Spatial and Collective Learning through Mobile Sensory Photography and Creative Cartography

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ABSTRACT

Spatial and Collective Learning through Mobile Sensory Photography and Creative Cartography

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This dissertation explores how the educational tools of mobile sensory photography and creative cartography can be used in art education settings to encourage youth to attend to their everyday surroundings. *Mobile sensory photography* utilizes the connectivity of mobile devices to enable learning collectives to create and share photographs of their everyday surroundings. I anchored this process in Sensory Studies as a strategy to engage learners with the everyday places they inhabit. I use *creative cartography* as an umbrella term to describe a diverse set of practices that use maps to represent subjective, social, collective, political, and spatial experiences. A central question I examine is what kinds of spatial and collective learning occur when integrating these tools in art classrooms. My understanding of spatial and collective learning is rooted in the complementary theoretical frameworks of complexity thinking and spatiality, which regard learning as social, relational, and situated within existing spatio-temporal relations. I used the methodology of Design-Based Research (DBR) to integrate these tools in high school art classrooms. I worked collaboratively with two art teachers at two different schools in Montreal to design and test a series of educational activities that involved taking sensory photographs of everyday places and sharing these images on social media and online mapping networks. By analyzing student and teacher interviews and their artistic productions, I was able to develop pedagogical strategies and a spatial theoretical framework for using mobile devices to enrich teaching and learning in art classrooms. This research has convinced me of the pertinence of attending to the spatial and temporal dimension of teaching and learning in physical and online spaces, and the symbiotic relationship between photography, the senses, and place-based

learning. I also found the particular form of creative cartography that I termed *Collective Online Sensory Mapping* (COSM) to be a powerful tool for enabling a group of learners to attend to their everyday surroundings, express their identities, and learn about others.

Keywords: Mobile sensory photography, creative cartography, spatiality in education, senses in Art Education

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Dedicated to Fumi& Ren

PREFACE

My geographic journey on planet Earth began in the small university town of Arak, which is situated about a 3 hours drive southwest of Tehran, Iran. This is where my parents met as university students. During my early years, we moved from Arak to Tehran to my mother's hometown of Rasht to my father's hometown of Mashhad. In 1989, my family decided to leave Iran in search of better lives abroad. We spent a year in Ankara, Turkey while applying for refugee asylum with the United Nations. This was one of the best years of my life because I did not have to go to school, and I could idle the days away by playing with my brothers and watching cartoons and soap operas on Turkish television. Through the UN's selection process, which still remains a mystery to me, we were selected to settle in Canada. Our first Canadian home was in Calgary, Alberta. Eventually, my family decided to move to Toronto because of the presence of a large Iranian community. Being connected to a community with a shared culture was as essential for us as it is for the majority of humanity. The Greater Toronto Area was my home for most of my adolescence, and also the place that shaped my adult consciousness in significant ways. For one, the notion that people from all over the world can live together, and be enriched by their encounters with multiple cultures seemed natural to me for most of my adult life. In recent years, I have been shocked to discover that this poses an existential threat for many. As a young adult, I became restless and felt an unrelenting desire for more migration. I believe my childhood experiences formed my hungry for trekking across the globe. This led me to Japan, where I live and worked as an English teacher for three years. This experience instilled in me a passion for teaching, as it became clear that this activity was a profound and meaningful way of connecting with others. Eventually, I ended up in Montreal to do my graduate studies. At the time of writing, I am a resident of Verdun, which is a middle-class borough on Montreal Island.

Where I have been reveals so much about who I am. My journeys across the globe are always implicated in how I perceive my surroundings and interact with those who inhabit these spaces. These ideas are at the core of this dissertation. I believe there is immense value in creating art to connect learners to their surroundings, and sharing art to express one's unique perspectives and identities. I have become convinced that the highest purpose of education is to create encounters with alterity. Thus, I am inspired by the notion that through making and sharing of art, one can create genuine opportunities for encountering the perspectives, lives and personal narratives of others. For this dissertation, I used mobile sensory photography and creative cartography for this purpose. At the heart of this approach, there is a desire for me to make connections with others, and also create opportunities for learning collectives to encounter the unique perspectives of their peers in relation to local places and global space.

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CHAPTER 1— INTRODUCTION

I investigated how the mobility, networking and mapping capabilities of smartphones could be utilized in art and media classrooms to encourage youth to attend to their everyday surroundings. I utilized Design-Based Research methodology to design, test and re-design a curriculum for mobile sensory photography and creative cartography for art education settings. I refer to this curriculum as the "Map My World Project." By conducting research in the real-world settings of art classrooms, I was able to test the efficacy of this curriculum, develop pedagogical strategies, and contribute to theories for using mobile devices to enrich teaching and learning in art classrooms.

This research is anchored in the complementary theoretical frameworks of complexity thinking and spatiality, which regard learning as social, relational, and situated within existing spatio-temporal relations. My philosophical assumption is that the understanding and representation of place and space are value-laden, and spatial representations have consequences for individuals and societies. I have been attentive to the multiple layers of the subjective, interpersonal, social, cultural and political factors that shape the teaching and learning that occurred during this research. In education, mobile devices offer new possibilities of learning and teaching that amplify connectivity to spaces and others. My goal has been to utilize the mobility, connectivity, photography and mapping functions of these devices for the purposes of collective and spatial learning.

Statement of Problem

Mobile media enable ubiquitous and asynchronous connectivity to vast social, political, cultural and educational networks. With a smartphone, I can access the news, browse my friends' Facebook pages and read about their political views, send a text message to coordinate meetings, use a map to get directions to the meeting spot, research information on Wikipedia, and play

games—anytime and anywhere. This capacity for ubiquitous connectivity is an undeniable aspect of contemporary life in many parts of the world today. In the United States, a recent Pew Study found that 92% of teens go online daily largely due to the availability and convenience of their smartphones (Lenhart et al., 2015). In a recent Canadian survey of grade 4 to 11 students, it was found that 99% of the students accessed the Internet outside of school, and a larger portion of students owned smartphones than ever before (Steeves, 2014). These trends seem to indicate the connectivity enabled by mobile computing is having a profound influence on the lives of young people today. In this contemporary context, it is time that educators conceive of effective methods to integrate mobile technology into the learning process in meaningful ways.

In Education, proponents of mobile learning, or mLearning, have argued that these devices enable educators to extend learning beyond the context of traditional classrooms and bridge the gap between formal education and informal learning contexts (Trentin & Repetto, 2013). Many of these discussions on the integration of technology in education are grounded in theoretical frameworks of learning. For instance, Cochrane and Bateman (2009, 2010) situated mLearning within a social constructionist paradigm, which makes the learners' experiences and the social connections the focal points of learning. While experiential and social learning are key for developing educational interventions that effectively integrate mobile devices in education, the mobility and ubiquitous connectivity of mobile devices also offer new possibilities for learning and teaching that go beyond these paradigms. In this research, complexity thinking and spatiality provide the theoretical frameworks for learning and teaching to account for the affordances and limitations of mobile devices in education.

Statement of Purpose

I collaborated with two High School art teachers, and 60 of their students, to develop educational tools, processes, and strategies for using smartphones in art classes for the sake of

learning. This dissertation expands on the MonCoin research project (Akbari, Castro, Lalonde, Moreno, & Pariser, 2016; Castro, 2019; Castro, Lalonde & Pariser, 2016; Lalonde, Castro & Pariser, 2016; Pariser, Castro & Lalonde, 2016), which is a visual art education curriculum and research that utilizes mobile devices to foster engagement with youth's education through increased mobility, peer networked learning, and positive identity construction. For this dissertation, I focussed specifically on developing teaching and learning strategies that use mobile sensory photography and creative cartography to connect learners to their everyday spaces, and others inhabiting these spaces. I based my conceptualization of everyday spaces on literature from Visual Culture in Art Education, Place-Based Education, Sensory Studies, and the Sensory Curriculum. During the fieldwork in the two art classes, the theme of the senses proved to be an effective means of engaging learners with their everyday spaces. I also examined various cartographic practices that exploit the power of maps to represent subjective, interpersonal, social, cultural and political realities. This includes literature on critical, Indigenous, collective, and narrative cartographies. I also drew inspiration from creative cartographers and locative artists, who use mobile devices to create new kinds of encounters within space.

This body of literature inspired me to develop the pedagogical tools of mobile sensory photography and creative cartography. I integrated these tools in a curriculum of "Map My World," which I ran in two different art classrooms in collaboration with the teacher. My analysis of data collected during the fieldwork has provided valuable insights into the affordances and limitations of these tools in educational contexts. The pedagogical tools made learners notice, become aware, and pay attention to their everyday environments. Learners also described learning about their peers and their class as a collective because of sharing photographs on the social media and mapping platforms. It was evident that mobile sensory mapping and creative cartography were effective in connecting these learners to their everyday spaces, and the people

who inhabit these spaces. The outcomes of this research will be discussed in relation to three main themes: spatiality, creative cartography, and sensory photography.

Terminology

Mobile Sensory Photography

I use this term throughout the dissertation to connote the specific way photography was integrated into this curriculum. Mobile refers to the use of smartphones for photography. This is distinct from traditional photography because we carry these devices in our pockets for multiple purposes. This ubiquity enables one to do photography anytime and anywhere. Another key distinction is the ability to share images through various means, such as social media. On social media, images are a form of communication. These aspects of mobile photography were integral to the curriculum.

The theme of the senses was another integral element. I used this theme as a strategy to meet the goal of this research to connect learners with their everyday spaces, and I found that the senses and photography have a strong and productive symbiotic relationship. This theme motivated learners to apply photographic skills, and also to pay attention to details in their everyday surroundings. These ideas are discussed in the literature review and Senses and Photography chapters.

Creative Cartography

I use this term to describe a diverse set of practices that use maps for the representation of subjective, social, and political experiences, which includes critical, Indigenous, collective, narrative, and artistic cartographies. These practices will be discussed in detail in chapter 2. The particular form of creative cartography I found most effective in my research is what I have termed “Collective Online Sensory Mapping” (COSM). I used the online mapping platform of Google My Maps with the art classes to develop a collective online map of the senses in their

neighbourhoods. This tool engaged students with their surroundings and created opportunities for learning about others.

There are also a number of technical terms that are used in relation to the various cartographic practices discussed in the dissertation. This includes GPS, GIS, GI. Global Positioning Systems (GPS) are satellite-based navigation systems used for tracking one's location on a global map. This is a common feature of smartphone mapping applications used for wayfinding. Geographic Information System (GIS) is a tool for capturing, storing, and displaying geographic data. These are often professional tools that are used by cartographers, geographers, and other experts who deal with geospatial data. Geographic Information (GI) refers to any data that contains some geospatial information. This includes the common feature on smartphones of capturing and displaying the geographic information of where a photograph was taken.

Learning

I define learning as a dynamic, adaptive, relational and open-ended process of interactions and transformations within and among individuals and collectives in specific contexts. This definition is rooted in *complexity thinking*, which is one of the main topics in chapter 2. One key implication of this theoretical understanding for my research is the emphasis on creating opportunities and spaces that enable learning interactions. Learning emerges from and is enriched by the interactions among learners and their environments. This framework is also attentive to the collective learning that emerges from these interactions. Collective learning acknowledges that learning is both an individual and collective process. Within an art classroom, for instance, there are numerous sub-groups of peers with stable and continuous relations. A class as a whole is also a collective, with unique sets of characteristics that transform in time. This understanding of the collective of learning highlights the essentiality of the existing spatio-temporal relations that are always implicated in learning. Moreover, within this view, it is not only individuals who learn but

also groups and collectives. Technologies that collect, store, and display data from multiple sources can be effective tools for collective learning. In this research, the closed social media and online mapping networks allowed a group of individuals to create a repository of their photographs, which could be accessed by all members of the class. In many ways, individuals working independently impacted the creations of the collective, and the collective impacted the engagement of the individuals.

Spatiality

Spatiality refers to all elements that relate to my conceptualization of space. Here, I define space as the product of a multiplicity of human and non-human interactions, in which time is an integral and inseparable element. Space emerges from interactions. This view borrows from Massey's (2005) theorization of space. This is the other key topic in chapter 2. Throughout the dissertation, I refer to the Spatiality of the "Map My World" project. In this context, spatiality connotes all of the spatial and temporal elements that were implicated in the project. This can include elements such as how the teachers organized the spaces of their classrooms, the schools' schedules, students' attitudes towards the spaces of their schools, and students' existing digital practices. All of these elements had an impact on how the project unfurled. Another key term is spatial learning, which was also a central goal of this research. I use the term spatial learning to describe the transformation in students' perceptions and engagement with their everyday surroundings. This included students noticing new details, or becoming aware of how they interacted in everyday spaces. I found that artistic, aesthetic and sensory engagement to be productive for spatial learning. These are the themes of chapter 5.

Research Question

Question 1 — Personal and interpersonal learning: How do youth's perception and engagement with their everyday surroundings shift when they engage in a creative process of mobile sensory photography and creative cartography?

Question 2 — Designing curriculum: What are the affordances and limitations of a curriculum that encourages youth to attend to their everyday spaces through mobile sensory photography and creative cartography?

Question 3 — Complexivist theory of learning and teaching: What are the characteristics of the individual and collective spatial learning that occurs as a result of peer networked mobile photography and creative mapping?

Organization of Dissertation

The dissertation opens with a discussion of the theoretical frameworks of complexity thinking and spatiality because the concepts of learning and spatiality as defined within these theories have been foundational to how I designed the curriculum, as well as my data collection, analysis, and interpretation. After establishing the theoretical unpinning of the research, I contextualize this study within the field of Art Education. The pertinence of this study for the field is the meaningful integration of new technologies and the everyday experiences of youth in learning in the arts. I also draw on Place-Based Education, which shares the goal of connecting learning to the everyday places learners inhabit. Next, I explore the theme of the senses as a practical means of attending to one's individual relations to everyday places. Finally, I provide a survey of cartographic practices that were instructive for the integration of creative cartography.

In the methodology chapter, I describe the philosophies, processes and uses of Design-Based Research. I also provide details about the fieldwork including descriptions of the schools, the teachers, the curriculum design, ethical protocols, data collection and analysis. Three main

themes emerged from my analysis, which I elaborate on in the three findings chapters. Chapter 5 provides an analysis of the existing spatio-temporal relations in which the fieldwork occurred. This led to some unintended outcomes, as well as the intended outcome of facilitating spatial learning. Chapter 6 focuses on the various uses of mapping activities in the project. Here, I describe how the online mapping tools enabled the visualization of spatial relations, and facilitated spatial and collective learning. Chapter 7 deals with themes of sensory and photographic engagement. The productive relation of the senses, place and photography, as well as the challenge of translating the senses into images will be discussed here. I conclude with a number of recommendations based on my findings.

CHAPTER 2 — THEORETICAL FRAMEWORK

Complexity and Spatiality in Educational Research

In this chapter, I describe in detail the complementary theories of complexity thinking and spatiality to frame the epistemological perspective of this research. Fenwick, Edwards & Sawchuk (2011) characterized these theories as socio-materialistic frameworks that view knowledge as "emerging simultaneously in webs of interconnections among heterogeneous entities: human and non-human, social discourses, activities and meanings, as well as material forces, assemblages and transformations" (p. 2). Such theories challenge the notion that learning and education can be solely viewed as social, personal or individualistic processes. Rather, knowledge is viewed to be enmeshed within larger networks of relations among social as well as material actors and agents.

Thus, the endeavour of conducting educational research within such frameworks primarily involves what Bruno Latour (2007) called *tracing of associations*. Latour (2007) urged social scientists to move away from explanatory models for social phenomena, and instead focus on providing rich and detailed accounts and descriptions of vast constellations of relations among human and non-human agents. He used the term *actant*, in place of actor, to emphasize that individuals, groups, ideas as well as material are implicated in all social processes, including education.

As such, my aim was to develop educational interventions and principles that take into consideration the subjectivity of individual learners as well as collective learning and the role of spatiality in the learning process. Complexity thinking provides a framework for understanding learning as an on-going process of interactions within a collective process that is situated within multiple nested structures. Spatiality accounts for the existing and emergent human and non-human relationships—in space and time—that co-constituted the learning space in which the

research was conducted. The learning spaces of this project included the physical spaces of the classroom, school, neighbourhood and the city as well as the online spaces of the social media and mapping networks.

This chapter is divided into two sections: Learning and space. I begin each section by defining each keyword, and then apply these concepts to educational research, in general, and the "Map My World" project, which incorporated the online spaces of social media and collective mapping in art classrooms. I conclude by describing the salience of these theories for the design, analysis and theory development of the research.

What is Learning – Complexity Thinking and Learning Systems

I define learning as dynamic, adaptive, relational and an open-ended process of interactions and transformations within and among individuals and collectives in specific contexts. This definition borrows from *complexity thinking*, which shifts the focus of education from a linear relationship between a singular teacher and singular learner towards *learning systems*, which are comprised of dynamic networks of interconnections among multiple teachers and learners (Davis & Sumara, 2006; Davis, Sumara, & Luce-Kapler, 2015). The roots of complexity thinking are in *complexity science*, which is a scientific paradigm investigating how relationships among parts give rise to emergent, self-organizing systems. This paradigm originated in meteorology, physics, chemistry, cybernetics and information science, and many of its underlying concepts have since been applied in trans-disciplinary research on diverse topics such as the brain, consciousness, artificial intelligence, neural networks, social networks and collective intelligence (Mitchell, 2009). Each of these phenomena can be described as a complex system that emerges from networks of relationships among autonomous units that give rise to qualitatively different phenomena.

In educational research, the term *complexity thinking* has been coined to describe how the

understanding of complex systems can be used in teaching and learning (Davis, Sumara, & Luce-Kapler, 2015). Davis, Sumara, and Luce-Kapler (2015) characterized complexity thinking as a *Coherence theory* of learning, which they contrasted to *correspondence theories*. In correspondence theories, knowledge and truth are viewed as existing outside and independently of the learner, and learning is the process of arriving at knowledge. The notion that teaching involves transmitting a piece of knowledge from the teacher to the learner(s) epitomizes this epistemology. Davis, Sumara, and Luce-Kapler (2015) applied the label *correspondence* to such conceptions of teaching and learning because they make the assumption that learning can be measured by the "fidelity of the match or correspondence between subject (internal) model and object (external) reality" (p. 92–98). On the other hand, *Coherence theories*, such as complexity thinking, view learning as a "dynamic, evolving, and relational phenomenon that is manifest in and across all levels of organization" (p. 166). Coherence theories situate learning in the learner and context and account for the personal and relational aspects of learning, as well as larger socio-political factors. Examples of coherence theories include constructivism, social constructivism and critical theories. Constructivist theories ground learning in personal experiences (Piaget, 1970), while social constructivists pay attention to the social and interpersonal dynamics that shape learning, such as culture and language (see for example Lev Vygotsky, 1962). In critical pedagogy, gender, class, race and body politics are added to the understanding of learning (Freire, 1974). Complexity thinking embraces aspects of all of these coherence theories. In complexity thinking, learning is a personal experience as well as a social, cultural and political phenomenon. The individual is a complex structure that is nested inside and participating in other larger complex structures such as the school, the community, the city, the country. As such, complexity thinking is concerned simultaneously with the individual as well as the collective learners and teachers. This understanding of learning and teaching is informed and

enriched by evolutionary biology. Davis (2009) borrowed concepts from biologists and philosophers Maturana and Varela to develop a theory of learning as *structural couplings* among *autopoietic unities*. In the following sections, I explain how these terms apply to the interrelated acts of learning and teaching.

