Wars* movies and *The Boy Who Harnessed the Wind* to propose a solution to a social issue, water scarcity. The three boys’ hybrid narratives of new knowledge were a source of creativity and joy. They were also a means through which the boys experienced different genres of school (narrative, explanation, argumentation) and represented their understanding of the importance of water and
its cycle through the environment. In their hybrid narratives, verbal language was but one of the many communicative resources they had to hand to (re)make, distribute, and interpret meanings. Similar findings were also reported by Early et al. (2015) in their study on multimodality in teaching English as a second language (TESOL). The authors discuss examples of research on this topic, specifically illustrating the impact of multimodal texts on students’ meaning making processes and how non-linguistic modes enabled understanding of difficult knowledge in health education.

For example, Hassan depicted the water cycle in three of his scrapbook pages. His cover (Figure 7) illustrated a body of water, water states, and precipitation. As he explained, “This is like a waterfall; these are bubbles; this is some rain falling; this is hail” (Interview, March 10, 2020). To create a narrative, he utilized a literary device (personification) and a visual resource (a speech bubble) to establish a character in his multimodal text. On this page, a fish was saying it’s cool, which can mean either state of contentment or calmness; it may also denote a body sensation (Hassan’s scrapbook).

Hassan employed the same narrative features (i.e., personification and a speech bubble) to draw a diagram of the water cycle on another page (Figure 8). There, he illustrated an explanatory text with a character narrating the process. For such, he relied on a variety of materials and multimodal resources, namely papercraft, stickers, paper towel, wool strips, drawings, arrows, a speech bubble and written text. On a third page, he created yet another narrative to demonstrate his learning. He situated a waterfall in Afghanistan and set a problem (Figure 6). He drew a boat sailing down the body of water and, through written design, stated a conflict: if boat fall down, they will be died (Hassan’s scrapbook). Likewise, he explored multimodal resources and the materials he had available, such as drawings, stickers, and pebbles.
In creating his scrapbook, Reem also produced a hybrid text by combining explanatory and narrative textual genres. His cover showed a diagram of the water cycle (Figure 15). As he explained, “I kinda made the water cycle. Evaporation, precipitation, condensation, and this is runoff.” On this page, Reem managed to create a setting – another narrative element – to situate his science learning. He explained, “This is an island with a map and treasure down into the water” (Interview, March 11, 2020). He structured his text by utilizing stickers, cotton balls, and wool strips.

Lastly, Yusef shared a unique narrative to contextualize his three LEGO spacecrafts assembled to explore space in search of water sources (Figure 13). For his hybrid narrative, he combined his background knowledge of Star Wars movies, and the story read in class, The Boy Who Harnessed the Wind, to propose a solution to a real-world problem, water scarcity. At the same time, he managed to create a parallel plot for his one-of-a-kind production. In this quest to find water in space, he imagined possible problems and explained his escape plan. In case his spaceships were attacked, at least one could return safely to Earth to supply his community with water (field notes, March 2, 2020).

As Kendrick (2005) asserts, when children create narratives in play, they consciously choose symbols and modes of representation to organize and articulate their thoughts. They create hybrid artifacts through which they repurpose pre-determined and limited meanings of the materials they have to hand so that their interests are “reflected in the sign in the best possible way, in the most plausible fashion, in the most apt form” (Kress, 1997, p. 19). As they redesign meaning from available modes of communication, children rework and ‘revoice’ the world as found (Cope & Kalantzis, 2015). Considering the academic struggles that MRBC with little, no or severely interrupted schooling face in content-area subjects (Dooley, 2009), hybrid narratives
in science learning may be included in teachers’ pedagogic repertoires as an optimal educational strategy through which MRBC can acquire resources to learn about academic language and abstract scientific concepts while still learning basic reading and writing skills.

Hassan’s, Yusef’s, and Reem’s multimodal ensembles demonstrate how they combined and restructured meanings imparted in available designs (e.g., dice set, fortune teller origami, picture books) to form hybrid constructions and enhance their academic language and science learning. On no account were their constructions mere reproductions of what they experienced earlier. Instead, their hybrid texts embedded traces of subjectivity and background knowledge. In the following section, I present the cross-case theme collaborative learning, which explains how Hassan, Reem and Yusef enhanced their learning through dialogue and peer support.