Autopoietic Unities, Structural Couplings and Nested Structures

Humberto Maturana and Francisco Varela (1998) designated the terms *autopoietic unity* and *structural coupling* to describe the process of life endlessly reproducing other similar yet different life forms, which are “unities of the same class” (p. 59). According to them, an *autopoieticunity* necessitates "an act of distinction which distinguishes what has been indicated as separate from its background”(p. 40). For instance, a single-celled organism consists of a membrane, which demarcates it from its surroundings and maintains its boundaries. In order to stay alive, an autopoietic unity must engage in ongoing exchanges in its environment, and with other autopoietic unities. In this sense, an autopoietic unity is simultaneously stable—maintaining its boundaries and internal structural—and dynamic—transforming constantly and being transformed in its surroundings and in relation to others.

When interactions among autopoietic unities are recurrent, this leads to what Maturana and Varela (1998) called *structural coupling*. Structural coupling refers to "a history of recurrent interactions leading to the structural congruence between two (or more) systems”(p. 75). Through the structural coupling of autopoietic unities emerge larger systems, which can themselves be described as autopoietic unities. An individual human-being, for example, is a composite of cells, microbiomes, a nervous system and organs. Each cell can be characterized as an autopoietic unity with its own boundaries, and these cells are part of a stable network of interactions that form a second-order autopoietic system—a human being.

Furthermore, structural coupling among second-order autopoietic unities give rise to

third-order coupling; a term Maturana and Varela (1998) used to describe the social bonds that develop with "definite complexity and stability" whenever organisms take part in recurrent interactions (p. 181). For example, from the recurrent interactions among human beings emerge social cliques, nations, cultures, societies and civilizations. Each of these unities is constituted of many smaller unities, and part of other larger unities. That is to say, autopoietic unities are *nested structures*. David Sloan Wilson (2019) argued such concepts from evolutionary biology should be applied for understanding and improving the efficacy of all kinds of groups, including schools, neighbourhoods, religious groups, business groups and government policies. Wilson is a strong advocate of multi-level selection evolutionary theory, which looks at how natural selections work across multiple levels of nested structures, rather than solely on an individual level. Multi-level selection theory accounts for the adaptability of altruistic behaviours in natural selection. Darwin had pondered this question and proposed that individuals as well as groups are driven by the survival instinct. This is why a member of a group might sacrifice their life for the survival of their group. Wilson (2019) argued that this process of group selection should be expanded into a theory of multilevel selection because

> … nature is more complicated than two-level selection, or a hierarchy of only individuals within groups. Individuals are themselves groups of cells and genes. Single-species social groups such as fish schools, bird flocks, and lion prides exist in ecosystems composed of many species and a nested hierarchy of scales, ultimately making up the whole biosphere. In the human world we have genes, individuals, families, villages, cities, provinces, and nations, all nested within what Marshall McLuhan dubbed the Global Village. (p. 161)

The value of multi-selection theory for educational research is in highlighting that intelligence, creativity and learning are not isolated in the individual. In significant ways, these are collective processes, situated within ecosystems, and nested within larger and smaller

structures. The concepts of autopoietic unities and structural coupling provide a model for understanding how individuals, collectives and societies learn and adapt in their surroundings. The notion of autopoietic unity suggests that an individual is a whole engaged in an on-going process of adaptation and transformation in its environment. On-going interaction with others also leads to the establishment of stable relationships, or structural couplings, which shape and transform the individual. In other words, individuals simultaneously shape and are shaped by the worlds in which they live. From these ongoing interactions emerge larger collective unities, which are comprised of individual unities and dynamic networks of structural couplings. In terms of education, Varela and Maturana's (1998) theories highlight the significant role that connectivity and interaction among individuals within a learning environment plays for learning. Educational theorists have built on these ideas to develop teaching methods and principles that encourage connectivity and collective learning.

Learning as Structural Couplings among Autopoietic Unities

Within complexity thinking, one can regard a group of students who regularly meet at a specific location — such as, a class — as an organism, or autopoietic unity. Firstly, the physical classroom has physical boundaries that demarcate it from its surroundings, and a class is comprised of individual students who meet regularly at a specific time. As an autopoietic unity, a class of students has clear spatial and temporal boundaries that maintain its coherence. Furthermore, a class is one nested structure among other micro, meso and macro structures of other classes, student cliques, the school, community, society, culture and humanity. It follows that an individual learner is always in relation not only to other learners, but also to the material and social world at large. What matters most in terms of teaching and learning is the quality of connectivity among these autopoietic unities and the different levels of nested structures in which learning is situated. Thus, learning can be described as an emergent property of on-going

interaction, change and adaption among autopoietic unities within specific contexts. It follows that teaching is primarily about creating conditions that enable quality connectivity.

Complexity thinking offers a number of practical strategies for creating conditions that enable learning. Firstly, a learning system, as an autopoietic unity, is a bounded system created by an act of distinction. This is to say that some criteria are required to define a group as a learning collective. Secondly, it is vital within a learning system to have some degree of redundancy to establish common grounds for interaction. Equally important is variation and diversity because this enables creative and novel responses. To enable this group to engage in collective learning, the teacher can prompt students by presenting *constraints that enable* (Castro, 2007). Davis (2009) defined constraints that enable as "guidelines and limitations for activity that are intended to provide enough organization to orient students' actions while allowing sufficient openness for expression of the varieties of experience, ability, and interest represented in any social grouping" (p. 168). A constraint that enables could simply be a topic question about a reading that provokes the collective to engage in a meaningful exchange of diverse perspectives on a topic. Effective constraints are not prescriptive with predetermined outcomes, nor are they completely open because learning requires the collective to have a focus so as to enable a meaningful exchange. Constraints that enable also “reference the embodied knowledge of the learner and ask for a reconfiguration of habitual patterns” (J.C. Castro, personal communication, December 19, 2019). Complexity thinking provides a conceptualization and practical approaches to teaching and learning that were instrumental in how I designed and implemented the “Map My World” educational interventions.

Application for Research — Complexity Thinking in Mobile Art Education

One central aspect of “Map My World” was the integration of peer learning networks to harness the collective intelligence and creativity of the art class. In Art Education, Castro (2012,

2015) applied the notion of *peer learning networks* to investigate the relational and collective nature of learning that can occur when using social media in art classroom contexts. Peer learning networks have been central to the development of the MonCoin visual arts curriculum, which aimed to utilize the connectivity of social media in the classrooms in ways that would amplify existing connections among individuals, create new connections, and to enable the emergence of new ideas and possibilities. Our role as educators was to establish conditions within which interactions and transformations among students and teachers were possible. We did not centre the MonCoin curriculum on the teachers nor students but rather the collective learning that emerges from interactions (Akbari, et al., 2016).

Learning in "Map My World"

Two concepts from complexity thinking —bounded unities and constraints that enable— were essential to how peer learning networks were conceptualized and designed. Firstly, the learning networksI setup for the project were closed and bounded learning systems. I took a number of calculated steps to establish boundaries between our online learning network, and the larger world accessible on social media. To do this, I asked students to create a private account specifically for our project, and only connect with ("friend") other students in the class. Creating a closed-network gave the project some coherence, and enabled connectivity among a specific group of learners with the specific focus of making and sharing mobile photography on spatial and sensory topics and themes. Although the world-at-large is always implicated in such closed-networks, I have found the establishment of such bounded systems to be essential to learning—as a process of interactions, adaptions and transformation— online and in the art classroom. In the "Map My World" project, I established peer-learning networks using social media and online mapping. Only the students and teachers in the specific participating classes were able to view and share their geo-tagged photographs with each other on these networks. As will be evident in

the following chapters, the larger world-at-large also bleed into our closed-network.

Another critical component of the MonCoin curriculum that I integrated into the "Map My World" was the *missions*, which prompt participants in our closed-network to respond with a photograph. These missions were designed based on the principles of constraints that enable. Missions are constraints that require a collective of learners to focus on specific themes while enabling individuals variation in how these themes could be interpreted. When developing missions for this research, I aimed to provide constraints that would serve "as models for students' creative activities, without being prescriptive, and created the necessary boundaries for meaningful engagement, without being restrictive" (Akbari et al., 2016, p. 22). The missions for "Map My World" were based on three main themes: My city, senses, and mapping. The first two missions included a series of micro-missions, which aimed to provide some variation and redundancy to the themes. The micro-missions for "My City" included "Paths I Take, " "Art," "Landmarks" and "Notice." Each of these micro-mission prompted participants to look for and photograph some aspect of their everyday surroundings. However, each theme could be interpreted in multiple, creative ways. The "Senses" missions were based on each of the five senses, giving participants the challenge of translating what they see, hear, taste, smell, and touch into a photograph. Further variations were provided in the form of adjectives that connote different senses, such as "soft," "loud" and "sweet." Again, these micro-missions were open to multiple interpretations, while providing the collective with a focus for doing photography. These missions were designed, on the one hand, to encourage spatial awareness; on the other, to enable visual conversations among a group of learners about their perspectives and relationships to their surroundings. As such, missions —as constraints that enable—were critical to both spatial and collective learning in this project.

Space and time are central considerations for this research given that my primary goal

was to use mobile photography and mapping to encourage youth to pay attention to everyday spaces. This intervention took advantage of the ubiquitous connectivity of social media and the site-specificity of locative media to create learning environments that are asynchronous and situated in space and time. In such contexts, educators need to carefully consider the place and time in which learning and interactions occur. Spatiality and temporality were critical to how I designed the education interventions. I had to carefully think about, for instance, the timing of dispatching a particular mission, the location of a group photo walk, or how I moved through the classroom space while giving instructions.

Moreover, space and time are critical to the theorization of learning in this research. I aim to expand the notion of collective learning to include the situated and spatial learning that occurs when interacting with one's environment through photography and mobile mapping. Interactions among learners within physical and online spaces were fundamental to the learning that occurred during the project. The social relationships that constituted these spaces also affected the quality and nature of the spatial learning that occurred. In some instances, students began to see, notice, sense, photograph, and reflect on their everyday surroundings differently based on their relations and interactions with peers within physical and online spaces.

Thus, I view learning to be fundamentally social and relational. This relationality also applies to my understandings of space and time. To deeply examine the spatiality of learning in this project, I rely on a theoretical framework for spatiality that emphasizes its social construction, openness and multiplicity. In the following sections, I elaborate on this theory.

What is Space — Spatio-Temporal Events

I define space as the product of a multiplicity of human and non-human interactions, in which time is an integral and inseparable element. This latter point is illustrated by the famous utterance by Heraclitus, "no man ever steps in the same river twice" (Gross, 2013, p. 312). The

temporality of space suggests that space is always contingent and indeterminate; that space is open to multiple trajectories; that space emerges from interactions in time. This conceptualization is inspired by the writings of human geographer Doreen Massey, from whom questions of space and time were an urgent political issue. Massey (2005) posited that space is the realm of the social, which presents the possibility for encountering alterity. She emphasized the value of conflicts and negotiations among multiple actors and interests for enabling an active and engaged democracy. For her, places could never be closed and sealed, nor space could be conquered through progress, technology nor globalization. Rather, space confronts all of us with the pressing questions about how we are all—human and non-human—going to live together.

Massey's ideas are insightful for educational research. The theory of spatiality of learning highlights that interaction among various actors, at different scale levels, constitute a learning space. These ideas also emphasize the importance of situating research within a specific context, and enable an understanding of teaching as creating spatio-temporal structures. In the following section, I provide a detailed description of Massey's ideas, followed by a discussion of how these ideas can be applied to educational research, in general, and the "Map My World" project, specifically.

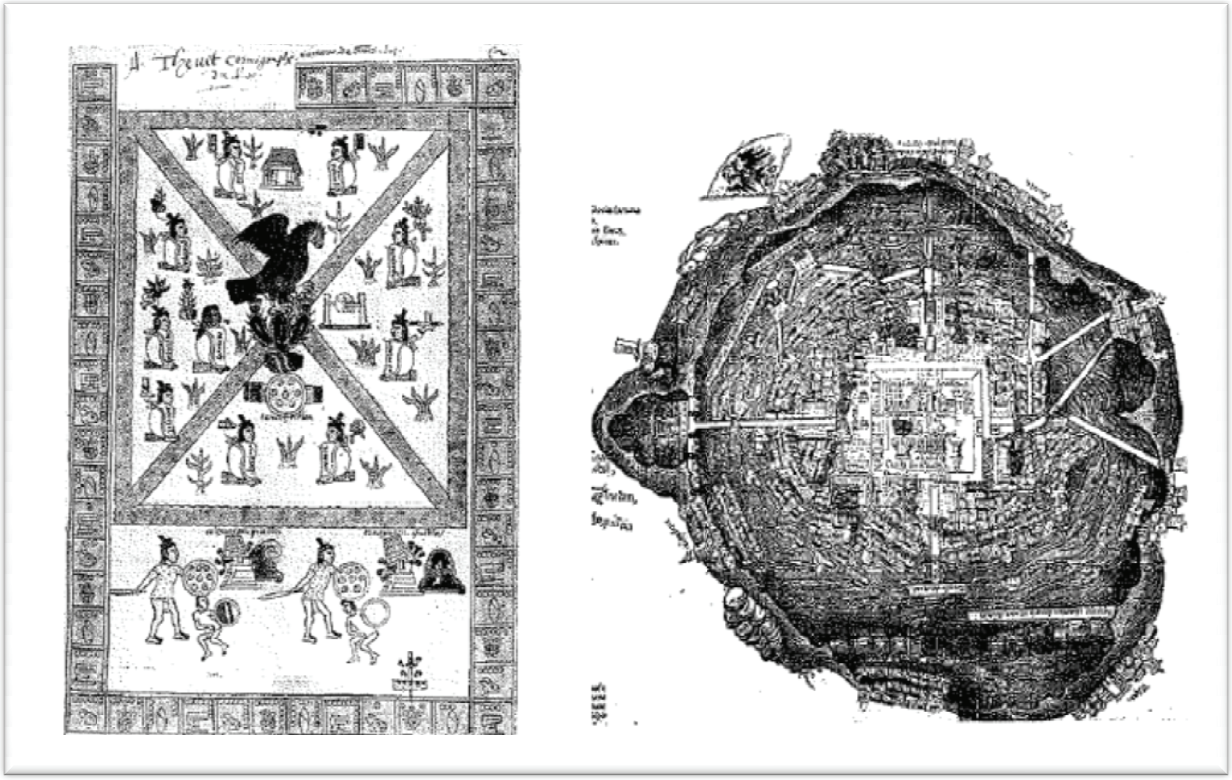
Space is Relational, Co-Constituted and Open

For Massey (2005), how we think about space has immense social, political, cultural and historical consequences. To illustrate this point, Massey begins her theoretical discussion about space by telling a story of two maps that describe the first encounters between the Aztec and conquering Spanish sailors in the city of the Tenochtitlán (Figure 1). The Aztec map of the city was based on a mythic notion of space-time, according to which the Spanish colonizers first approached their city from a direction of authority at a time that had both historical and cosmological significance. On the other hand, the Western representation of this space was rooted

in Euclidian geometry, which, according to Massey (2005), implicitly "equates space with the land and sea", and conceives of "other places, peoples, cultures simply as phenomena 'on' this surface" (p. 4). These two civilizations' differing ways of conceptualizing and representing space and time was an essential factor in the outcome of an encounter that eventually rendered the Aztec the colonial subjects of the European conquerors.

Figure 1

Aztec and SpanishRepresentations of Tenochtitlán



Note. Aztec representations of Tenochtitlán on the left; Spanish on the right.Reprinted from *For space* (p. 2–3) by D. Massey, 2005. Sage.

Massey (2005) showed how this Euclidian notion of three-dimensional space that can be mapped on X, Y and Z coordinates played a role in validating the conquests of the colonial era and still permeates today in the way we see the world. One need only to glance at a world map to

notice the inextricable link between how global space is represented and contemporary power structures in the globalized world.

To counter these kinds of conceptualizations, Massey (2005) offered a relational notion of space, the key tenets of which are that space is "the product of interrelations; as constituted through interactions," space is multifaceted and "co-constitutive," and "space is always under construction" (p. 9). This *relational space* is rooted in the metaphysical notion that space is composed of relationships between human and non-human actors, rather than a container in which objects exist. Relational space is the product of interactions and cannot exist without them.

I argue that this conceptualization has great implications not only for society and politics, but also for learning and teaching, in general, and for developing curricula for using mobile devices in high school classrooms.

To develop a theoretical framework for space as relational, co-constitutive and open, Massey (2005) engaged with the philosophies of Henri Bergson, structuralism and deconstruction because these theories hold both immense productive potential for thinking about space in the manner Massey wished, but also because they have contributed to problematic imaginations of space that associate space with "closure and stasis, or with science, writing and representation" (p. 18). Such associations have "choked" space "to death" and robbed it of its "openness, heterogeneity, and liveliness" (p. 19). One key contributor to this is the costly error of associating the spatial with representation. For Massey, Henri Bergson's understanding of time and space offered one of the most "complex and definitive [examples] of these philosophical positions." In Bergson, Massey found a conceptualization of time that provided opportunities for openness, "real novelty, the production of the really new, of things not already totally determined by the current arrangement of forces," yet Bergson's concern with time had "devastating consequences for the way he conceptualized space" (p. 21).

The concept of *duration* is helpful for understanding Bergson's theorization of time and space. Duration, for Bergson (1911), "is the continuous progress of the past which gnaw into the future and which swells as it advances" (p. 63). Duration is inherent to both consciousness and life. On the one hand, the lived experiences of conscious beings involve continual changes of "states, sensations, feelings, volitions and ideas" (p.1). The accumulation of memories over time has a formative effect on the quality and nature of these conscious experiences. On the other hand, all living organisms change and transform throughout their lives through ontogenetic processes, going through cycles of birth, growth, development and death. Thus, Bergson argued, "wherever anything lives, there is, open somewhere, a register in which time is being inscribed" (p. 69).

This lived and living time is an inherently continuous and contingent process that cannot be divided, separated or abstracted from lived experience. Bergson (1888) argued that the act of dividing or separating time requires one to place different simultaneities into spatial order. Thus he speaks of time as represented by clocks:

> When I follow with my eyes on the dial of a clock the movement of the hand which corresponds to the oscillations, I do not measure duration, as seems to be thought; I merely count simultaneities, which is very different. (p. 50)

The difference Bergson (1888) is referring to is between a continuum that cannot be reduced to an aggregate of static moments, without becoming something different—a representation. Bergson often referred to this spatial and representational time as the time of the physicists and astronomers. "The time which the astronomer introduces into his formulae," he argued, would deprive duration of its inherent dynamism and multiplicity. In other words, duration is a qualitative phenomenon that cannot become quantified—i.e., spatialized—without losing its essential qualities.

Massey (2005) noted that the frustration of Bergson "derived not only from the specifics of what natural scientists were arguing about time but also from the emerging role and status of those sciences…[in] knowledge production as a whole" (p. 34). The ascent of the status of science in knowledge production is epitomized by the events that took place on April 6, 1922 during a prestigious meeting among intellects of the Société française de philosophie in France, where Bergson and Einstein confronted each other (Canales, 2015). While lecturing the gathering, Einstein uttered the provocative statement "Il n'y a donc pas un temps des philosophes" (the time of the philosophers does not exist), and went on to claim that "there remains only a psychological time that differs from the physicist's" (p. X). Against this assertion, Bergson contested that were it not for a lived sense of time (duration) clocks would lose all purpose.

> [Clocks] would be bits of machinery with which we would amuse ourselves by comparing them with one another; they would not be employed in classifying events; in short, they would exist for their own sake and not serve us. They would lose their *raison d'être* for the theoretician of relativity as for everybody else, for he too calls them in only to designate the time of an event. (p. X)

Canales (2015) argued this moment marked a division between the Humanities and Natural Sciences that has persisted since. Einstein's relegation of the philosophers' time to merely the psychological greatly diminished the importance of philosophy in knowledge production. In Einstein's formulation, physicists measure objective time, while philosophers deal with how our moods affect our experience of the objective—real, truthful, scientist—time. This formulation immensely over-simplified the true depth and complexity of Bergson's (1911) notion of duration.

Canales (2015) pointed out that and the relative obscurity of Bergson, who during his time was considered one the great philosophers of the West, is an indication of how this debate has played out in history.

One of the most problematic aspects of Einstein's theory of special relativity, for Bergson, was that it allowed for the reversibility of time. This is exemplified by Einstein's thought-experiments of travelling on a beam of light. In his imagination of time, travelling at such high speeds allowed one to go back into time, which suggested that time and space were closed and pre-given. The "physicists' and astronomers' time," for Bergson (1911), contradicted his conceptualization of time, which is the gradual and on-going build-up of everything in the immediate and distant past, and in which the future remains open.

"Duration," Massey (2005) pointed out, emphasized the "continuity, irreversibility, openness" of time (p. 31), while Bergson's misreading of space "came about in part because of social scientists' and philosophers' reactions to natural science's intransigence on the matter of time" (p.32). On the one hand, Massey applauded Bergson of the "imaginative leaps" of thinking of time "in relation to memory, of placing ourselves 'at once' in the past; in relation to language, of jumping into the element of sense" (p. 59). On the other hand, she viewed "the bifurcation of time and space, and the privileging of time over space" as the crucial "founding moment of modern philosophy" (p. 58), which has severely limited the imagination of spatiality.

Massey wondered if Bergson's imaginative leap of relational and open time could also be applied to spatiality. In an interview, Massey (2013) articulated that one of her main reason for her theorization of space was rooted in her anger at social scientist and philosophers paying so much attention to time, as the "dimension of change, of dynamism, of the life we live," while space became the dimension of a flat surface devoid of temporality. Massey's answer to this was to argue for a notion of space that is temporal, open, subject to change. While time is the

dimension of change, space is the dimension of the social. Space is a relational construction of multiple trajectories, which allows for the emergence of something new through interactions, conflicts and negotiations.

Multiple Trajectories in Space-Time

In order to convey the sense in which space is temporal, social and political, Massey (2013) told a narrative, in an interview, about traversing space on a train:

> You're taking a train across the landscape – you're not travelling across a dead flat surface that is space: you're cutting across a myriad of stories going on. So instead of space being this flat surface, it's like a pincushion of a million stories: if you stop at any point in that walk there will be a house with a story. Raymond Williams spoke about looking out of a train window and there was this woman clearing the grate, and he speeds on and forever in his mind she's stuck in that moment. But actually, of course, that woman is in the middle of doing something, it's a story. Maybe she's going away tomorrow to see her sister, but really before she goes she really must clean that grate out because she's been meaning to do it for ages. So I want to see space as a cut through the myriad stories in which we are all living at any one moment. Space and time become intimately connected. (para. 8)

In this excerpt, one can grasp some of the key tenets of Massey's conceptualization of space: Space is constituted by multiple stories, time and space are intimately connected, space is dynamic and indeterminate. Massey (2005) asserted that "thinking space as the sphere of a multiplicity of trajectories, imagining a train journey [for example] as a speeding across ongoing stories, means bringing the woman in the pinny to life, acknowledging her as another on-going life" (p. 119). Within this context, the aforementioned encounter between the Aztec and Spanish is understood as the meeting up of on-going, open and dynamic histories, and "not merely a

pushing out 'across space'" (p. 120). In this conceptualization one is compelled to view the inevitable encounters with others in space as the "meeting up with others who are also journeying, also making histories" (p. 120).

This holds a great productive potential of space. Relational space creates the possibility for the emergence of something new through chance encounters. In spatial configurations, she contended, "otherwise unconnected narratives may be brought into contact, or previously connected ones may be wrenched apart" (p. 111). This heterogeneity of "different temporalities and different voices" that must work out means of accommodation is the important political challenge, for Massey (p.111). The accidental neighbour, the encounter with the other, and chance encounters are all important elements for keeping the spatial open, alive, and political.

Local Place, Global Space

Massey contested common ways of thinking about local places and global space that limit their imagination in relational terms. She rejected modernist notions of places as isolates, and certain post-modernist ideals of global space being completely open and without temporality. Firstly, she disputed the modernist notions such as "nation-states," "cultural isolates," "local communities" which resonated "with the billiard-ball view of the world proposed by physical mechanics" (p.72). These notions of places as separate entities fail to account for the rationality and openness of all places. It is a mistake to view places as bounded and existing in their "full identities" before coming into interaction, when places, like most entities, come into and form their identities through interactions. Places are internally multiple and exist in relation to other places, and global space.

Massey (2005) also cautioned against certain versions of post-modernity, which hold the "extreme view of a single global present (global village, and perhaps in the propositions of an easy multiculturalism across-the-continents in a host of advertising strategies)"(p. 76).

A key contributor to creating a sense of a global present is the ubiquitous connectivity of telecommunication technologies across global space. Cyberspace, Massey pointed out, provides a rationalization for the "annihilation of space by time" (p. 91). The reality that we can now cross space "(by air, on-screen, through cultural flow)", and that distant places can now simultaneously and continuously be connected within globally interconnected networks can imply to some that "space doesn't matter any more," and that we have somehow "conquered distance" (p. 90). In Massey's words:

> Any assumption of a closed instantaneity not only denies space of this essential character of itself constantly becoming, it also denies time its own possibility of complexity/multiplicity. To read interconnectivity as the instantaneity of a closed surface…is precisely to ignore the possibility of a multiplicity of trajectories/temporalities….If this is the imagination which is to replace modernism's temporal alignment of regions then it is a move straight through from a billiard-ball world of essentialized places to a claustrophobic holism in which everything everywhere is already connected to everywhere else. And once again it leaves no opening for an active politics. (p. 77)

An over-emphasis on the promises of instantaneous— anywhere and anytime— connectivity across vast regions of the globe is problematic for a number of reasons. First of all, it ignores the fact that connectivity is not evenly distributed across global space. The functioning of cyberspace relies on place-based infrastructures and material links places to other places and spaces. Just as cyberspace is anchored in the specificity of the location, so too are spaces and places "altered in their physicality and in their meaning through their embeddedness in networks of communication" (p. 96). Physical space and cyber-space affect and co-constitute each other

through networks of relations. This "mutual constitution" is not between the human and the technological alone, but with what we choose to call *nature* too (p.97).

In Massey's view, global space also contains multiple trajectories and multiple narratives. It contains countless conflicting interests—at the local, regional, national and international levels—that must be negotiated. If global space is to be thought of as the product of relations, Massey argued, then visiting places — both physical and virtual— is more than just traversing across space in no time, but rather "a practice of engagement, an encounter," and an instant of "open-ended configurations within multiplicities"(p. 91). In this conceptualization, cyberspace is not merely there to connect everyone across pre-existing global space in instantaneous time.

To ignore this, Massey warned, "could potentially enable…a kind of disembedding into non-contiguous communities of people-like-us which evade all those challenges thrown up by what material spatially always present you with – the accidental, unchosen (different) neighbour" (p. 95). This statement was prophetic as the phenomenon of *the filter bubble* is now a known side-effect of the kind of connectivity enabled by social media (Pariser, 2011), and the influence of social media on the current divisive political climate is a common topic of debate. This promise of a networked globe that does not account for alterity and encounters with the other robs spatially of what Massey considered to be its greatest potential: "that business of walking round a corner and bumping into alterity" (p. 94). On this basis, Massey contended that a technology-led understanding of globalization that emphasizes only connection at the exclusion of spatiality and temporality is a dangerous basis for politics. In this context, politics means taking into account that multiple interests, values, cultures, and history, and doing the hard work of negotiating space.

Open and Closed, Bounded and Multiple.

Place cannot be thought of as hermetically sealed with its roots and unique identity; Space is not an abstraction that is waiting to be conquered or connected; the challenges of space cannot be ignored; nor distance and time overcome through ubiquitous connectivity and cultural flows. "The appeal to an imagination of pure boundedness or pure flow" of modernist and post-modernist conceptions of place and space, Massey argued, is neither possible in practice nor open to political debate (p. 86). Firstly, one can never really close up a space, because if "space is the sphere of multiplicity," and relations "then space can never be closed, there will always be loose ends, always relations with the beyond, always potential elements of chance"(p. 95). On the other hand, flow without stabilization and boundaries of any sort is not possible, as mobility and fixity, flow and settledness" presuppose each other. Places are both bounded and constituted through multiplicity both within and in relation to other places and global space. Global space is also bounded to specific places that co-constitute this space.

Thus, place and space are at once bounded and multiple; open to relations beyond, yet fixed, particular and situated. This understanding parallels the conceptualization of autopoietic unities as simultaneously bounded and dynamic. Multiplicity within and interactions beyond bounded unities are formative features of both space as well as learners. Thus, the quality and nature of such interactions among learners within space is a primary concern for this research. The critical political question, for Massey, is the negotiation of the terms under which such interactions occur.

Negotiation among Human and Non-Human

Conflict and negotiation are critical components to the political challenge of living together;*our throwntogetherness*, which, for Massey, was an important part of the productive aspects of spatiality. The idea of place as a *spatio-temporal event* —"as open (' a global sense of

place'), as woven together out of on-going stories, as a moment with power-geometries, as a particular constellation within the wider topographies of space" (p. 130)— entails an understanding of place that requires on-going negotiations among human and nonhuman actors. Place as event necessitates negotiations about its borders, what is to be included and excluded, on what terms are these inclusions and exclusions based, how one accounts for the heterogeneity within and multiple relations to the outside. Such negotiations are essential to an active and engaged democracy. Without such negotiations, regional and global democracy is disabled.

The non-human also plays an important part in the constitution of place. "Some of the strongest evocations of place," she pointed out, draw on notions of the "hills," "wilderness," and "the sea" (p. 131). She asked, how do we "think this notion of place as a temporary constellation, as a time-space event, in relation to this 'other' arena, 'the natural world'"? (p. 131). One answer to this is that the material—non-human— is also moving, evolving, transforming and becoming. The hills, woods and seas are temporal and relational, too. To illustrate this point, Massey talked about an iconic mountain in Northern England: "Skiddaw [is a] massive block of a mountain, over 3000 feet high, grey and stony; not pretty, but impressive; immovable, timeless" (p. 131). This imposing figure is a prominent feature of the region in Northern England, and there are myriad historical narratives and folktales about the massive rock. When thinking about this landmark relationally, there is no doubt that this mountain has had an enduring relationship with the humans who have lived in the area. However, Skiddaw is itself also a nomad. Massey recounted some of the long history of this rock.

> The landscape here has been etched and moulded into its present-day basic shape by the glaciers of ice ages, the last of which retreated some 10,000 years ago….the rocks of which Skiddaw is made were laid down in a sea which existed some 500 million years ago….And 'not long' afterward (in the same—Ordovician—geological period) there was

> volcanic activity. There are reminders of that tumultuous era too in the present-day landscape….A long and turbulent history, then. So much for 'timelessness'. (p. 133)

This is a powerful evocation that shows that the idea of place as spatio-temporal events also applies to that vague and dubious category of the non-human we call nature. Mountains, rocks, water, animals and plants are temporal too. As humans, we are in relation to non-human, and we affect, transform and co-constitute each other. All have their trajectories and convene in the here and now. Here, Massey noted, "is no more (and no less) than our encounter, and what is made of it. It is, irretrievably, here and now. It won't be the same 'here' when it is no longer now" (p. 139). If space is relational and temporal (i.e. irreversible), then negotiation among human and non-human are an important political project as well.

Application for Research — Spatiality of Learning

Massey's ideas have immense relevance for educational research. To examine how these ideas about spatiality have been applied to educational research, it is necessary to broaden the scope and ask a more general question about the relevancy of the field of geography in educational research. Various authors have noted that geography has become an increasingly energizing force in the humanities since the advent of the 'spatial turn' in the 1990s, which has placed an emphasis on relational space, place, and mapping. Various approaches to spatiality share in common the fundamental assumption "a dynamic multiplicity that is constantly being produced by simultaneous practices-so-far" (Fenwick, Edwards & Sawchuk, 2011, p. 29). These assumptions about space parallel developments within the field of Geography, which has also gone through a number of transforms, from a modernist project of providing quantitative analysis and scientific explanation of spatial distributions towards an understanding of space as socially, politically, culturally structured (Taylor, 2009). Massey's theorization of space belongs to this

tradition of human geographers who challenged the positivist notions of detached space and paid attention to the social and political construction of space.

The field of education has been impacted by these developments within geography and humanities. Fenwick et al. (2011) identified some key themes explored by educational researchers who draw on spatial theories: Curriculum space; globalized educational space, technologized educational space, gendered space, and spatializing metaphors in education. The first category is most pertinent for this research because it includes studies that view learning spaces as "the spatio-temporal orderings of practices," in which researchers examine not only the context of learning but also "how these spatio-temporal orderings produce and construct disciplinary practices and knowledge production" (p. 153). For instance, Nespor (1997) studied an urban elementary school and showed that the regional policies, parental concerns, corporate agendas, popular cultures, gender ideologies, politics and other factors together produce the educational effect. In these approaches to spatiality, the view that a school or classroom can be contained and closed off from the world is rejected. Rather learning spaces are thought to be engaged in relational sets of practices and mobilities, and embedded in their communities, neighbourhoods, cities, regions and the world.

Spatiality in education implicates learning in the physical as well as the larger social world. This involves paying attention to the specific context and how spatio-temporal constructions within this context produce disciplinary practices and ways of knowing. Spatiality is also multiscalar. The local place and global space are implicated in the process of learning. Taylor (2009) used the notion of scales to examine to the role of spatial theories in education. At the micro-level of the scale, there is the learner, a group of learners, or a class; at the meso-level, the school, community of learners, and the neighbourhood; at the macro-level, cities, regions, nations and the globe. There has been little attention paid by educational researchers on regional

and national analysis of space, and international analyses have tended to focus on the process and influences of globalization on education (Taylor, 2009, p. 660). Taylor (2009) pointed out that the greatest contribution of spatiality in education has been at the level of community and neighbourhood, with community-based studies, and studies of formal sites of learning such as classrooms and schools, as well as informal ones, such as social media and online gaming.

Taylor also argued that while there has been considerable interest in geography on children as actors in society and space, little attention has been given to the child as a learner. Taylor viewed the growing interest in "psychogeographies, with their emphasis on the relationship between the environment, emotions, fantasies and embodiment of children" to be an important area of future educational research (p. 657).

Spatiality of "Map My World"

Spatiality is a critical consideration for "Map My World." First, learning is understood to be situated within a context—space and time—which is also in relation to micro-meso-macro contexts and agents beyond the confines of a classroom. Also, the ordering of the human and non-human in space-time has a critical influence on learning. In this sense, a key consideration for the design of the educational interventions is to consider, order and structure space and time to facilitate learning. This learning space and time expands beyond the confines of the classroom. This is generally true of any learning space, but particularly relevant to this research, which uses mobile devices to connect to students asynchronously.

Massey's notion of place as spatio-temporal events can be invigorating for educational research because it gives urgency to engaging in on-going negotiations, to encounter alterity, to acknowledge the trajectories of human and non-human actors one encounters within and beyond learning spaces. Comber (2013) drew on Massey's ideas for this reason for a study on the affordances of place-based pedagogy for students' literacy learning. For Comber, spatio-temporal

events enable an understanding of schools as "material places located in geographic sites, with different social, cultural, and physical histories and characteristics that are dynamic and subject to change" (p. 362). Schools are also constructed through social relations, meeting places of multiple trajectories. This requires acknowledging differences, conflicts and negotiation. Massey's notion of spatiality is valuable for educational research because, Comber argued, it allows for the politics of places, "contingency, specificity, and the possibility of negotiating something new" (p. 370).

I see the value of Massey's theorization along similar lines. For my research, this framework provides an approach to teaching, learning and educational research that is situated, and contingent on the specificities of the context. My research was situated within two sites, each with its own unique spatial-temporal configurations. The spatiality was constituted through relations among various actors across scale-levels. The demographic of the school, its location, the teachers' experiences, researcher's experiences, and class dynamics were among the factors that determined the outcomes. Each iteration was a unique spatio-temporal configuration; a meeting of multiple trajectories.

One of my main roles as an educational researcher was to arrange space and time in ways that enabled meaningful connections among learners, teachers and their surroundings in the physical spaces of the classroom, school and neighbourhood, as well as on our closed-online networks. Developing lesson plans essentially involved creating spatio-temporal arrangements with stated objectives. These lessons were situated within existing arrangements, schedules, and relational dynamics. Factors such as the time of day the lesson took place, the day of the week a particular Mission was dispatched, or the mood of an individual or the class at a particular time had a decisive influence on learning. In this sense, how I structured space and time, in relation

tothe existing spatio-temporality of the class, determined how and what we learned. Our collective learning was spatial and relational.