**Collaborative Learning**

Luna Scott (2015) defines collaborative learning as “the intentional grouping and pairing of learners for the purpose of achieving a learning goal” (p. 6). She contends that intentional design, co-labouring of group members and meaningful learning are the three key elements that can foster collaboration in the classroom. She elucidates:

The collaborative learning environment challenges learners to express and defend their positions, and generate their own ideas based on reflection. They discuss their ideas with peers, exchange different points of view, question others, seek clarification, and participate in higher-order thinking such as managing, organizing, critical analysis, problem resolution, and the creation of new learning and deeper understanding. (p. 6)

Since the first weeks of the school year, Mr. Samuel assigned roles geared towards increasing collaborative learning and self-regulation amongst learners. As he explained:
You see, I don’t manage much here. I don’t do micro-management, right? So, they regulate themselves […] I don’t want them to depend. I want them to be more independent […] What you see right now, it was so much work and effort I put in the first two weeks when you have to set the standards and do everything, and like, expectations, those first two weeks were crucial (Interview, March 2, 2020).

One of the roles he assigned was of language brokers. Hassan and Reem supported Farsi-speaking newcomers who had recently arrived at New Vista and whose proficiency in English was still developing. They would translate instructions and aid their peers in school activities. As Hassan explained, they would “[…] invite new people who are not new to our community; make sure they have fun; be nice to them; respect them; be responsible for them; give them stuff that they need (Interview, March 10, 2020). Reem also elucidated, “I help them by writing or if they don’t know what to do, I tell them what they should do. And if they’re alone, I play with them” (Interview, March 11, 2020).

Considering the case of MRBC, studies have shown that these learners’ language skills can be honed in through peer interactions, especially when their home languages are treated as an asset rather than an impediment (Karlsson et al., 2019; Lewis et al., 2012). Through translanguaging, which can be defined as the process of making meaning and shaping experiences through the use of two or more languages, children can mediate understanding, co-construct meaning, show knowledge, and include those learners who are not proficient speakers in the host country’s language (Garcia, 2011). Specifically in science learning, Karlsson et al. (2019) found that translanguaging can help students from diverse backgrounds relate and contextualise the science content with their lived experiences.
In this sense, Hassan’s, Yusef’s and Reem’s interactions with peers through playful gave rise to translanguaging, with learners’ home language used as an asset rather than an impediment (e.g., Reem and Nimra playing the dice game). In engaging in dialogue and peer support, the three boys sought clarification of verbal and non-verbal meanings (dice game), asked one another question (fortune-teller game), discussed ideas and engaged in higher-order thinking (water cycle tableau), and re-designed their understanding of new knowledge (LEGO models and scrapbook design).

The outcome of Hassan’s, Yusef’s and Reem’s collaboration relates to Vygotsky (1978)’s zone of proximal development. The pedagogical movements proposed for the classes aligned with the existent collaborative environment in Mr. Samuel’s class opened space for peers to interact and enhance their academic language and science learning together. On the one hand, Hassan and Reem advanced their understanding of the water cycle by serving as language brokers to help recent newcomers by translating concepts from Farsi to English. The search for words or best ways to describe the stages gave rise to higher-order thinking and consequent development of competencies. On the other hand, the interactions that the three students engaged in during rule-bound games, dramatic and constructive play allowed them to share understanding and achieve common learning goals.

The peer collaboration observed in this study also foregrounds literacy development. As Barton and Hamilton (2000) contend, “literacy practices are more usefully understood as existing in the relations between people, within groups and communities, rather than as a set of properties residing in individuals” (p. 8). While engaged in playful practices, the three boys transformed or had their literacy practices (i.e., set of beliefs, feelings and attitudes towards the printed word) changed. Concepts like precipitation or runoff were not abstract codes to be deciphered and
written on an exam. During rule-bound and dramatic play, Hassan, Yusef and Reem negotiated meanings and developed their literacies through dialogue and peer support.

The collaborative environment that Mr. Samuel established in his classroom could be noticed in learners’ engagement in playful practices. For example, regarding the water cycle tableau presentations, Mr. Samuel asserted:

That’s great! Even students much familiar with drama, *they were kind of taking the leading role and helping other students […] we didn’t give out much instructions and they came up*; it worked out perfectly. No one made a mistake; a couple of times people were really confused. However, they didn’t make, the first 4 groups, they didn’t make any mistake. So, it’s like they had been doing that for quite a while (Interview, February 26, 2020, *my emphasis*).