Spatiality is also the subject of much of our learning. A key objective of this research was to encourage spatial awareness through mobile photography and mapping. This research built on the MonCoin project, in which we found that a key to motivating students was to create "opportunities for students to actively engage with their immediate physical space in their online network through photography" (Akbari, 2019a, p. 103). Photography, and in this research mapping, mediated students' experiences within their surroundings, and the missions served as prompts to raise spatial awareness by getting learners to pay attention to certain aspects of everyday places (Akbari, 2019b). The theme of the senses was used with the intended purpose of bringing awareness to mundane but germane aspects of the space participants inhabited. As will be discussed in the findings, relationships among students had a profound effect on what was noticed, and how students engaged with their surroundings.

Finally, Massey notion of spatiality requires one to think not only about spatial relations within a specific context but also about the relations beyond, to other places and global space. While this research is situated within particular schools, in specific neighbourhoods in Montreal, the larger world is also implicated. Factors at macro levels, such as regional policies, international travels and immigration, popular culture, and the political climate of the time played significant roles in the outcomes. Online Mapping proved to be a powerful tool for visualizing these relations in global space. I view learning in this project as spatio-temporal events, in which groups of learners were encouraged to encounter their everyday spaces, and to encounter each other within physical and online learning spaces.

Conclusions — Implication of Theory on Research

Complexity thinking and spatiality are complementary theories that inform this research in many ways. First, both theories emphasize that the interactions among human and non-human actors allow for the emergence of something new. Learners and places can both be characterized as unities with boundaries, which emerge into their current form through multiple interactions. Learners and places are bounded and dynamic; united and multiple; open and closed. Massey noted the importance of on-going negotiations about the terms and conditions of how these boundaries are constructed and connections made. Further, both theories acknowledge connections beyond. In spatial terms, places are connected to other places and global space through vast constellations of relations in space-time. To frame this in terms of complexity, unities are nested within other larger complex structures. Thus, the learner is situated in a place, school, community, city, country and the globe. Space at multiple scale levels is implicated in the learning process.

These ideas have influenced my research in terms of curriculum design, data collection, and analysis and theory development. Within these frameworks, knowledge cannot be separated from the learner, attention is paid to how collectives learn, and learning is also situated in space-time. Thus, the students' and teachers' perspectives were essential components of the outcomes, and data collection and analysis were attentive to their views. Attention was also paid to the spatial, social, subjective, interpersonal, and political dimensions that influenced their experiences and learning. The methodological approaches I used to design, test, and interpret the educational interventions were rooted in the epistemology and philosophical assumptions that I have been discussed in this chapter. This is the subject of chapter 4.

In the next chapter, I situate this research in literature from diverse fields including Art Education, Visual Culture Studies, Sensory Studies, and Human Geography. This literature

provides valuable insights for the integration of mobile sensory photography and creative cartography in Art Education.

CHAPTER 3— REVIEW OF LITERATURE

A central objective of this dissertation is to use smartphones in art classrooms in ways that enhance and enrich human experiences. I see great potential for using a tool that is part of the everyday life and culture of youth in schools. Using smartphones in thoughtful ways in classrooms can create bridges between the everyday life and practices of youth and formal educational curricula. Smartphones have a number of features that are beneficial for art teaching, including mobility, ubiquitous connectivity, and geo-location. I aimed to develop a curriculum that utilizes these features to facilitate collective and spatial learning in art classrooms. This curriculum integrates mobile-sensory photography and online mapping to encourage youth to attend to their everyday spaces. I ground this research in a multi-disciplinary body of literature that addresses the themes of the everyday, spatiality, the senses, and mapping in art, education, and research. The literature on Visual Culture in Art Education and Place-Based Education provides insights into the role of the everyday in art classrooms, and the connection of the classroom to the everyday places learners inhabit. I draw on sensory anthropology to examine how art educators can encourage youth to attend to everyday places by paying explicit attention to the senses. Finally, I provide a survey of cartographic practices that reveal the subjective, interpersonal, collective and socio-political nature of maps and space. These practices are instructive for the integration of geo-location and online mapping in art classrooms. This body of literature provides an understanding of how smartphones can be used by art educators to enable peer and collective learning and to encourage youth to attend to their everyday surroundings.

Art Education and the Everyday –Visual Culture, Space and the Senses

Technology is a topic of great interest in Art Education. A cursory browse of the recent National Art Education Association (NAEA) convention catalogues reveals presentation titles such as "Flipping your classroom for the YouTube generation," "The potential of VR (Virtual

Reality) for the classroom" and "From STEM (Science, technology, engineering and math) to STEAM (Science, technology, engineering, art and math)." The 2018 NAEA convention was devoted to STEAM education, with keynote speakers and super sessions dedicated to the topic of the integration of technology in art education. The range and diversity of presentations offered on these topics, as well as the numbers of enthusiastic attendees at these talks are good indicators that art teachers are interested in finding innovative ways to integrate new and everyday technologies in their teaching. At the moment of writing, online learning is emerging as an essential part of education due to the COVID-19 global pandemic. There is clearly a need in Art Education for the thoughtful integration of mobile and online technologies.

However, there are a number of challenges teachers face in the implementation of technology in the institutional settings of schools including time constraints, technical constraints, and competing forces of "new-world thinking" and "old-world systems," which are based on top-down, teacher-centred curriculum delivery systems (Delacruz, 2009, p. 14). This latter point raises a pertinent question: If mobile technologies offer new modes of connectivity, information flow, and space-time interactions, are they compatible with models of schooling based on the notion of learning as individual mastery of knowledge?

For Sweeny (2004), integrating digital technologies in formal education based on dated modes of thought is problematic. The Internet represents new forms of communication, which can be characterized by the interconnectedness of individuals, societies and institutions in decentralized networks. Within network societies, both top-down systems of control and bottom-up participatory forms of communication are possible. To effectively integrate technology in Art Education curriculum and pedagogy, art educators need to take into consideration these new forms of communication and avoid approaches that do not account for the social and cultural impact of technology. The integration of mobile devices, for example, is not simply a question of

which mobile applications to use. Curriculum and pedagogy that utilizes these technologies should relate to how these devices impact students' social relations, identity construction, connections to their surroundings, and worldviews. By connecting curricula to the everyday realities of youth, art educators can create spaces for critical reflection and imagine new possibilities.

In recent years, various authors in the field of Art Education have explored ways of connecting art teaching to the everyday realities of the contemporary world, which today is saturated with media images. Proponents of Visual Culture Studies in Art Education have argued that the field can have greater relevance if it expands the study of art to include contemporary cultural forms such as television, advertising, popular culture, magazines, and the Internet (Chalmers, 2005; Efland, 2004; Freedman, 2003; Tavin, 2002; Tavin & Anderson, 2003). Duncum (1999) urged art educators to incorporate sites of the everyday into theory and practice because these sites play an increasingly critical role in informing one's identity and worldview. For Darts (2004), these everyday sites are places of "ideological struggles and resistance" (p. 316). He suggested art educators introduce the work of socially engaged artists who transform daily life into spaces for discussion on the social, political and historical complexities that constitute the everyday. The common belief among these advocates of Visual Culture is that art education can play a significant role in students' social and cultural engagement by directing conscious and critical attention to their everyday world.

Visual Culture is characterized by this shift towards everyday visual experiences. However, some authors sought to expand the meaning of the visual in Visual Culture. Bal (2003) pointed out that the act of looking always involves other sensory activities, which necessitates that Visual Culture studies include non-visual cultural artifacts such as literature, sound and

music. Duncum (2004) advanced the term multimodality to describe the interrelationships of images, texts and sounds in contemporary media such as television and the Internet. Richardson (2006) articulated the need for Visual Culture to account for the spatial conditions that shape how we see. He stated,

> People do not discover meaning merely by analyzing images; rather, they construct meaning as we encounter, use, and reconfigure them within their lives. Ignoring the spaces in which people encounter the visual effectively alters what is seen and makes necessary the need to attend to the spaces in which it is seen as carefully as we attend to the objects and images caught in their gaze. (p. 63)

In Richardson's (2006) conception, images are conditioned by the spaces in which they are encountered; and conversely, images condition the spaces in which they circulate. An advertising billboard, for instance, is a site-specific visual object whose meanings are tied to its location. Likewise, viewing a photograph on display on a museum wall impacts the value and meaning one ascribes to it. Images circulate in spaces and are given meaning and value by their spatial context. Richardson's call to attend to the spatiality of images and Visual Culture is pertinent for this research, for which I asked students to photograph and share photographs of their everyday spaces. Here, the connections between the viewing and production of images to space were explicit. The images were taken in and of the spaces of students' schools, neighbourhoods and homes. The viewing of these images on mobile and online platforms also impacted the meaning and interpretation. For one, Instagram and Google My Maps visualize different kinds of spatial relationships among students' photographs, and present meta-data, such as usernames and geo-location, which inform how the images were viewed. The spatiality of the physical and online environments was implicated in various ways in how students produced, shared and viewed their photographs. Furthermore, the acts of creating and viewing images are

multi-sensory. My main incentive for placing an emphasis on the sensory is based on the understanding that explicit attention to the senses provides a powerful opening for engaging with one's surroundings. Throughout the research process, I have also found that explicit attention to the sensory can be informative for the creation, viewing, and interpretation of images. Theories and practices in Visual Culture are enriched when attending to the multi-sensory nature of seeing. My research underscores the importance and value of attending to the spatial and sensorial in Visual Culture in Art Education. My approach to the integration of smartphones in art teaching is based on the assumption, in Visual Culture studies, that art teachers can play a valuable role by addressing the culture and everyday practices of youth in art education. Smartphones, social media and mobile mapping are part of youth's reality today. Thus, the inclusion of these tools in art classrooms can be a powerful way of bridging the everyday visual practices of youth with formal art teaching. The MonCoin research, led by Juan Carlos Castro (2019), has inspired my approach to the integration of smartphones in art teaching.

The MonCoin Project — Peer learning networks and Spatial Learning

MonCoin (My Corner) is a multi-year educational research project conducted in several Montreal area high schools in collaboration with three art teachers and over 300 students (Castro, 2019). The MonCoin curriculum was "designed to incorporate the ubiquity of mobile media and social media practices in the lives of young people with the formal art curriculum" (p. 10). As a research assistant, I contributed to the development of the MonCoin curriculum, which involved designing in-classroom and online learning interactions that encouraged students to express their identity, examine their schools and everyday surroundings, and learn from and about each other by taking and sharing photographs on social media. A number of key findings from the pilot phase of the project were determinative in the development of the MonCoin curriculum for high school classrooms. The pilot phase took place as part of an after-school project for a group of 16-

18-year-olds who had either dropped out of high school or were at risk of dropping out. Lalonde, Castro, & Pariser (2016) examined ways in which youth constructed their identities online through multimodal expressions. Pariser, Castro, & Lalonde (2016) found that while the researchers' goal was to foster critical engagement with civic environments, these at-risk students were less enthusiastic about such goals as they generally felt disempowered to change their neighbourhoods, and were much more interested in making well-crafted images. This underscores the importance for youth of developing technical skills in the process of engaging with other learning activities. Castro (2019) pointed out that students' learning of "the grammar of Visual Culture" was essential to motivating them to engage with "questions of civic concern" (p. 3). In subsequent iterations, we were mindful of the need to integrate the teaching of technical photographic skills in order to engage students with the broader themes of identity construction and civic engagement.

The pilot phase was particularly illustrative of how the mobility and connectivity of mobile devices affected the spatial relations of the participating students and educators. Castro, Lalonde, & Parsier's (2016) found, much to their surprise, that the more students engaged in the online space of the social media network they had set up for image sharing, the more the students wanted to be together in physical spaces to go for walk and trips to take pictures together. Castro et al. (2016) posited that the mobile devices gave students a sense of spatial agency by allowing them to engage with the curriculum as they moved freely in their educational and civic environments. The freedom of movement afforded by the curriculum and mobile technology was critical for student motivation, and also created a desire of being together as a collective learner in physical space. This finding underscored the ways in which online and offline learning spaces reinforce one another in the learning process. As such, our research team was extremely

conscientious about designing complementary in-classroom and online activities that built on interaction and engagement in physical and virtual spaces.

Peer-learning is another pertinent aspect of the MonCoin curriculum. Castro (2019) argued that while peer-learning has long been fundamental to visual arts education, social media offers unprecedented abilities for students to view their peers' artwork asynchronously. Castro's (2012, 2015) research has focussed on harnessing the relational and collective nature of learning that occurs on social media for art educators in their classrooms to create dynamic, decentralized networks online. For MonCoin, we created decentralized peer-learning networks by asking participating students to create Instagram accounts with an anonymous pseudonym and then following the accounts of their classmates, only. By doing this, we established a closed-network of 20-35 students, teachers and researchers, in which the identities of the participants were largely unknown to each other. These closed learning networks provided a framework for allowing students and educators to exchanges images and ideas. Akbari, Castro, Lalonde, Moreno, & Pariser (2016) explained, "A key objective of our curriculum is to amplify the already existing peer learning networks and harness the collective intelligence of the class to expand the space of possibility in creative ideation" (P. 20).

We observed that our creating peer-learning networks enabled students and teachers to learn from and teach each other by exchanging images and receiving feedback. As an example of peer-learning in MonCoin, Akbari et al. (2016) described the example of "Create Your Mission," which asked the participants to create prompts for their peers. Participants discussed how the process of developing their missions for their peers allowed them to "test out their own ideas with the group, and make adjustments and improvements based on the feedback loop that emerges from the collective learning network" (p. 23). Akbari et al. (2016) argued,

> These examples illustrate that collective learning emerges when groups of individuals communicate freely and frequently with each other. It is not a collaborative process where consensus is reached; rather, it is dependent on individuals sharing ideas with the group. The educator's role is to create and sustain the conditions that enable collective learning through creative exchanges in a social network. (p. 24)

As such, our curriculum was not teacher or student-centred but rather centred on the collective learner. In this view, collective learning emerges "from interactions among students within the conditions established by the teacher" (p. 23). The teacher's role is to establish, maintain and adapt the conditions that "enable positive and generative communication among students" (p. 20). This emphasis on collective learning through peer connectivity, which I elaborate on in the theory chapter, is a central aspect of this dissertation. My research aims to expand on the notion of collective learning on social media to incorporate the situated and spatial learning that occurs when interacting with one's environment through sensory-mobile photography and creative mapping.

Spatiality is also a central theme in the MonCoin curriculum. I examined how the combination of asynchronous connectivity of a mobile curriculum and physical in-classroom interactions was essential to students' engagement and learning during the project (Akbari, 2019a). I posited that a key to the success of MonCoin was "in creating opportunities for students to actively engage with their immediate physical space in their online network through photography" (p. 103). In MonCoin, photography played the important role of triangulating "the binary between face-to-face and online learning" by allowing students to share their various impressions, observations and perceptions of the everyday spaces of their schools and neighbourhood on our closed social media network. I provided the examples

of the school walks and neighbourhood walks as instances when students taught and learned from each other about their everyday surroundings and photography. Going on walks provided students with a chance to be together and move through the space of their schools and neighbourhoods. Being together with peers in familiar spaces for the purposes of taking photographs, and sharing these photographs online motivated students to engage with the curriculum, their surroundings, and their peers. Being together in space as well as viewing photographs of others online reinforced students' engagement and learning.

Akbari (2019b) also examined students' spatial learning in relation to Spatial missions, which are "visual prompts that encourage students to observe, photograph and share various aspects of their everyday surroundings" (p. 131). This included the mission "My Surroundings," "My Neighbourhood," "My School," and the related micro-missions "Nature," "Notice," "Change," "Paths I Take," "What I Love About My School," and "Where I Learn Best." For Akbari (2019b), the goal of the spatial missions "is to intervene in the automatic functions" of one's sensory awareness in everyday environments, and "guide students' attention towards specific aspects of their surroundings" (p. 130). Akbari (2019b) provided some examples,

> The students' attention is directed to the murals, graffiti, and myriad hidden messages on the street of the city when they see the micro-missions "art" and "message" on their mobile device. After seeing the micro-mission "Paths I Take," a student might slow down or stop on her walk home to take a few pictures. An enthusiastic student will bend down or lie on the ground to capture the perfect angle. (p. 131)

These spatial missions primed students to observe and pay attention to their surroundings, and also to engage with their surroundings, bodies and senses, in ways that differ from their automatic and habitual ways. As such, the spatial missions, with mobile networking of the smartphones, proved to be powerful tools for connecting youth to place.

My doctoral study elaborates on these findings by explicitly attending the spatiality of learning, and the relation of the senses to place. I base my approach on the assumption that attending to the sensory through photography can be effective in connecting youth to their everyday environments, reflect on their connections to these places, and share their perspectives with their peers. A consistent finding in the research on the spatiality in MonCoin was that face-to-face and online interactions complemented and reinforced each other. This highlights the importance of planning, scaffolding and coordinating the in-classroom activities with the posting of missions online. It also highlights the potential for using mobile photography, social media and online mapping to connect youth to their everyday surroundings.

Spatiality is a key consideration for the "Map My World" curriculum. In the following section, I examine the theme of spatiality in relation to Placed-based education. This literature provides a critical theorization of the local, and ways in which educators in the arts and humanities can meaningfully connect their students to their local environments and communities. After, I examine the theme of attending to place in relation to the senses and cartography.

Place-Based Education

Place-Based Education (PBE) refers to educational practices and research that connect classrooms to local communities and environments (Ball & Lia, 2006; Gruenewald, 2003; Gruenewald& Smith, 2008; Sobel, 2004). The environmental educator and scholar David Sobel (2004) described PBE as "the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum" (p. 6). PBE relates to diverse educational practices including community-based education, environmental education, education for sustainability, project-based learning, critical pedagogy of place, and land-based learning. The shared objective of these educators and researchers is, in the words of Gruenewald and Smith (2008), to make the walls of the school

"more permeable" (p. xx.) by asking students to go outside, to interact with members of their communities, and to address local needs. PBE is often touted as an antidote to standardization in educational policy. "Generic textbooks designed for the big markets," Sobel (2004) argued, "provide the same homogenized, innutritious diet as all those fast-food places on the strip" (p. 4). Sobel (2004) believed that educational biodiversity flourishes when educators anchor their teaching in local needs and environments. Gruenewald (2003) took issue with the exclusive emphasis on standardized education because it deprived educators of opportunities to incorporate the actual experiences of their students in the phenomenal world in learning. Instead, educators "are handed, and largely accept, the mandates of a standardized, "placeless" curriculum (p. 8), which primarily aims to prepare students for the globalized market economy. Promoting student engagement in community life contributes not only to diverse forms of learning that can emerge from students' in-situ experiences but also to the overall health and quality of life in their communities.