As Mr. Samuel stated, students took on different roles within their groups and co-designed performances without much support from teachers. By collaborating and sharing their understanding of the water cycle, learners managed to transfer and apply new knowledge to drama productions.

The first research question that the present research addressed was: How do children from migrant and refugee backgrounds enhance academic language proficiency and science learning through playful practices? Cross-case findings discussed in this chapter suggest that learners enhanced their learning by engaging in a meaning-making flow of science learning, with various playful practices offering different entry points to academic language proficiency and scientific knowledge; by creating hybrid narratives of new knowledge, through which Hassan, Yusef, and Reem blended school genres to demonstrate their science learning; and through collaborative learning, with leaners experiencing translanguaging and sharing their
understanding of the water cycle while engaged in play. In the next section, I respond to the second research question by explaining how Hassan, Yusef and Reem created playful threads of identities to enhance their learning in a science classroom.

**Playful Threads of Identities**

In playful threads of science learning, I utilized the word threads to denote the idea of lines that interweave to form a complete ensemble. By drawing on this notion, I explained how Hassan, Yusef, and Reem construed new knowledge in science by engaging in a playful flow of meaning-making, by creating hybrid narratives of new knowledge, and through collaborative learning.

In this section, I utilize the term treads to denote the idea of a storyline. Play, according to Geertz (1973), “is a story the players tell themselves about themselves” (p. 237). In this sense, findings suggest that Hassan, Yusef, and Reem told stories about aspects of their real and imagined selves while engaged in playful practices in a science classroom. Through threads of identities, the three boys reinforced their sense of belonging, drew on lifeworld experiences to enhance their learning, and were resilient and creative citizens. Subheadings are organized according to cross-case themes 1) foregrounding belonging(s) and b) being resilient and creative citizens.

**Foregrounding Belonging(s)**

The meaning of the term belonging(s) employed here is twofold. The singular noun means belongingness, or, in other words, it entails the feeling of being legitimate and worth within particular social groups (Duff, 2011; Norton, 2016). On the other hand, the plural noun belongings denotes the idea of possessions, the things that individuals own and carry with them at a particular time. Although the term is closely associated with concrete artifacts, I use it here
to refer to unobservable lifeworld experiences, interests, aspirations, and one’s in-the-head knowledge (Cummins & Early, 2011).

Neither our sense of belonging or our lifeworld experiences (belongings) are stable concepts. They are constantly (de/-re-) constructed “in the course of participation in socially organized activities” (Scribner, 1984, p. 8). In other words, they are continuously reshaped by how people build their relationships within and across different sites at distinct moments in time (Norton & Toohey, 2011). As well, both concepts have embedded within tense power relations (Street, 1994). It is through constant negotiation, where dominance and resistance co-exist, that our sense of belonging is legitimate, and that our lifeworld experiences and background knowledge is validated (Norton & Peirce, 1995).

While learning about the importance of water and its cycle through the environment, Hassan, Yusef, and Reem foregrounded their sense of belonging to their home or Canada in different ways. Hassan, for example, showed enthusiasm for being Afghani. As he explained, he preferred to speak Farsi and only spoke English at school because it was easier to communicate – “It’s like if you don’t know a word and if you know it in Farsi how are you going to commu… [cate].” When I asked what he watched on TV, Hassan asserted, “I just search for Afghani songs and cartoons. Afghanis stuffs.” To legitimate his Afghani identity while engaged in playful practices, Hassan managed to situate his productions in Afghanistan. In his scrapbook, he depicted a waterfall which he also situated in his homeland. He captioned the picture as The waterfalls in Afghanistan is beautiful (Hassan’s scrapbook).

According to school files shared by the community school coordinator, Yusef arrived in Canada with his family as refugee claimants. He first attended Kindergarten in Chilliwack, BC before moving to a neighbourhood near New Vista community school at Grade 1. Yet, when
interviewed, Yusef stated that he had been born in Canada and, for this reason, was not fond of speaking his home language, Tigrinya (Interview, March 11, 2020). As stated in the British Columbia guideline that discusses means to support students from refugee backgrounds (2015), there are four stages of adjustment for resettled learners. In one of them, the home stage, students may demonstrate proficiency with both their first language and with English; they may also show acceptance and identification with the host culture, without giving up on original identity.

Yusef’s statement to be born in Canada can be understood as evidence of his sense of belonging to the host country. He identified himself as Canadian and preferred English to his home language Tigrinya. At the same time, when I asked what language he spoke at home, he stated, “I speak my language” (Interview, March 11, 2020, my emphasis). The use of the possessive adjective my can be evidence that he did not give up on his Eritrean identity.

Two of Yusef’s scrapbook pages can also be understood as his attempts to foreground his sense of belonging to the host country. He depicted waterfalls and stages of the water cycle. When I asked if he had ever seen that body of water, Yusef recalled his hiking experiences in Chilliwack: “When I went to Chilliwack, I used to live there, and then there was a big waterfall, we went hiking and there a big waterfall” (Interview, March 11, 2020). Drawing a parallel with Hassan’s waterfall in Afghanistan, it can be argued that both Yusef and Hassan enacted their identities by situating their literacy events in the places they feel more legitimate.

Regarding belongings (i.e., lifeworld experiences), Hassan drew on his lived experiences or knowledge about ongoing wars in Afghanistan to make a haven to protect his people from current wars in his home country. He justified his production: “I wanted to build a big house that is super invincible because they still have wars in Afghanistan” (Interview, March 10, 2020).
As for Yusef, he created a hybrid narrative that featured his interest in *StarWars* movies. He managed to blend new knowledge with known information to build LEGO spacecrafts and represent his contribution to his community. This connection between the known and new knowledge can be understood in two ways. First, when he elucidated that his spacecrafts were *StarWars* ships “because of the top”, he demonstrated specific connoisseur of these popular culture elements (Interview, March 11, 2020). He contextualized his unique narrative by drawing on space battle plots that commonly feature in *StarWars* productions. On the other hand, regarding his understanding of The Boy Who Harnessed the Wind, Yusef’s plan to tackle water scarcity was associated with the story read in class: extract infiltrated water from the ground to provide for the community.

Meanwhile, Reem contextualized science concepts in his scrapbook cover by placing an island made out of cotton on the bottom right corner of the page and a map sticker below. When I asked whether he played online games featuring deserted islands and treasure hunting, he confirmed. He did not, however, specify any particular game with this setting. Yet, his production may be an inference to one of his home practices, online gaming after homework. As he explained, “I usually do math before I go on any electronics” (Interview, March 11, 2020).

Finally, Reem’s LEGO model of a flowerpot (Figure 19) is an example of how he showcased his sense of belonging to Canada and drew on his lifeworld experiences. During constructive play, he justified the construction of a LEGO flowerpot by highlighting his home practice of looking after plants placed in every room of his house (field notes, March 2, 2020). When asked whether his project responded to a problem in Afghanistan or Canada, he pointed to the latter (Interview, March 11, 2020).
Considering MRBC’s literacy education, a focus on their belonging (s) is capital. As other studies have shown, whether it is their sense of belonging to particular social groups (Correa-Velez et al., 2010) or the legitimacy of their in-the-head knowledge (Cummins et al., 2015), capitalizing on MRBC’s belonging(s) can foster their investment (Darvin & Norton, 2015) in learning a language and content-area knowledge. In Hassan’s, Yusef’s and Reem’s cases, findings suggest that they foregrounded their belonging(s) through playful practices to enhance academic language and science learning. They were invested in transferring and applying their learning when playing the dice and fortune-teller games, acting out the water cycle tableau, constructing their LEGO models and scrapbooks. In this context, play rendered the boys opportunities to draw on aspects of their identities to transform the world according to their desires (Bruner, 1983).

Bruner (1983) explains that, when learning unfamiliar subjects through play, “we interiorize the external world and make it part of ourselves” (p. 61). In this context, we “act out of a certain interest in the environment in which we are, and that in our making of signs, that interest is reflected in the sign in the best possible way, in the most plausible fashion, in the most apt form” (Kress, 1997, p. 19). Aspects of our identities permeate this (re-/de-) construction of meaning. As a result of incorporating our lived experiences, beliefs, and background knowledge to the learning of new information, we transform ourselves and make the world anew.

For MRBC, this exercise of making the external world a part of themselves can be mediated by playful practices. In a science classroom, for example, at the same time that they interiorize academic language and conceptual knowledge by engaging in rule-bound games, they can reflect on who they are and their sociocultural backgrounds to produce identity texts that generate insight about their social and personal realities. Consequently, learners can legitimate
their in-the-head knowledge and direct attention to practices pertaining to their particular social groups.