The conceptualization of the local is an important consideration in PBE. Ball and Lia (2006) problematized approaches in PBE that privilege local knowledge uncritically and create a false dichotomy between the local against "globalist, rootless cosmopolitanism" (p. 264). They pointed to the writings of the environmental activist, intellectual and farmer Wendell Berry (1972), which inspired successive generations of researchers to develop place-based approaches to social and ecological sustainability in education. This tradition has made valuable contributions to PBE. However, Ball and Lia (2006) contended that some arguments made by early place-based educators were "too simplistic or under-theorized when held under the light of critical scholarship in the humanities, social sciences, and education," which have been transformed in recent decades by "feminist, queer, post-colonialist, and critical multiculturalist" theories (p. 266). Ball and Lia (2006) emphasized that approaches to place-conscious education

that depoliticize the local come dangerously close to naturalizing the local and promoting homogenized notions of community that fail to account for the diversity within local communities. This reduction, they argued, could "cause injury to particular marginalized individuals or groups who inhabit that community" (p. 266). The local is internally diverse, and it has multiple, complex, and, at times, contradictory relations with other places, and the global. This requires educators implementing PBE to "remain attentive to the political geography of difference not only among places, but also within places" (Ball & Lia, p. 270).

Gruenewald and Smith (2008) argued that addressing this diversity in educational contexts requires a critical awareness of the political implications of being in a place. They advocated for an approach to PBE that accounted for the realities of the global and advanced the notion of new localism. In their conceptualization, new localism conserves and creates "patterns of connectedness and mutuality that are the foundation of community well-being" (P. xvi) as a response to economic globalization (p. xvi). They viewed globalization under corporate capitalism to potentially be "economically devastating, culturally homogenizing, and ecologically destructive to local communities" (p. xiv). Thus, the act of creating connections between students and their local communities is also a political project. However, new localism also implicitly and explicitly involves contextualizing the local in relation to the global. Gruenewald and Smith (2008) were adamant that in the process of connecting students with the local, it is always vital to resist "nostalgic or homogenous images of the local" that fail to attend to the "diversity within places and the diversity between places" (p. xxi).

Critical Pedagogy of Place (CPP)

To address the important connection between PBE and the political, Gruenewald (2003) developed the concept of Critical Pedagogy of Place (CPP), which incorporates elements of PBE and Critical Pedagogy. For Gruenewald (2003), the key connection between these traditions is

their focus on “localized social action” and “situationality” (p.9). The notion of “situationality” draws on the influential work of critical pedagogue Paulo Freire, and particularly a passage in which Freire (1974) described how people’s political realities are conditioned by their situation:

> People as beings “in a situation,” find themselves rooted in temporal-spatial conditions which mark them and which they also mark. They will tend to reflect on their own “situationality” to the extent that they are challenged by it to act upon it. Human beings are because they are in a situation. (p. 109)

Freire's "situationality” reveals the geographic dimensions of critical pedagogy. The key shared goal of critical pedagogy and CPP is to make learners aware of their socio-political contexts so that they “act on their own situationality” (Gruenewald, 2003, p. 8). CPP simply makes explicit this connection between one’s “situationality” and place.

For Gruenewald (2003), two key objectives for CPP are “reinhabitation” and “decolonization.” The former has long been a major focus of PBE, while the latter is a central theme in critical pedagogy. Reinhabitation involves identifying, recovering, and creating “material spaces and places that teach us how to live well in our total environments” (p. 9). This necessitates that one develops a sense of rootedness, care and intimate relationships with places. Decolonization requires one to “identify and change ways of thinking that injure and exploit other people and places” (p. 9). This necessitates political engagement with place. If one aims to learn to live well socially and ecologically in places (reinhabitation), then one must also begin to “recognize disruption and injury and to address their causes” (Gruenwald, 2003, p. 9). From an educational perspective, decolonization and reinhabitation involve unlearning hegemonic notions in the dominant culture, and also learning socially just and ecologically sustainable ways of living well in a place.

Land-Based Education (LBE)

Land-Based Education (LBE) builds on PBE and CCP by adding the important element of Indigenous ways of knowing. Within this view, ontologically land encompasses "all water, earth, and air and is seen simultaneously to be an animate and spiritual being constantly in flux " Styres, Haig-Brown, & Blimkie, 2013, p. 37). Epistemologically, land is an essential source of knowledge. Tuck, McKenzie, and McCoy (2014) emphasized the importance of Land-Based Pedagogy for reconnecting Indigenous peoples to the materiality of the land, as well as the social relations, knowledges, and languages that emerge from the land. McCoy, Tuck, and McKenzie (2016) compiled a special issue of articles on the educational potential of the notion of land as "a spiritually infused place grounded in interconnected and interdependent relationships" (p. 300). They pointed out that a major theme among LBE scholars is the problematization of approaches to reinhabitation in PBE and CPP that do not "recognize the settler colonial histories of and Indigenous claims to the land that is intended to be reinhabited" (p. 17). By not meaningfully acknowledging this history, reinhabitation in PBE can come dangerously close to a form of colonizing settler land. This underscores Gruenewald's (2003) point that it is not possible to live well in a place, without decolonization. LBE scholars argue that it is critical to acknowledge Indigenous claims to land and undoing colonial injuries for PBE and CPP.

Limitations and Dialogical Negotiations

Ball and Lia (2006) pointed out two major limitations for PBE and CPP in school settings, both of which relate to student motivation and interest. Firstly, some students may not be interested in exploring the local environment. Ball and Lia (2006) observed that "many of today's students are likely to find products of mass media, mass pop culture, and the Internet more familiar than whatever happens to be going on in their own backyard" (p. 268). The inclusion of local content does not guarantee student engagement, nor does it necessarily lead to more

effective learning. The second obstacle, which relates specifically to the objective of CPP to create transformative educational experiences, is that some students resist politics and socio-ecological transformation in classroom settings. Gruenewald (2003) noted,

> some ecological place-based educators have learned that over-politicizing pedagogy can be a strategic mistake: If political perspectives are introduced at the wrong time, for example, they can create anxiety, fear, and hopelessness in learners that makes them less capable of taking socially or ecologically appropriate action. (p. 7)

Ball and Lia (2006) suggested dialogical negotiations as a solution to students' resistance to curricula with a strong local, political and environmental focus. They recommended that the focus of the curriculum and actions emerge from conversations and discussions among teachers and learners. Such negotiations should "honour a learner's developmental readiness for engaging with complex ecological themes" (Gruenewald, 2003, p. 7). It must account for the students' existing attitudes and relationships to their local places, as well as their "desires to succeed with the overall status quo" (Ball & Lia, 2006, p. 272). It follows that approaches that aim to engage students with the relational politics of the local must be adaptive and context-sensitive. Since the focus of the curriculum emerges from dialogical negotiations, learning is contingent on the students' existing beliefs, values and attitudes. Ball and Lia (2006) recommended PBE educators to "relativize" the focus of their teaching "with respect to the place in question" (p. 275) and to "temper" their political engagement by being sensitive to "some students' indifference to the local and their resistance to transformative political pedagogies" (p. 262).

PBE in Art Education

For Ball and Lia (2006), a key strategy to engage students with the local and political in the arts and humanities is the incorporation of local, folk, and vernacular artists who reside in the community. They argued the inclusion of "texts, artifacts, and performances that are locally

familiar or meaningful" could be more persuasive for students' critical engagement than "conventional, national literary texts and artworks" (p. 281). This argument converges with the notion in visual cultural studies that the inclusion of everyday artifacts and media can be engaging for youth, and enrich learning in art classrooms. Ball and Lia (2006) also pointed out that the inclusion of local art forms can legitimate excluded and marginalized cultural practices and groups, which fall outside the purview of standardized national and regional education. In this sense, engaging with everyday cultural practices within the community can also enable critical engagement with the diversity of the local.

In art education, Mark Graham (2007, 2008) has explored ways in which PBE and CPP can enrich students' connections to their surroundings. To do this, Graham (2007) suggested the complementary methods of going for walks, creating maps, cultural journalism and activist art. Cultural journalism involves creating media, such as photo-journals and video documentaries, that explore the cultural life of the community "through local histories, stories, traditions, and the artifacts and performances of local cultural production" (p. 380), while activist art-making requires students to reflect on and address environmental, social, and political issues that are germane for their communities. These approaches meet the key objective of CPP to play a transformative role on social and ecological issues within local contexts.

Graham (2008) also suggested the notion of "sacred places" to encourage students to engage deeply with places that have deep personal resonance. To illustrate how this idea can be applied in high school art classrooms, Graham (2008) described a project he did with his high school art students involving the exploration of sacred everyday places through painting and photography. This project began with a dialogue among the class, guided by questions about sacred places, such as "How is this sacred space defined? Have you ever experienced it? Where are the places you go for refuge? How does a space become sacred?" (p. 35). The conversation

becomes the catalyst for students to reflect on the special places in their lives. The class also referred to visual artworks to develop their ideas about sacred places by, for instance, looking at the paintings of Thomas Moran, who "painted the natural landscape as an exploration of sacred earth" (p. 36). Students were also sent out with sketchbooks and cameras to look for, capture, and reflect on sacred spaces within their everyday surroundings. The conversations, photographs and sketches become the inspiration for painting and photo-collages, which become part of a group exhibition. Graham (2008) contended that these activities transformed the classes' collective vision and awareness of their "community as a unique web of history, personal experience, and interaction with nature" (p. 40).

These various approaches to PBE, CPP and LBE provide great inspiration for the development of the educational interventions described in this research, particularly in relation to the question about students' relationship to their everyday surroundings. Scholarly writing suggests that there are great benefits to such approaches not only for learning but also for contributing to the overall health and well-being of the community. This literature also highlights the social, relational and political dimensions of developing such interventions. LBE contributes the valuable, and often omitted, understanding that Indigenous knowledge and colonial histories are integral to places that have been colonialized. The literature also offers insights into the relevance of place-based approaches for art education. This includes the legitimization of local cultural practices and art-making as a powerful tool for enriching students' awareness and relationship to everyday spaces. Moreover, the limitations highlighted by some scholars are extremely pertinent.

Students' lack of interest and resistance to over-politicization are two important obstacles that conscientious educators must account for in their designs and implementations. This calls for approaches to teaching that are dialogical and rooted in conversations among students and

teachers, rather than topics imposed by the teacher. Dialogical negotiations are essential to collective and peer learning because they enable learning to emerge for on-going interactions among learners and teachers. These negotiations are also essential to spatiality, as defined in this dissertation, because being in space necessities on-going negotiations.

The various theories and practices of PBE provide a solid understanding of the educational value of connecting youth to their environments, as well as the multiple layers of the relational, social and political dimensions that constitute local places and global space. In the following section, I examine the themes of space and place in relation to the senses. Sensory studies and education provide pertinent insights and practical strategies for attending to places.

The Senses in Art, Research, and Education

The senses are a powerful tool for achieving a key research objective of using educational and technological interventions to connect youth to their everyday environments. We experience the world around us through the senses; and thus, we can use our senses to understand something about ourselves, and use this understanding as inspiration for artistic expression and peer learning. The field of Sensory Studies offers valuable insights into how we humans relate to our environments and other human and non-human entities through our senses. I specifically draw on sensory anthropology of David Howes (2003, 2005, 2011) and the sensory ethnographic methods suggested by Pink (2007, 2008, 2009) to elucidate the salience of the senses for educational research. Pink (2009) argued, from an anthropologist's perceptive, that the "acknowledgement that sensoriality is fundamental to how we learn about, understand and represent other peoples' lives" in anthropology, as well as a host of different "academic and applied practices in the social sciences and humanities" (p. 7). In most educational fields, and most predominantly in the education of the arts, the senses play an equally fundamental role, yet little explicit attention is paid them. The senses can, specifically, play a critical role in Place-Based Education by bringing

attention to how we experience, perceive and act in the places we inhabit. The senses connect us to place and the social; and such as, I believe it is worthwhile for art educators and students to explicitly attend to the sensorium.

Sensory Studies

Howes (2003) observed that there has been a "sensorial turn" in the humanities and social sciences since the last two decades of the twentieth century (see for example, Stoller 1997; Howes 1991; Classen 1993). In the view of Howes and Classen (2014), the task of sensory anthropology is to describe and analyze the sensory practices and meanings of cultures and societies, while also been attentive to "the danger of generalizing across cultures" (p. 11). A central assumption of sensory anthropology is that culture has a significant role to play in how humans sense our world. They argued, there are "culturally modulated ways of touching, tasting and smelling and culturally meaningful textures, tastes and smells" (p. 4). Just as importantly, there are endless cultural variations and diverse meaning systems, which influence perception at a basic level. To illustrate this point, Howes and Classen (2014) described how three different cultures imagine the sun in relation to their senses.

> In the West… the sun has traditionally been seen above all as a source of light. However, the Tzotzil of Mexico, who emphasize thermal values in their culture, think of the sun pre-eminently as a source of heat, and even call it 'Our Father Heat' (Classen 1993a: 122–26). The Batek Negrito of peninsular Malaysia, who classify virtually everything in their environment by smell, say that the sun has a bad smell, 'like that of raw meat', in contrast to the moon, which has a good smell, 'like that of flowers' (Endacott 1979: 39). (p. 5)

These divergent classifications of the sun as sight, temperature and smell suggest that there exist culturally specific means of classifying the senses, which modulate human perceptions and actions in fundamental ways. It follows that understanding people's sensory lives requires an

understanding of the diverse culturally specific sensory coding systems, which mediate our relations with our environments, and human and non-human others. The critical role of the sensory anthropologist, within this conceptualization, is to elicit, identify, and analyze the sensory models of the people they study. This also sets up a program of cross-cultural analysis, in which Western ocularcentrism is viewed as one among many ways of organizing sensory experiences. Howes has frequently critiqued the tendency in Western culture to associate the visual and auditory with the intellect, and elevate sight and sound above the other senses. One implication of this is the need to attend to "those senses which have customarily been denigrated as 'lower' in the West, particularly smell and taste" (Howes, 2011, p. 318).

Classen, Howes, and Synnott (1994) illustrated the profound role that odours play on emotions and social bonds, and they argued for the importance of attending to smells to understand social life, culture and power. In the modern West, there is a general lack of attention to the role of the olfactory in culture and politics. They argued cultures suppress certain senses "not only because they are considered inferior, but also because they are considered threatening to the social order" (p. 4). "Olfactory silence" within the modern Western sensory regime reveals a great deal about the covert and unnoticed ways this sense enforces socio-political hegemonies (p. 162). Classen et al. (1994) revealed the relations of smell to power by contrasting the characterization of the scents of those in power to that of the marginalized:

> While groups in the centre – politicians, businessmen – are characterized by a symbolic lack of scent, those on the periphery are classified as odorous. Women, for example, are either 'fragrant', or 'foul'. Ethnic groups exude 'foreign', 'undesirable' odours. The working classes, in turn, 'reek' of poverty and coarseness. The olfactory challenge for those in power is how to preserve their inodorateness from the onslaught of odours emanating from these peripheral. (p. 161)

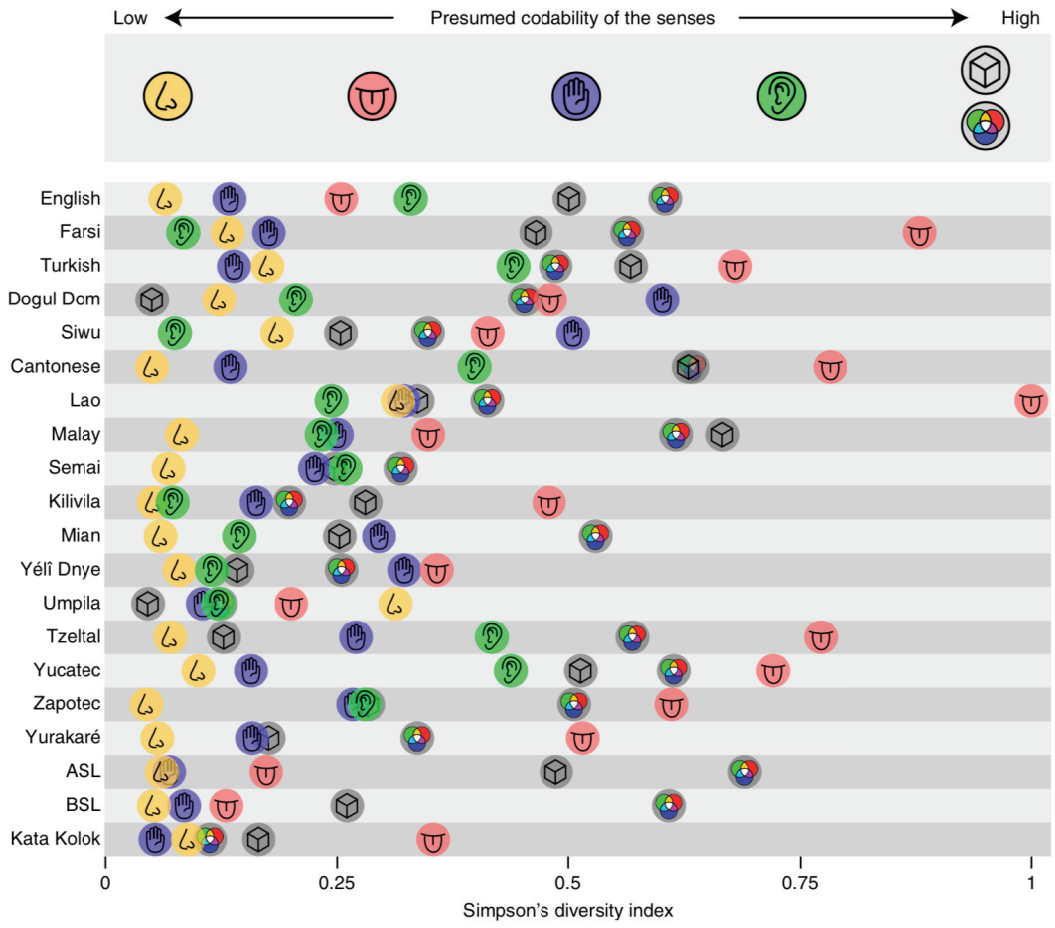
Smells, and smell neutrality, often serve to divide humans along ethnic, gender, and class lines. This point was vividly illustrated in the acclaimed Korean film *Parasite* (Joon-ho, Sin-ae, Moon, & Yeong-huwan, 2019). In a nutshell, this film represented an encounter between a rich family, living in a luxurious house overlooking the city, and a poor family, living in a semi-basement in the city. The poor family is marked by the scent of their humid and damp apartment. Throughout the film, various members of the rich family mention this smell, and this smell plays a significant role in the final outcome of the movie. During one humorous scene, the rich family describes the smell of the father of the poor family as smelling like a "boiled dirty rag" (1:27:00). In a similar vein, I remember a conversation with a friend who described the repugnant smell of curry coming from his neighbour's house as the main reason for not wanting them to be his neighbours. In this case, the emotional, social and political significance of smell is clearly evident. The analysis of aroma by Classen et al. (1994) and artistic examples such as Parasite reveal the value of attending to the significant role of smell in culture and society. The fact that smell is considered a lower-sense, and often not dealt with in polite company means that it is all the more important to develop, what Classen and Howes called, "a heightened olfactory consciousness" (p. 4).