**Being Resilient and Creative Citizens**

In the last section, I discuss how engaging in a plethora of playful practices rendered Hassan, Yusef and Reem opportunities to draw on their belongings to enhance their academic language proficiency and science learning. In this part of the chapter, my intention is to illustrate how they enacted agentic imagined identities to engage in problem solving. In this context, they were resilient and creative citizens.

Kalantzis et al. (2016) draw on perspectives of critical literacies and define citizenship as a participatory process of meaning-making in which the learner draws on background knowledge and lived experiences to participate in society, to offer solutions to problems afflicting community members, and to make others aware of these issues. Maia (2009) subscribes to this view and adds that citizenship is a “holistic experiential opportunity for youth to reflect on their life trajectories and on the meanings of their actions” (p. 16). Such actions, Hargreaves and Hartley (2016) define as creative acts of citizenship that “make or produce something new, and in parallel induce a critical reflection on political, social or cultural issues” (p. 258). The result of these acts, Zamenopoulos, et al. (2016) argue, can have an impact on both the community and the citizen.

Resilience can be understood as “an individual’s ability to bounce back from adversity” (B.C. Ministry of Education, 2015, p. 14). A resilient child is skilled at problem-solving, socially competent, self-confident and autonomous, and has a personal sense of purpose and future (Hutchinson & Dorsett, 2012). Studies with students from diverse backgrounds found that such characteristics can be nurtured by trusting relationships (Brok et al., 2010; Suárez-Orozco et al.,
Taking these two views into consideration, it can be argued that, while engaged in playful practices, Hassan, Yusef, and Reem were resilient and creative citizens. They enacted multiple imagined identities to share their intentions to provide their communities with housing, food and water security and protection. As they developed a problem-solution argument, there is a likelihood that playing these roles enhanced their academic language proficiency and science learning.

For example, Hassan was a builder or an engineer willing to protect his people from ongoing wars in Afghanistan by building a safe haven. His eagerness to complete his project can be seen in how he explained the design process – “I kept looking for pieces that can connect, I had some swords to protect the people. And I got a van and a house for free” (Interview, March 10, 2020). Meanwhile, Yusef was an astronaut and an explorer who cruised space in search of water sources to secure this vital element to his community. To cope with adverse circumstances, he proposed an escape plan in case his spacecrafts were attacked. As he explained, two of them would remain in combat so that the third could return to Earth and secure water supply (field notes, March 2, 2020). Lastly, Reem was a gardener willing to plant and collect crops to feed those in need. As he justified, “I made a plant and then after when it’s growing you could pick up the seeds and maybe make food out of it” (Interview, March 11, 2020).

Overall, Hassan’s, Yusef’s and Reem’s LEGO models can be understood as creative acts of citizenship. Their problem-solution argument zeroed in on what seems to be their first and foremost priority, safety, a natural human need (Maslow, 1988). They closely considered problems afflicting their real or imagined communities, such as ongoing wars in Afghanistan,
water scarcity, and food insecurity in Canada. As well, the three learners were resilient and creative citizens while engaged in play. They imagined possible roles in possible worlds (Kendrick, 2005) to transform the conditions in their real or imagined communities (Ginwright et al., 2005; Norton & Pavlenko, 2019). They played the part of a builder (Hassan), an astronaut and explorer (Yusef), and of a gardener (Reem).

In this sense, a first lesson learned from the three boys’ engagement in constructive play is that, when developing MRBC’s literacy education, in particular of those who may have experienced abrupt changes in their country of residence, family dynamics, or social status, teachers’ attention is prone to be directed to needs and demands that exceed their classroom borders. However, this should not sound at all discouraging or as trigger to label learners from such backgrounds as lacking the will or conditions to succeed (Bal, 2014). To respond to MRBC’s socioemotional, psychological, and financial hardship, studies have shown that a wrap-around approach through which schools strengthen partnerships with other schools and with agencies can enrich shared knowledge, resources, and expertise to cater to MRBC’s social, emotional, and educational needs (Hamilton & Moore, 2004; Block et al., 2014).

A second and topical lesson from Hassan’s, Yusef’s, and Reem’s multimodal productions is that, by making room for the production of identity texts in whichever subject area, teachers can nurture acts of creative citizenship and ergo resilience. Learners can draw on background knowledge and lived experiences to develop alternative solutions to adverse circumstances (e.g, ongoing wars, water scarcity, and food insecurity). As a result, they can be autonomous, goal driven, and develop interpersonal skills and academic language proficiency to communicate their ideas.
When asked in what ways children from migrant and refugee backgrounds can foreground aspects of their identities through playful practices in a science classroom, and how this may enhance their learning, findings suggest that, by creating identity texts, learners can strengthen a sense of belonging, draw on lifeworld experiences (belongings), and be resilient and creative citizens. Capitalizing on these threads of identities can help these children make content-area learning meaningful by bridging the gap between formal schooling in the host country and their lived experiences. It may also help them take up an agentic stance to respond to adverse circumstances outside school grounds in their real or imagined communities.

In the following, I introduce a summary of my findings, implications and limitations of this study, and point to possible further research that the findings of this investigation may lead to. I end this paper by presenting my final considerations.
Chapter 6: Conclusions

Summary

Given the challenges that MRBC face to make sense of academic language and abstract concepts in content-area classrooms and to have their lifeworld experiences legitimated as assets, this study aimed to investigate how MRBC could enhance their learning and foreground aspects of their identities in a Grade 2/3 science classroom through a plethora of playful practices. Specifically, I examined:

1. How do children from migrant and refugee backgrounds enhance academic language proficiency and science learning through playful practices?
2. In what ways do children from migrant and refugee backgrounds foreground aspects of their identities through playful practices in a science classroom, and how does this enhance their learning?

Findings suggest that Hassan, Yusef and Reem enhanced their academic language and science learning by 1) engaging in a playful flow of meaning-making, in which the new knowledge flowed in natural motion from one playful practice to another; 2) by creating hybrid narratives, which comprised elements of distinct textual genres or a blend of storylines that gave rise to authentic multimodal productions; 3) and through peer interaction. In designing multimodal identity texts, they also developed their language proficiency and scientific knowledge by foregrounding a sense of belonging to their home or host countries, legitimating their lifeworld experiences (i.e., belongings), and being resilient and creative citizens.

Implications

These findings have significant pedagogical implications that can help educators adapt their teaching practices to cater to the academic needs of MRBC in mainstream classrooms. First,
this study demonstrated that, when provided with meaningful play activities, MRBC (re-/de-) construct their existent knowledge and repurpose the available resources they have to hand to create authentic artifacts and demonstrate their understanding of new information. As well, affording MRBC a plethora of playful practices to learn a given content-area concept can help them access this knowledge through a variety of modes of communication which do not necessarily depend on verbal language to exist.

A second pedagogical contribution of the present research concerns the practices designed specifically for this investigation. Findings showed that adapting playful practices to content-area subjects such as science can give rise to synesthetic learning and make space for language diversity as students may experience translanguage while engaged in play. Such adjustments may also open doorways to the production of identity texts through which MRBC can develop a sense of belonging to a particular social group, legitimate the wealth of their lifeworld experiences, and enact agentic identities.

The present research also contributed to the relevant scholarship on supporting the literacy education of ELLs in content-area subjects as it attempted to responded to a gap in the literature about how MRBC aged 8 to 12 years develop their academic language proficiency and science learning through playful practices in Canada. The language and literacy education of this group of students – specifically learners from refugee backgrounds – in such context has not been thoroughly investigated.

Regarding theoretical implications, findings in this study discuss the notion of meaning-making flow across playful practices, a concept that attempted to account for the teacher-guided play activities proposed to help MRBC enhance their academic language proficiency and science learning through various play-based activities. This notion rose from the combination of the
theoretical frameworks guiding this research, particularly the integration of play to the pedagogical repertoires proposed by the NLG in the pedagogy of multiliteracies. Having access to these two theoretical lenses made it possible to address learners’ thinking-in-action processes and transform science learning into a ludic and engaging experience. As well, this study also demonstrated that analyzing MRBC’s meaning-making with the support of the theory of identity and the concept of literacy as a social practice can help teachers notice the wealth of knowledge and lifeworld experiences that children bring to the classroom and capitalize on these belonging(s) to enhance students’ learning and identity enactment.