Another important aspect of their analysis was that the understanding of aromas would be enriched through cross-cultural examinations of the role of smell in other cultures, particularly Indigenous cultures. Cross-cultural analysis has been integral for numerous sensory anthropologists who aim to understand the role of the senses in culture. The assumption of these researchers is that examining and presenting diverse sensory models enriches sensory understanding. A good example of cross-cultural sensory analysis was conducted by Majid et al. (2018) which looked at how 20 different languages, including 3 unrelated sign languages, "coded" the five senses to see whether they follow the Aristotelian hierarchy of vision, sound,

touch, taste, and smell. Majid et al. (2018) developed their concept of "codability" from previous research on how different languages classify colours. For their research on sense coding, Majid et al. (2018) provided participants with sensory stimuli and asked them to describe their sensory experiences. Auditory stimuli included "20 audio files that varied in perceived loudness, pitch, and tempo;" tactile stimuli consisted of "10 texture materials, pressed to a booklet, including materials such as felt, sandpaper, rubber, and plastic;" for taste "sodium chloride (salty), 0.05 g of quinine hydrochloride (bitter), 5 g of citric acid monohydrate (sour), and glutamate (umami) were dissolved into water" or presented in powder form; and for smell, a booklet with scratch-and-sniff common odorants was provided (p. 11375). Researchers examined participants' descriptions of their sensory experiences by measuring factors such as "length of response (number of syllables or words), reaction times, and agreement across speakers and within speakers over time" (p. 11371). These measurements showed the codability of each sense in the different languages varies greatly, and concluded that the Aristotelian hierarchy of the senses is not universally applicable across the 20 languages. In the resulting figure (Figure 2), it can be observed that English follows a pattern that corresponds to the Aristotelian model, while speakers of Farsi, Lao and Malay are more articulate in describing tastes. Thus, the researchers concluded that "the mapping of language onto senses is culturally relative" (p. 11374). However, they also pointed out that smell is generally poorly coded across the different languages.

Figure 2

How Various Languages Code the Five Senses



*Note.*From "Differential coding of perception in the world's languages," by A. Majid, et al., 2018, *Proceedings of the National Academy of Sciences, 115*(45), p. 11372. (https://www.pnas.org/content/115/45/11369). Copyright 2018 by National Academy of Sciences.Reprinted with permission.

These examples highlight the value of sensory anthropology for understanding human cultures, languages and societies. Cultural and social structures are fundamental for understanding how we sense our world. Cultural models are the starting point for scholarship in sensory anthropology. These models challenge the hegemonic privileging of visual-auditory in

West and engage in comparative cultural analysis to enrich the understanding of a variety of ways we humans sense our world. Scholarship in this area has shown that generalizations often do not hold up to scrutiny, as there is a rich array of possibilities in how humans can understand and represent our sensory worlds.

Cultural models Versus Relational Ontology

Howes' approach to sensory anthology has received some critique, particularly for its reliance on cultural models for understanding sensory experiences. Howes and Ingold engaged in an insightful debate about basic ontological and epistemological assumptions of their differing approaches to anthropology. A core issue in their debate was Howes' insistence on the social as the fundamental starting point for research, versus Ingold's *relational ontology*. Ingold (2011) described this ontology:

> As I have shown throughout my work, what anthropology can bring to ecological psychology and phenomenology is a focus on the *relational*. 'Social', here, refers not to a domain of phenomena, as opposed – say – to the 'natural', but to a certain ontology wherein every being, or every thing, is a certain gathering together of the threads of life…. (This ontology) takes the world we human beings inhabit, alongside manifold non-humans, to be social in its very constitution (Ingold 2011, 236).

Ingold's view of the social bears resembles a relational understanding of the social of Latour (2007) and spatial theory of Massey (2005). In such views, there is no pre-given phenomenon of the social, but rather sets of relationships and networked interactions that coalesce in space and time. The social is an on-going process. The social emerges from interactions among human and non-human agents. Ingold's criticism of Howes was that his notion of social structures and modals were closed systems. Ingold (2011) asserted that Howes' approach to anthropology is "a comparative project that locks the ways of thinking and knowing

of ‘Indigenous cultures’ into closed sensory epistemologies that are held up to the overarching purview of the all-seeing, all-knowing western anthropologist” (p. 316). Ingold insisted that instead of cultural modelling, anthropologists should “start from the processes of social life” (p. 316). Borrowing from Merleau-Ponty’s phenomenology and Gibson’s ecological psychology, Ingold argued for an approach to sensory anthropology that involves an understanding of the whole body in its environment. In Ingold’s view, the senses are deeply integrated, and cannot be discussed meaningfully as separate systems or models. He (2011) argued,

> The senses cannot be differentiated according to the kinds of information they transmit for the simple reason that they are not transmitters. Vision, hearing and the rest are aspects of action – ways of attentively going forth in the world; they are not filters in the conversion of external physical stimuli into internal mental representations (Ingold, 2011, p. 315)

Based on this, Ingold rejected the terminology of ‘scapes’ such as soundscapes and smellscape because they suggested a parsing apart unified sensory experiences. One of his core arguments was that “in reality, the environment that people inhabit is not sliced up along the lines of the sensory pathways by which they access it. It is the same world, whatever paths they take” (Ingold, 2011, p. 316). In response to this, Howes pointed out that sensory multiplicity and integration has long been a core theme in his research, and contended that Ingold’s model privileges the visual and auditory while failing to meaningfully address the underrepresented senses of smell and taste. Moreover, Howes took issue with Ingold’s relational ontology. Howes (2011) stated that while he agreed with Ingold on the importance of taking “human–animal relationships into account,” he also believed that “dissolving social relations into ecological relations and defining the social as ‘a certain gathering together of the threads of life’ means jettisoning any concept of social structure” (p. 329). For Howes (2011), abandoning social structures could lead to a universal and a-cultural understanding of the senses that fails to account

for the many ways in which culture "*mediates"* our relations with human and non-human in the environment (p.329).

For similar reasons, Howes also rejected the tendency of anthropologists such as Ingold to over-rely on Merleau-Ponty's phenomenology of perception. Howes and Classen (2014) took issue with such approaches because phenomenologists, "in their effort to arrive at a 'prereflective' understanding of our being in the world," have "left all the essentialist presuppositions about the 'nature' of the senses that have currency in our culture unquestioned and intact" (Howes, 2014, p. 9). Such approaches, do not address the privileging sight and sound among Western academics, for instance. Nor do they reflect the diverse ways in which cultures structure sensory perceptions, nor the diversity of sensory experiences within cultures. Thus, Howes and Classen (2014) asserted, "phenomenology may be highly informative of a particular approach to the world and it may speak to many people who have had similar experiences. However, it cannot speak for all peoples everywhere" (p. 10). In other words, the value of phenomenology for understanding human action and perception is limited because it does not meaningfully address the social and cultural dimensions of sensory experiences. In this view, anthropological research ought to be rooted in cultural models, and anthropologists are recommended to take as a starting point the social and cultural context of those they study. The contextual anchoring of research is also essential for challenging Western hegemonies in terms of understanding the sensory.

In my view, valuable arguments were made on both sides of this debate. On the one hand, Howes' critique of visual essentialism as an unreflective adoption of Western cultural bias is valid, and so too the corollary that the lower senses, from the Western view, of smell and taste must be more thoroughly investigated. As I argue later, there is clear privileging of sight over other senses in Visual Culture and Art Education. Calling attention to sensory experiences

beyond the visual is of great value to Art Education. Furthermore, it is true that the senses are fundamentally integrated into a body, as a whole, in its environment, as Ingold contends. However, it has also been my experience as an educator that there is great value in isolating and attending to a specific sense at a given time. As Zhang (2017) observed in his during his sensory ethnographies studies on tasting and filming tea, the senses are unified and work as a whole, but "when one sense organ may work more actively, another may be less active" (p. 143). While numerous sense organs, and our bodies as a whole, are constantly engaged in sensory entanglements with our surroundings, our conscious awareness has limited bandwidth. Thus, Zhang found that while filming a tea tasting ceremony, he forgot to taste the tea. For similar reasons, I found that when I focus and listen to my everyday surroundings, I notice new things that were had previously escaped my conscious awareness (Akbari, 2014). This is the pedagogical value of isolating the senses. It enables of experiences a familiar space anew.

In my attempts to photograph and encourage students to photograph their sensory experiences, I have often found the categorization of five senses to be limiting in many ways. There are many sensory experiences beyond that defy this categorization; and, furthermore, the senses are integrated and they do not always lend themselves easily to photographic representation. In spite of these limitations, focusing on the senses has been an extremely productive creative constraint, which, I have found forces photographers to notice and focus on specific details in their surroundings, and think carefully and creatively about how to capture what they sense in an image. Isolating the senses in this wayhas been pedagogically fruitful. Thus, I see tremendous usefulness in the cultural model for education because this model brings awareness to the cultural specificity of sensory experiences; provides an insightful critique of the Western model; and calls for attention to the rich diversity of human sensory experiences and representations, beyond the visual-auditory.

In some ways, however, the cultural model contradicts the epistemological and theoretical framework of this dissertation. In the previous chapter, I argued that learning is a dynamic, adaptive and open-ended process of interactions within and among individuals and collectives in specific contexts. Massey's (2005) relational understanding of spatiality has enabled me to understand learning as "spatio-temporal" events, which involve on-going negotiations among human and non-human actors. This opens the possibility for political and democratic engagement. For Massey (2005), the conceptualization of space as open, contingent and dynamic necessities the rejection of notions of structure that rob space of its "inherent dynamism" (p. 39). Massey was particularly critical of Lévi-Strauss' structuralism, which aimed to undercover underlying structures to explain culture and society. For Massey, this structuralism is "characterized by relations between their constituent elements such that they form a completely interlocked system" (p. 39). In other words, structures are closed, a-temporal and static systems, which rob "relational construction of the anti-essentialism to which it is often claimed to lead" (p. 39). For Massey, one catastrophic consequence of the conceptualization for classical anthropology was what she called the "turning" of "world geography into a historical narrative" (p. 36). In other words, cultures in places elsewhere were not seen merely as alternative ways of being in the world, but rather as being back in time, behind in terms of development, but developing to join the developed world. For Massey (2005), a relational understanding of space was a political project that demanded respect for the trajectories of others in spatio-temporal relationships and configurations. This implicated the multiplicity and dynamism of local places as well as global space.

Massey's theorization of space, Howes' cultural model, and Ingold's phenomenological and ecological model were all essential to Sarah Pink's (2009) approach to sensory ethnography.

Pink (2009) called for an approach that is contingent but also considers mediation of cultural and social forces. She argued,

> Indeed it is essential that the sensory ethnographer appreciate the cultural and biographical specificity of the sensory meanings and modalities people call on and the sets of discourses through which they mobilize embodied ways of knowing in social contexts. However, at the same time, our sensory perception is inextricable from the cultural categories that we use to give meaning to sensory experiences in social and material interactions (including when doing ethnography). Indeed, perception is integral to the very production of these categories: Culture itself is not fixed. (p.28–29)

This statement suggests that culture is enacted, produced, adapted by individuals and social groups. For Pink (2009), it was essential to understand culturally-specific sensory categories and meanings "in terms of a model of culture as constantly being produced and thus as contingent" (p. 15). This means that while Howes' model is vital for anchoring research in the social and cultural context, it is also essential to attend to the "specificity of individuals' practices and the experiential" (Pink, 2009, p. 12). One important aspect in the diversity of sensory experiences is what Howes and Classen (2014) called the politics of perception, referring to the critical role sensory classifications play in establishing positions of power within society. Systems of sensory regulations, officially and unofficially, determine "not only *who* is perceived, but also *how* they are perceived. The smells of the working classes and racialized others, the association of women to the lower senses of touch, taste, and smell are examples of this. Acknowledging the politics of perception is vital for creating meaningful accounts of individuals' sensory practices and experiences. It is also vital to account for individual idiosyncrasies within cultures and sub-cultures.

In the educational context of a high school art class, for example, one can observe the value of the cultural and relational models for understanding sensory relationships. There exist a sensory regime that determines the individual and collective experiences within the school space. Examples of this include the division of subjects such as visual arts and music along sensory lines and the ways in which student bodies are disciplined to sit still, move and interact in prescribed ways. However, within these social and cultural codes, there are many discrepancies, and individual idiosyncrasies and social adaptions. Accounting for individual variations, sensory politics, and multiplicity and dynamism within school cultures is essential.

Senses and Emplacement

Pink (2009) proposed a model and various methods for conducting sensory ethnographic research that accounts for culture, as open and contingent, as well as phenomenology and experiential and embodied specificity. Her approach is centred on the emplacement of an embodied ethnographer in relationships with other "bodies, minds and the materiality and sensoriality of the environment" (p. 25). Emplacement, in Howes' (2005) words, refers to "the sensuous interrelationship of body-mind-environment" (p.7). Emplacement addresses the sensuous subjectivity of individuals in relation to their surroundings. In Pink's view, the subjectivity, embodiment and emplacement of the ethnographic researcher are essential to doing sensory ethnography. The sensory ethnographer is co-implicated, along with those she studies, in a process of making place. Pink (2009) described her view of sensory ethnography as a process of making place with others:

> One of the tasks of the reflexive sensory ethnographer is thus to develop an awareness of how she or he becomes involved in not only participating in 'other people's' practices, but also in anticipating her or his co-involvement in the constitution of places, and to identify the points of intervention of her or his own intentionality and subjectivity (p. 43).

The act of doing research implicates the researcher not only in the practices of others but also the production of place and space. This approach to emplacement grounds sensory ethnography in a research program that acknowledges the specificity, complexity, and multiplicity of places, as well as the local in relation to the global. Doing sensory ethnography involves connecting with people in place. This research program is rooted in a sense of being in place, and knowledge emerges through interconnections among people in environments. Pink (2008) suggested sensory ethnographers to address the act of making place on different levels:

> First we investigate how the participants in our research make place themselves; second we reflect on how we collaboratively make place with research participants through research practice; third we consider how in representing our research we reconstitute place;and finally we anticipate how audiences/readers of our work in turn create place as they follow and add to its narratives. (p. 2)

Pink (2009, 2008, 2007) suggested a number of audio-visual methods for investigating place-making on these three levels. Pink's (2008) research on the town of Diss in England illustrates some ways the sensory ethnographer can make place by doing and representing research. For this research, Pink (2008) examined the cultural artifacts of a town trail leaflet, a historical walk, and two documentaries. She described her embodied experience of the artifacts as "ways of making place in movement" (p. 12). The leaflet used text, images and a map to invite a self-directed walk, the History Walk was an event as part of the city's history festival, and Pink also looked at a television documentary called "Something About Diss" and the sequel "Something Else About Diss." The leaflet and walk involved moving through the space of the city, while the walker is directed to look and see specific aspects of the environment that have historical significance. In films, the voice of a narrator guides the viewer as the camera moves through the town, inter-cut with historical photographs comparing past and present. These films

convey a sense of movement through space and time through narration and visuals. The common elements among these artifacts are that they, in their way, involve movement through space-time, and they are also didactic in that they aim to teach one to "learn where to look" (p. 11). Pink (2008) argued that walking and viewing films offered ways of "sensorial engagements that entail not just looking, but feeling or imagining the ground underfoot, the weather (central to my experience of the walks and explicitly compared between the films), and many others things" (p. 12).

Video is another important tool for sensory ethnology. Pink (2008) identified the method of a "video or multisensory tour" as a collaborative process "that involves walking around a specific place with a research participant" (p. 7). During the walk, which is recorded on video, the researcher and participant move through space while attending to "the physical and multisensorial environment as ways of exploring material/sensorial practices and meanings, and place-making" (p. 7). For Pink (2007), recording video while walking with research participants is an effective tool for attending to "the sensorial elements of human experience and place-making" (p. 240). Pink (2009) highlighted some of the benefits of using video in sensory ethnographic research including providing "ways of inviting research participants to use their whole bodies to communicate; reflexive texts that represent the emplacement of the research in the research context; and processes through which to share and collaborate in the production of an 'ethnographic place-event' with research participants" (p. 114).

Videos, pamphlets, and films are valuable tools for conducting research that is attentive to the sensorial. However, there is also an important limitation: these media are exclusively visual and auditory. They only capture smell, taste, touch, proprioception, movement, and other embodied experiences through allusions, metaphors, and visual and auditory effects. Pink was able to articulate and experience rich sensoriality at least in part because she is a highly trained

expert on sensory research. For the average person, such as a teenager in a high school art class, walking or video documentary may not be enough to engage deeply with one's environment, develop a sense of emplacement, or sensorially rich experiences. In some cases, it is not enough to create audio-visual representations of places. It also involves priming and motivating individuals to look, listen, smell, taste, and touch. Furthermore, creating audio-visual media that effectively conveys the sensorial experience of place is an art form in itself. It takes a skilled artist to go beyond the didactic and informative in order to convey the sensuality of place in ways that evoke rich sensoriality in the viewer-listener.

For me, this is where Art Education and sensory ethnography converge. The value of Sensory Ethnography for Art Education is in addressing issues of emplacement and culture in shaping our fundamentally sensual perceptions, experiences and representations of the world. The value of Art Education for sensory ethnography is in addressing the artistic skills and training needed to create and appreciate textual-audio-visual media in a sensorial rich manner. Art Education can address the skills of producing effective and sensorial photographs, videos, and soundscapes, as well as the proficiencies in observing and interrupting such sensorial media.

Sensory Education

The senses have always played a significant role in the education of the arts, and, in recent years, there has been a growing interest in attending to the sensory in teaching and learning. Gershon (2011) argued that while there has always been an awareness in curriculum studies of "the arts, politics, aesthetics, and experiential ways of knowing and being," there needs to be more "explicit attention" paid to the senses (p. 2). He called for a *sensual curriculum*, which draws on Sensory Studies (Howes, 2005; Pink, 2009; Stroller, 1997) and curriculum studies to develop approaches to teaching and learning that account for the personal, social and cultural complexities of the sensory experience. On one level, this approach is complementary

with the goals and approaches in aesthetic education. Aesthetic educators regard the creation, appreciation, and critical understanding of artworks to be essential for the development and growth of youth (see, for example, Maxine Greene Institute, 2014).