**Limitations of The Study**

A first consideration to make regarding limitations of this study concern the exceptional circumstances during which it was conducted. Due to the COVID-19 pandemic, schools closed soon after Spring Break 2020 when I finished a first round of interviews with students. The original design of the unit of study under investigation also suffered alterations to meet time constraints. Taking all this into consideration, I acknowledge that further investigation of learners’ backgrounds and lifeworld experiences could have broaden my understanding of the interests that may have motivated their multimodal productions.

This thesis is limited in scope as it considered the case of only three male children from migrant and refugee backgrounds studying in a Canadian mainstream classroom. Due to school closures and the anticipated conclusion of data generation, I could not gather enough information to provide a detailed account for the playful practices of the two girls with consented participation. Thus, I acknowledge that a longer period of investigation could have expanded the scope of this research by making it more gender-diverse and with more accounts of other students’ playful practices.
I also recognize that playing both the role of a researcher and of a teacher may have hindered more effective data generation procedures despite my efforts to rely on memory-checking devices and field annotations at the end of each class and interviews. At the same, I believe that having played both parts rendered me a realistic experience of teaching children from migrant and refugee backgrounds. In this sense, what I reported in this study can be understood as a fleeting glimpse at real-world pedagogical practices in a mainstream classroom with students from such backgrounds.

**Further Research**

This investigation occurred amid the COVID-19 pandemic that forced teachers to close their physical classroom doors and open cyber spaces to proceed with school activities. Consequently, educators were prone to redesign their pedagogical practices and students led to reshape their learning strategies within online environments. On the one hand, this abrupt transition has possibly widened the gap between those who have access to digital media and technology and those who do not. On the other hand, the imminence of transferring education to online platforms may have approximated school practices to 21st century literacies. In this context, further research would entail observing in what ways a plethora of playful practices could be adapted to the digital world as a means to support 21st century education of students from migrant and refugee backgrounds who, apart from overcoming disruption in their formal education and sudden change in their sociocultural status, have now to adapt to yet another schooling reality.

**Final Remarks**

In his seminal work, late Gunther Kress offered some precious advice to those on the never-ending journey of rethinking the paths to literacy – “my strategy is, as it has been for many
others before me and now, to trust children; and to try to see by a close look at their actions what I might come to learn” (Kress, 1997, p. 3). In this study, my hope is that I have been able to share the invaluable lessons that I learned from Hassan’s, Yusef’s, and Reem’s actions at play. They have taught me that, despite whatever adverse circumstances on the way, children can and will find in the small things, no matter their size or significance, a means to learn, to help, to belong, and to leave their legacy of transformation in the world. It is on us, adults, the responsibility to heighten our attention and keep reimagining play, the arts, the digital, or any combination of these worlds to scaffold, whenever possible, children’s threads of learning and identities.
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Appendix A – Semi-Structured Interview with Students

1. What language do you speak at home?

2. Do you usually read with your family at home? What do you read? Do you play games? Which ones? Phone? TV?

3. What do you usually do after school?

4. What do you usually do on the weekend?

5. What did you like best about our unit of study about water? If you close your eyes and think about the water unit, what activity will come to your mind?

6. Body of water – what is this? Why did you choose to make a ___? I see you wrote something there. Can you read? Why did you choose this one?

7. Let’s play the fortune teller.

8. Can you show me your water cycle? What is this here?

9. Let’s watch your performance. Can you tell me what was happening here?

10. Now your project. How did you come up with this idea? How does it relate to water? How does it relate to your life?

11. Explore drawings.

12. What do you like about Mr. Samuel’s classroom? How do you feel there? E.g. lights, friends, activities.
Appendix B – Mr. Samuel’s Classroom
Appendix C – The Dice Game Template

Precipitation
When the droplets in the clouds become too big and heavy to stay in the air, water droplets fall back to Earth as rain, hail (ice), sleet (rain and snow), and snow.

Evaporation
The sun is hot and makes the water in bodies of water warmer. This water changes from liquid into gas (vapor).

Condensation
Water vapor rises into the air, but it’s cold up there. Water vapor turns into tiny droplets of water and ice.

Clouds
When tiny droplets join together, clouds form. As more and more droplets stick to each other, they grow bigger and bigger.

Groundwater
Water falls on land and seeps down underground. You can get groundwater from wells.

Run-off
Water falls on land and runs off to bodies of water, such as rivers, lakes, ponds and the sea.