The senses are essential to aesthetic education. The word aesthetics is derived from the ancient Greek word aisthetikos, meaning sense perception. Sir Ken Robinson tirelessly advocates for the importance of arts education because the arts create spaces and moments for learners to have aesthetic, sensory, experiences. Robinson (2008) described an aesthetic experience as "one in which your senses are operating at their peak; when you're present in the current moment; when you're resonating with the excitement of this thing that you're experiencing; when you are fully alive" (p. 13). In this light, an aesthetic experience is a rich sensorial experience that can be profoundly valuable and inspiring for learners. Abbs (1989) argued that the aesthetic is not only about profound experiences, but also a mode of intelligence, which works "not through concepts but through percepts, the structural elements of sensory experience" (p. 76). For him, the value of art education is in elaborating and developing aesthetic intelligence. In his view, the education of the arts involves introducing learners to "the artistic grammar of expression, the tools, techniques, and traditions of the art forms" (p. 81). Abbs (1989) insisted that teaching aesthetics must be rooted in the "common symbolic order" that is unique to each discipline with its "distinctive work and a range of conventions" (p. 83). This argument is valuable in highlighting the importance of knowledge and skills in engaging with aesthetics, and, by extension, with the sensory. However, there is a blind spot here. Art canons are exclusionary. For instance, Akbari (2016b) argued that in visual arts education, the history of art is often represented as a linear progression from Renaissance to Impressionism to Cubism to Pop Art, and so on. This leaves out many non-western traditions, such as "Persian miniature paintings, Japanese woodblock prints, African masks, and the totem poles of First Nations" (Akbari, 2016a, p. 63), which are significant

contributions to the art of the world. Canons can also be exclusionary to outsider art, craft and local practices, which are important practices for Place-Based Education in Art Education. Furthermore, canons do not address the everyday practices of youth — the central concern in Visual Culture Studies. Limiting teaching of arts and aesthetics to "a symbolic order," as Abbs (1989) contended, does not allow an open and emergent curriculum. Above all, the exclusionary nature of cultural canons minimizes the possibility for educators and learners to engage with the socio-political dimensions of everyday life.

Gershon (2011, 2019) was adamant that sensual curricula must also be, by definition, political, and warned against versions of aesthetics that "eschew the political and/or racial for examinations of the emotive, developmental, or experiential" (p.8). Rather, he insisted, Sensory Studies have shown that "the aesthetic is inseparable from the political" and "Sensory Studies are necessarily examinations of perspective, perception, and power" (p. 8). This assertion hinges, primarily, on the fact that sensory experiences are an amalgamation of the personal, and socio-cultural. On the one hand, individuals filter sensory information through multiple layers of socio-cultural norms and values; and, as such, these norms and values are critical to an individual's sensory perceptions and actions. Factors such as cultural heritage, class, race, gender, and sexuality are always implemented in these norms and values. However, one must also be cautious about reductive cultural models that do not account for multiplicity within groups and individual idiosyncrasies. Gershon (2019) observed,

> There are often greater differences between members within a particular group than divergences between groups, (and) how one attends to and acts on the sensory is always a polyphonic tapestry constructed on the warp of the socio-cultural and the weft of individualism. (p. xiii)

In this view, the sensory is particular, embodied and situated, and, at the same time, embedded in social-cultural norms. Gershon's response to this intermingling was to call for an understanding of the sensory in education as "critically embodied experiences" (Gershon, 2011, p. 2). He rejected the notion of universally understood perceptions, and, instead, emphasized that the sensory is situated within and enacted by embodied individuals in relation to their socio-cultural standards. For Gershon (2019), this understanding of the sensory underscores "the never-finished, always-emergent nature of" what he called "beingknowingdoing" (p.xvii). This emergent process of being, doing, knowing, and sensing is fundamental to my understanding of sensory learning. Learning about and through the sensory involves the personal, aesthetic and psychological as well as the social, cultural and political. From interactions emerge new ways of understanding, perceiving and reflecting on one's sensory experiences and actions.

In addition to this theorization of sensuous curricula, Gershon (2019) also articulated how explicit attention to the sensory can enrich research and practice for five types of curricula, which are:

1. Formal curriculum, the knowledges students are intended to learn in schools (textbooks, assessments)
2. Hidden curriculum, the often implicit norms and values expressed through both everyday interactions and in the formal curriculum
3. Enacted curriculum, the meanings and understandings educational actors create together through their everyday interactions
4. Delivered curriculum, the information teachers present to their students through pedagogy
5. Null curriculum, noticeable for its absence (the gay rights movement in most high school social studies classes) (p.xvi-xvii)

Sensuous educational research is not limited to the examination and development of formal curricula and instruction. The sensory is also a powerful tool for analysis of the hidden, enacted and null curricula. One can investigate the hidden curriculum, for example, by examining the implicit sensory norms within school culture. Gershon (2019) assembled a series of essays exploring the pertinence of the sensory for various kinds of curricula. One example is Wozolek's (2019) examination of the "sensuous curriculum of racism-as-affect" (p. 80), which explores how the null curriculum affects the bodies of marginalized youth in a Midwestern United States high school.

Wozolek's research and theorization centred on "the crew," which consisted of a small group of male students of colour. Wozolek told the story of how he first encountered the group in the hallways of the school.

> As one of only 3 teachers of colour at a Midwestern suburban high school with a student body of about 2,400, I often found myself moving quickly through the halls, working hard to go unnoticed by the largely white student and staff population. As I rushed to the copier one afternoon, located roughly a quarter mile walk from my classroom, I was stopped by a group of biracial male students who asked if I would be their leader. When I inquired about the activity I was to lead, I was informed by Darius (pseudonym), who I knew as one of the more boisterous young men in the group, that it was "for the war of the half-breeds, of course!" Smirking, he continued, "You're our only half-breed teacher, right? So, we need a leader, Wanna help?" (p. 73)

This group of predominantly biracial male youth had developed a collective identity to support each other, and they saw a teacher of colour as an ally in their cause. "Crew business" consisted of performing "tasks they believed would help marginalized students feel safe, recognized, and included at school" (p. 75). "Crew" members gave the example of sitting next to

and talking with a white kid in a wheelchair who was alone in the cafeteria. They explained that while they tried to help as many kids as possible, they mostly focused on youth of colour (p. 75). In many ways, this collective was a response to "absences of African American voices in the curriculum and, in specific, about the dearth of biracial perspectives in school" (p. 63). These students' marginalization and exclusion in the school and formal and enacted curriculum give them the impetus to unite and support each other. In this case, the absence of their identities in the curriculum and school environment was a driving force for these students' unity and resistance.

A key concern for Wozolek (2019) was how this null curriculum "landed on the bodies of marginalized students" (p. 79). The sensuous curriculum, for Wozolek, was a way of exploring the sensory and embodied effects of racism—what he called "racism as affect" (p. 68). Wozolek described a racist encounter as "the sucker punch of privilege," which has "an emotional and physical impact" that "passes through your whole body" (p. 70). Such experiences are formative to how an individual perceives and acts in a particular environment.

Thus, "racism-as-affect" attends to "the encounters in, between, and on bodies as they exist as everyday affects of oppression in schools" (p. 68). This theorization is concerned with everyday encounters that normalize hegemonies in schools. Wozolek (2019) described a spontaneous encounter with "crew" members as an example of such daily encounters. One day, as he was passing through the stairwell, he stopped to eavesdrop on their conversation among two members and a boy he did not recognize.

> I heard Marcus say "Seriously? Goddamn, nigga…. That's what you call a handshake? Why don't you try it again?" This was followed quickly by the sound of palms smacking together. Then Marcus continued, "Good. Better anyway. You've got to have a strong

handshake but not too strong. A black man around here has to show he's worth a conversation but can't be too dominant, okay? (p. 74)

This handshake illustrates how socio-cultural norms and values are implicated in the physical and tactile interactions among the students. In this case, one's social status within the dominant culture is enacted through touch and communicated by the firmness of one's handshake. For Wozolek (2019), this is one of many examples of how various marginalized groups in the school learn "through multiple forms of the sensorium about the school's perceived value of their ways of being and knowing (P. 78). The sensuous curriculum is valuable to Wozolek for it provides a tool of the analysis of the normalization of privilege and racism in everyday interactions. In general, the value of the sensuous curriculum for educational research is in providing a framework that is simultaneously aesthetic and critical.

Sensory Methods in Education

There is extensive literature on practical ways of engaging with the senses in educational contexts. I draw on a set of studies that offer pertinent insights for integrating the senses for this research. This includes Powell and Uhlig's (2019) description of a graduate education course on "Sensory Ethnography," Lee and Duncum's (2011) call for the integration of the haptic in Art Education, Ceraso's (2104) theorization of multimodal listening for Music Education, and my research on Soundscapes in Art Education (2014, 2016, 2020). In this literature, two common themes are salient for my research. First, these authors used the tactic of separating the senses and focusing attention on a single sense at a time. However, in all cases, it was clear that when one is focusing on one sense, many other senses are always implicated. The second critical theme is the relation of the senses to space and place. These studies explore themes such as emplacement and ecology in relation to sensory awareness and representation. They address questions such as how the sensory can inform us about what is it like to be in a place with others, and how one can

represent place. These approaches to sensory education share with Place-Based Education the goal of connecting learners to place. Thus, these studies offer practical tools and activities, such as walking, listening, photographing, sound recording, and viewing contemporary art, for engaging with the senses and place in Art Education.

Powell & Uhlig (2019) described their approach to integrating sensory ethnography in a graduate Education course. Powell, the course instructor, assigned her class five "sensory fieldwork exercises" which aimed to disrupt "taken-for-granted everyday practices" (p. 161). These exercises divided the senses roughly along the traditional Western hierarchy of the sense: Vision/image; hearing/sound/vibration; taste/food and smell/scent; kinesthesia/ambulation/vibration; touch/materialization/tactility/texture (p. 162-164). Suggested activities included "blindfold yourself and move about in a familiar place," "use mapping or photo-elicitation," "create a sound collage, journal or walk via found sounds; create a scent map of "Scentscape," and take a walk with a neighbour (p. 162-163). The course was designed to have an "emergent, experimental and open-ended quality" (p. 159), so learners were given multiple options for each fieldwork exercise, and they were also given opportunities to design their own sensory encounters. Uhlig, a doctoral student in the course, responded to these prompts by creating and exhibiting five boxes to represent the senses: Vision, sound, smell and taste, movement, touch. For Uhlig, the box became a means of collecting, processing and analyzing sensory data. She described her rationale for boxing,

> The material contained inside a box allows me to perform more nuanced problem-solving of carefully curated thought, precisely because the very borders of the box delineated moments of experience and engagement, drawing attention to the object by literally framing it with a new context. The box acts as a framework to provide a structure, which

> organizes my research, ideas, and experiences in an aesthetic composition while still allowing for fluidity of arrangement. (Powell & Uhlig, 2019, p. 158)

The material collected in the box documented her sensory encounters and memories of different times and places. This material also enabled her to play, reinterpret, and rearrange thoughts in and experiences of places. Powell and Uhlig (2019) were cognizant that the dividing of the senses in this way may "reify a Western categorization of the senses and sensory engagement," but, in practice, these sensory exercises underscored "the amodal nature of sensory engagement" (p. 161). The boxes, for example, draw attention to one of five senses at a time; however, "other senses are evoked in written, visual, and material field notes" (p. 172). Powell's description of the course assignments and Uhlig's responses illustrate that separating and attending to a single sense is, in fact, a powerful way of understanding how the senses are deeply integrated.

Lee and Duncum (2011) have shown that this principle also applies to teaching in the visual arts, which, they contended, involves the haptic because visuals "engage spatial, kinaesthetic and tactile relationships" (p. 236). They understood the haptic as multisensory in nature because it includes touch, kinaesthetic, proprioception, and many other senses working together to form a perceptual system (p. 235). To illustrate the value of addressing the haptic in Art Education, they provided examples of women and feminist artists who touch to create vivid representations of socio-political relations in everyday life.

Ceraso (2014) also showed how touch and sight are connected to sound, and the value of exploring this interconnection in educational contexts. According to him, listening to sound does not merely involve the ears; one can "feel sound in one's stomach, throat, legs, and other areas of the body—a common occurrence at clubs where music is amplified" (p. 102). The body is listening. Ceraso proposed multimodal listening as a model for listening with one's body. Ceraso

(2014) drew on techniques and approaches suggested by musician Evelyn Glennie to develop this model for music composition classes. Glennie is a renowned deaf percussionist, for whom the experience of creating and listening to music is fundamentally a tactile experience. To listen, she feels the vibrations on her body and the surfaces of her instruments. Glennie's full-bodied listening illustrates that the act of listening fundamentally involves touching, and feeling vibrations. For Glennie, listening also involves sight. Ceraso noted that, in concerts, "the speed or slowness with which Glennie moves her body as she plays, her facial gestures, and the way that she physically handles the instruments all contribute to how sound is being experienced by the audience" (p. 109). Slow or fast movements, for instance, can evoke a sense of loudness or quietness, or standing in front of a gong for a minute after striking it encourages the audience to pay attention to the resonance that lingers and continues to vibrate the air. For Caraso, this awareness of the synesthetic convergence of the senses can be cultivated by anyone, and it is also an important feature of multimodal listening.

The educational value of multimodal listening is to offer listeners a heightened awareness of place. Ceraso (2014) maintained, "when listeners attend to a sonic event with all of their senses, mundane everyday experiences can be transformed into esthetic experiences" (p. 109). By asking listeners to touch and feel sound, multimodal listening practices aim to attune students to the "ecological relationship between sound, bodies, and environments"(p. 105). The sensory and aesthetic experiences bring awareness to individuals' "embodied relationship to the sonic world" (p. 110). The sonic world plays a fundamental role in how we experience places. Attending to one's environment by listening with one's full body can be an effective way of engaging with one's familiar environment in a different way.

The connection between the senses and place was also a crucial component of Powell and Uhlig's (2019) educational interventions. For Uhlig, the act of walking was a particularly

effective way of reflecting on important questions about her relationship to places. During walks, Uhlig collected objects, which provided "a tactile understanding" of the spaces she traversed (p. 158). These objects, along with other media, were later incorporated into her five sensory boxes. "Photos, maps, audio recordings, and objects" that were collected during sensory walks "all contributed to coming to understand place through the performativity of multimodal sensory data" (Powell & Uhlig, 2019, p. 172). In this case, objects and media represent places, and also provide a chance to play with and reinterpret one's relationship to the represented places.

The connection of self to place through the senses has also been a central theme in my research on soundscape compositions and soundwalks in art education settings (Akbari 2014, 2016b, 2020). For my Master's thesis, I investigated ways in which the process of listening, recording, and editing everyday soundscapes could be incorporated in art classrooms (Akbari 2014, 2016b). One consistent outcome of doing listening activities was that when I asked individuals to listen carefully to their surroundings, they always noticed new details, and this process of carefully listening to ambient sounds revealed a great deal about their personality and relationship to their surroundings. Furthermore, the recording and editing of soundscapes provided learners opportunities to express their relationship to the everyday surroundings of their schools. To guide the recording process, I utilized the notions of *soundmarks* for Murray Schafer (1977), who defined soundmarks as "a community sound which is unique and important to the community" (p. 10), such as the church bells in Montreal. This concept provided learners "a clear directive" for creativity; and moreover, allowed them "to notice and interpret the space of the schools in which they spend most of their days" (Akbari, 2016b, p. 20).

I also explored the integration of soundwalks (Akbari, 2020), which involve walking and listening to one's environment (McCartney, 2010; Westerkamp, 2007), in two different arts education contexts as a tool to connect youth to their everyday surroundings. The first series of

workshops took place in the Greater Toronto Area as part of a drama program for youth with intellectual disabilities. The second series was held with an art class at a private high school in Montreal. In the case of the high school, the emphasis was on making use of iPads, which all students had access to, in order to artistically represent the environment of their school. In the case of the drama workshop, on the other hand, it became clear that the value of soundwalk for these learning was to have opportunities to talk about their emotional reactions, and memories in relation to sounds. In this context, the most valuable activities involved listening to everyday sounds and having conversations among students about their feelings and interpretation of these sounds. Akbari (2020) argued for the immense value of attending to sounds in educational contexts.

> By attending to both inner and outer soundscapes, educators can address pertinent issues in the lives of youth, because how we perceive and interpret everyday sounds reveals a great deal about our identity, personality, and life history. The act of soundwalking—whether done with the ears, microphones, iPads, or a combination of tools—is a powerful method for bringing attention, not only to our everyday surroundings, but also to how we interpret, feel about, and relate to the spaces and people around us. (Akbari, 2020, p. 21)

This research illustrates the value of sensory education for reflecting on one's connection to everyday places, such as one's classroom, school, neighbourhood, and social media networks, and also, by extension, one's relationship to the different people who inhabit these places. A common thread in the literature above is the centrality of aesthetic experiences for sensory education. In many instances, engaging in sensory activities involved heightened awareness of the sensory, and alternative ways of sensing one's mundane environment. These researchers offer different ways of making the familiar strange through the senses. However, as Gershon (2011) argued, sensory education should not only be limited to aesthetics because aesthetics are always

inextricably linked to the political. In the case of soundscapes, for example, the opportunity to listen, create and discuss sounds enabled learners to express their identities, personalities and values (Akbari, 2020). During the discussions about sound, disagreements rather than consensus sparked the most engaging and revealing discussions among learners. The power of sensory education is in creating opportunities for learners to reflect on and express their sensory perspectives. Sharing perspectives in this way enables encounters with the views of others with whom one shares space. This is part of the political project of sensuality and spatiality.

Creative Cartography

Crampton and Krygier (2005) argued that maps make reality as much as they represent it. Their understanding of cartography is based on this assumption that maps are an active force that construct knowledge, exercise power, and promote social change. This understanding of mapping is fundamental to the approach in this research to creative and mobile cartography, which aimed to use maps for the expression of identities and perspectives in relation to everyday places. One theme that often emerges in the literature on cartography revolves the the question of the objectivity and subjectivity of maps. The fundamental assumption in my research is that cartographic processes and representations are valuable in Art Education because they engage us in subjective, social, and political processes within relational space. The artists, educators and researchers I draw from share in common the conviction that cartography is a powerful tool for socio-political engagement. These scholars incorporate cartography in various ways to enable the collective and individual expression of narratives and identities in relation to place. In the following section, I contextualize my research within K-12 education. Next, I present critical cartography as a general framework for understanding mapping as socio-political and relational. I then present examples of artists who use maps to representsubjective, social and political

realities. I conclude with a survey of applications of mapping in Art Education, and the pertinence of this literature for my research.

Mapping and GIS in K-12 Education

Mapping is a topic of great interest for numerous educational researchers in diverse disciplines. Questions of objectivity, subjectivity and truth claims are often at the heart of debates around how mapping and mapping technologies can be applied in K-12 classrooms. Gryl & Jekel (2012) provided an outline of some of approaches to using GIS, Graphic Information Systems, in formal educational settings. GIS are generally defined astools and theories for capturing, analyzing, and managing spatial data. They argued that the incorporation of maps in K-12 on everyday uses of Geo-information (GI), which simply refers to media, collected on smartphones or other mobile devices, containing meta-data about location. Gryl and Jekel (2012) traced three sets of formalized arguments for the inclusion of GIS and GI in K-12 contexts:

> 1. A technical argument (e.g., that GIS might be included in school curricula to prepare students for the requirements of the increasing geospatial workforce)
> 2. The argument of spatial thinking as a key competence for problem-solving in a variety of subjects.
> 3. An argument that re-centres GI in secondary education around the subject and everyday use of GI. (p. 19)

Gryl and Jekel (2012) associated the first two arguments with approaches in education based on instrumental knowledge, which narrowly focuses on the development of technical tools and specialist skills. Instead, they argued that the potential for the everyday uses of GI to enable reflective and emancipatory learning had not been fully realized. They contrasted their view on the importance of everyday GI with that of the first two categories. A primary target of their critique was an influential study on spatial thinking by the National Research Council (2006),

which argued for a strong inclusion of GIS technologies in curricula across disciplines. The NRC research committee looked at how GIS can be incorporated into existing standards-based instruction in all domains, and how cognitive developmental and educational theory can be used to develop new versions of GIS to support learning.

The argument of NRC (2006) for the inclusion of GIS rested on the assumptions that such teaching would allow youth to master tools and the cognitive skills related to spatial thinking. NRC's definition of Spatial thinking involves "visualizing relationships within spatial structures," which can enable learners in various subjects to "perceive, remember, and analyze the static and, via transformation, the dynamic properties of objects and the relationships between objects" (p. 3). NRC's (2006) understanding of spatial thinking is heavily skewed towards math and the sciences, as evidenced by the following passage in which they outlined some of the main attributes of spatial thinking:

> To think spatially entails knowing about (1) space—for example, different ways of calculating distance (e.g., in miles, in travel time, in travel cost), the basis of coordinate systems (e.g., Cartesian versus polar coordinates), and the nature of spaces (e.g., in terms of the number of dimensions (two elevations of buildings, orthogonal versus perspective maps), the effect of projections (e.g., Mercator versus equal-area map projections) (p. 3)

This understanding of spatial thinking resembles the attitudes and assumptions about space and mapping of many students I interviewed at RMA, which is a science-oriented school. While these views of spatiality and mapping are certainly relevant in math and science, they do not fully encapsulate the value of mapping in the art and humanities. The mapping practices I outline in this literature review, which have inspired my approaches to mapping in art classrooms, are rooted in an understanding of mapping and space as lived, embodied, experiential, social, relational and political. Likewise, Gryl and Jekel (2012) were critical of

NRC's restrictive conceptualization of spatial thinking, which rests exclusively on a notion of absolute space and quantitative representation. What is absent for this view, they argued, is "human intent, power, political processes – in short, important dimensions of social life" (p. 19). For Gryl and Jekel (2012) the use of maps in education presents opportunities for meaningful reflection on citizenship. They argued that the value of spatial thinking and learning is to engage learners in discussions about "politics, power, conflicts, discourse, and identity" (p. 20), and advocated for the everyday uses of mapping to encourage and enable spatial citizenship. A spatial citizen, they suggested, "should be able to access, read, interpret, and critically reflect on spatial information; communicate with the aid of maps and other spatial representations; and express location-specific opinions using geo-media" (p. 20).

They also pointed out that a spatial citizen does not necessarily need to be an expert in GIS technology. For Gryl and Jekel (2012), a major shortcoming of NRC's (2006) conceptualization of spatial thinking was its exclusive focus on training students to be the "spatial analysts," who are able to derive information and understanding from raw geo-spatial data. This requires "deep conceptual, methodological, and technical understanding" (p. 21); and as such, should be reserved for professional education (p. 21). The NRC (2006) also acknowledged this as a limitation of implementing GIS in K-12 learning environments. They stated,

> As an expert-based, "industrial strength" technology, it is, in one sense, too powerful for most K-12 needs. It is challenging and inviting, yet intimidating and difficult to learn. While the design issues can be addressed, the implementation challenges are immense. All of the essential implementation supports—for materials, logistics, instruction, curriculum, and in the community—are either weak or non-existent. (p. 4)

These technical and logistical issues are always consequential when teaching and learning with technology, and they have even greater effects when using high technology tools that require

high levels of expertise. I agree that to fully realize the potential of mapping and spatial learning in education, one should not be limited to the realm of professional knowledge, but also include the many everyday uses geo-spatial data, such as mapping applications and geographic meta-data attached to images and other media. Gryl and Jekel (2012) believed that the incorporation of such tools and approaches should be at the core of secondary education, as it is essential for the "emancipated appropriation of space" (p. 22). They argued, "new digital forms (volunteered geographic information, geo-social networks) allow for individual narratives within one representation through the use of different layers;" and thus, modern geo-information can become an educational instrument to engage students in "the negotiation of interests" (p. 22). In this conceptualization, mapping and spatial thinking shift from "decoding absolute spatial representations" towards an understanding of space as social and relational (p. 25). Their conceptualization is aligned with the theoretical framework of this research, which views space as constructed through relationships between the human and non-human in their environment. There are rich histories of mapping practices in diverse fields that are rooted in this theorization of space as constructed through relations; and therefore, space as the dimension of the personal, social and political. In the following sections, I provide a survey of some of these mapping practices.

Critical Cartography and Counter-mapping

Critical cartography provides a framework for mapping practices and theories that account for the constructed, social and political nature of space. Crampton and Krygier (2005) provided an insightful survey of critical cartographic practices, which subvert the claims and the practices of conventional mapping and challenge the vision of the world according to the status quo. They argued that in recent years cartography "has been slipping from the control of the powerful elites that have exercised dominance over it for several hundred years" (p. 12). They

credited this to the “one-two punch” of theoretical critiques of academic cartography in geography, as well as technological developments that have enabled open-source, collaborative, and pervasive mapping capabilities (p. 12).

In the field of geography, many of the assumptions and truth claims of academic cartography were challenged by a number of theorists since the 1980s. These theorists sought to include marginalized voices and reveal the power dynamics within academic cartography. For instance, Harley and Woodward (1987) provided an encyclopedic series of books on the history of cartography, which included the mapping customs of Aboriginal and Eastern cultures. Furthermore, Wood (1992) provided a compelling account of the relation of maps to power, contending that maps can be used as tools of persuasion to enforce existing power structuresand the interests of the mapmakers. A key objective of many critical cartographers has been to mobilize the power of maps in the interests of marginalized and under-represented groups.

In addition to these theoretical critiques of academic cartography, Crampton and Krygier (2005) credited the growth of critical cartography to technological developments, which have made the act of generating maps more accessible than ever. Some examples of cartographic practices that have been enabled by the advancement of mobile and digital technologies include “map mashups,” which amalgamate various data sources into a digital map, and “sound maps,” which enable individuals to share the soundscapes of specific places on global maps (Waldock, 2011; Thulin, 2014). Nowadays, the practice of combing data, media and digital maps has become ubiquitous among commercial and non-commercial enterprises. Such mapping platforms can also play a positive role in art,education and digital citizenship by enabling collective, participatory, and bottom-up approaches to generating and sharing place-based and spatial knowledge.

Artists are important pioneers in this area. Artistic appropriations of mapping

technologies show the potential for challenging hegemonic power structures through cartographic representations.A pertinent recent example of this is an online map developed as part of the "X Them Out" project, which aims to document racist violence across Greece (Bateman, 2020). The online map identifies the location and represents the violent actions against migrants in the form of comic drawings. These maps make visible injustices that are generally wrapped in silence, and also connect these events to the everyday public spaces of localities in Greece (Figure 3).

Figure 3

Online Map of Violent Racist Attacks in Athens Greece

*Note.*Screen Capture taken from "X them out — The Black Map of Athens" website. https://www.humanrights360.org/x-them-out-the-black-map-of-athens/

This example reveals some of the waystechnology has enabled artists and citizens to access and share maps that represent important, and at times hidden, aspects of their everyday spaces. There are numerous other examples of critical cartographic practices that account for the

constructed, social and political nature of space. Crampton and Krygier (2005) saw great potential specifically for artists to use maps as subversive tools, which resist hegemonic notions of space. In the following section, I provide an overview of artist mapping practices that offer insights into how to be playful and creative within relational space. Finally, I will outline some ways artistic mapping has been applied in art education.

Creative Cartographies — Artist Maps and Locative Art

Artistic mapping practices often exist at the intersection of the subjective and political, and provide examples of playful and creative interventions in space. Contemporary creative cartographic practices have precedents in twentieth-century avant-garde art movements. At the turn of century, Dadaist and Surrealist artists dabbled with map-making to enunciate their revolutionary ideals, as evidenced by the 1929 surrealist map of the world. This counter-map, first appearing in the Belgian periodical Variétés, is a light-hearted attempt at poking fun of the colonial project and fervent nationalism of its day. In the 1950s and 1960s, the Situationist International emerged in Europe as the heirs of Dadaist and Surrealist anti-authoritarian movements. Guy Debord (1995), a seminal figure in this movement, described late-capitalist societies as societies of spectacle:

> The spectacle appears at once as society itself, as a part of society and as a means of unification. As a part of society, it is that sector where all attention, all consciousness, converges. Being isolated – and precisely for that reason – this sector is the locus of illusion and false consciousness; the unity it imposes is merely the official language of generalized separation. (p. 12)

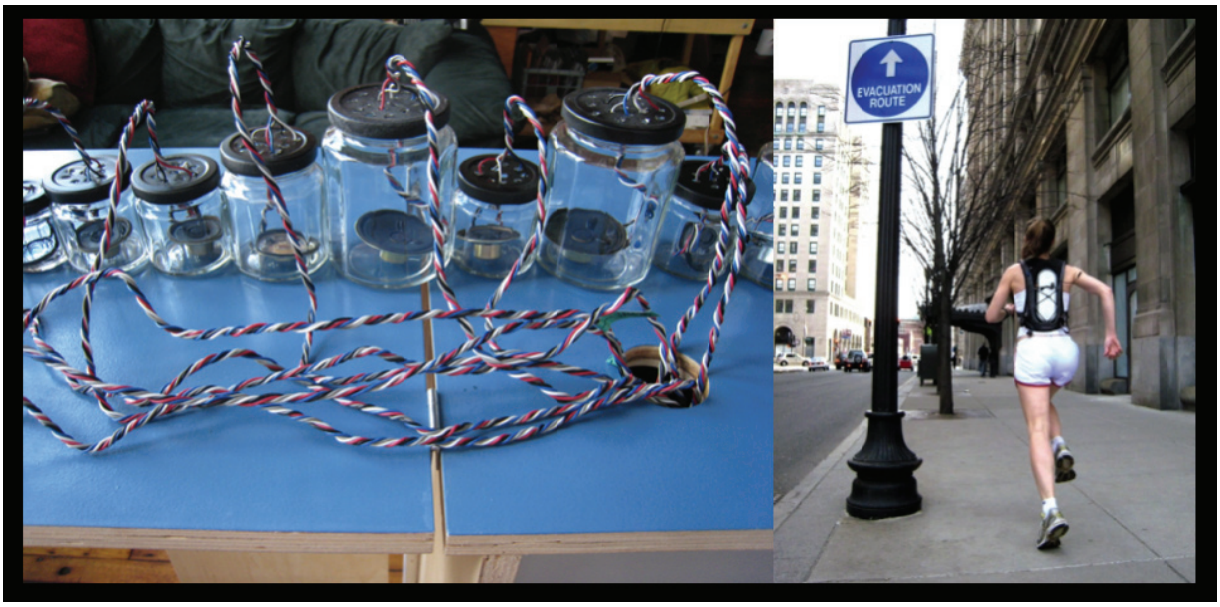
Essentially, *the spectacle* is the web of media icons that mediate social relationships in modern societies, which simultaneously isolates individuals and unifies them under the ethos of consumerist culture. Debord focused much of his analysis of the spectacle on the spatial

structuring of urban environments, which have clearly demarcated lines and boundaries that guide movement within their terrain in accordance with the values of the society of the spectacle. To counter this, Debord (1958) suggested the strategy of the *dérive*, or aimless drifting, in which a walker simply moves through an urban landscape allowing the aesthetic contours of the environment to direct his or her movements. The lessons drawn from such excursions became the basis for psychogeographic representations of the city. Guy Debord's *Naked City* of 1957 is one example of a psychogeographic depiction of Paris. Rather than relying on a grid to unify the various neighbourhoods of Paris, arrows bind different sections of the city indicting movements of the dérive. As such, this map is a subjective, temporal-spatial representation that weaves together the personal narrative of a traveller drifting through the city (PAavotehkti, 2011).

This emphasis on the subjective and temporal experience of space has inspired much of the creative cartography and locative art of the contemporary era. Numerous examples of such artistic productions could be found in the 2008 exhibition called *Experimental Geography*, organized by the Independent Curators International (Thompson& International I.C., 2008). The term *experimental geography* was coined by Paglen (2008) to describe contemporary "practices that take on the production of space in a self-reflexive way, practices that recognize that cultural production and the production of space cannot be separated from each another" (p. 31). In this conception, artists play as crucial of a role in the production of space as geographers and cartographers. The exhibition *Experimental Geography* is inherently interdisciplinary, incorporating the work of nineteen artists and collectives whose productions relate to the fields of science, history, economics, politics and geography. Below, I discuss several illustrative examples of artistic productions that bridged subjective experiences with socio-political meta-narratives.

Figure 4

"It Takes 154,000 Breaths to Evacuate Boston" by Kanarinka



Note. Screen captures taken from the official website of the artist:"It Takes 154,000 Breaths to Evacuate Boston" by Kanarinka, 2008. (http://www.kanarinka.com/project/it-takes-154000-breaths-to-evacuate-boston). Copyright 2020 Catherine D'Ignazio. Reproduced with Permission.

Catherine D'Ignazio, also known by her alias kanarinka, is an artist, software developer and educator whose artistic works can be described as hybrids of art installation, computer science, geography and cartography. She is currently working at MIT's Media Lab to develop technologies and visualization for a critical geography of new media. Her work *It Takes 154,000 Breath to Evacuate Boston* was featured in *Experimental Geography* exhibition. To produce this work, she ran the entire evacuation route system in Boston, which was installed by the city the previous year to demonstrate their preparedness for evacuating people in emergencies. She recorded her breath while running the course on different occasions, in "an attempt to measure our post-911 collective fear in the individual breaths that it takes to traverse these new geographies of insecurity" (Thompson& International I.C., 2008, p. 87). For exhibiting this work,

she presented a series of twenty-six glass jars that corresponded to the number of runs she completed. This work can be read as a contemporary psychogeography that encapsulates the psychological force of fear in a major city in post-911 America (Figure 4).

Solid Sea 03 – The Road Map is another work from this exhibition that related subjective experiences with socio-political meta-narrative in a cartographic representation. The work was produced by Multiplicity, which is a multidisciplinary collective made up of architects, geographers, artists, urban planners, photographers, sociologists, economists and filmmakers (Multiplicity, n.d.). For this artwork, members of the collective travelled to a region of Jerusalem with their European passports to carry out an experiment. On the first day, they travelled from the colony of KiriatArba to Kudmin with a person with an Israeli passport. The next day, they travelled the same distance with an individual holding a Palestinian passport. The former journey took an hour, while the latter took five hours with multiple stops and transfers along the way. For the exhibition, two maps were presented alongside multi-channel video installations, which documented the two journeys. This work represents the divergent subjective experiences of two individuals with different citizenships, who occupy the same land. This artwork provides an evocative and embodied account of political realities in the contemporary Middle East.

MILK, an installation by Ieva Auzina and Esther Polak, offers a vivid representation of the spatiality of materials in global space. For this installation, GPS was used to follow the path of milk from rural Latvia to cheese vendors in the Netherlands. The resulting installation combined the GPS images of the route with sound recording and photographic documentation (Auzina & Polak, 2004). Tuters and Varnelis (2006) pointed out that while most locative art is centred on subjective human experience in space, in a similar spirit to psychogeography of Debord, *MILK* offered an instance where GPS and Geo-media was utilized to allow objects to tell their stories. They suggested this to be a pertinent strategy in the critique of today's globalized consumer

culture. This work makes use of mapping technologies to make visible global supply chains, and the mostly invisible relationship among producers, distributors and consumers. The works of Catherine D'Ignazio, Multiplicity, Ieva Auzina and Esther Polak are instances in which the power of creative cartography to bridge the subjective and political are realized. The resulting maps offer various ways of visualizing relationships of human and non-human actors within global space.

Locative art provides another approach to creative cartography. The proliferation of mapping technologies such as GPS on mobile devices has inspired artists in various disciplines to design multi-sensory and embodied experiences for specific spaces. In these works, mobile media is used to create multiple layers of narratives, meanings, sounds, and images that can only be accessed by moving within a particular space. Whereas the mapping practices discussed above create representations of places that can be accessed from anywhere, locative artworks offer situated experiences that can only be accessed at a particular site. Pyschogeographic mapping practices have been inspirational for some of these locative artists (Tuters & Varnelis, 2006; Townsend, 2006; Wilken, 2010).

An exceptional example of a locative artwork is Janet Cardiff and George Bures Miller's (2012) *Alter Bahnhof Video Walk*, which was designed for the train station in Kassel, Germany as part of the *dOCUMENTA (13)* art festival. To experience this piece, participants used an iPod that contained a video directing them through the station. The events in the video also unfolded in the space of the station, presenting participants with an alternate virtual world that was layered on top of the physical space. In the piece, past and present merge together within a particular physical and virtual site. This example of the video walk illustrates the temporal, situated and embodied nature of locative art. One of the key affordances of this approach is that it can provide a powerful and provocative experience of a given space. However, therein lies the limitation of this

approach as locative artworks can only be fully experienced within the specific space for which they were designed.

Cardiff and Miller's work is but one instance in which the capacities of mobile devices were implemented to create an immersive situated experience. Another example is the musical duo Bluebrain's album *the National Mall*, which has been called the world's first location-aware music album. To experience this album, listeners download a smartphone application that uses Global Positioning System technology (GPS) to trigger different electro-pop sounds while they walk within the space of the national park in Washington, DC (Richards, 2011). Similarly, sound artist Teri Rueb (2014) used this technology to create a locative sound walk for the Bussey Brook Meadow Arnold Arboretum of Harvard University. As the listener walked through this space, a blend of abstract sounds and recorded conversation were triggered bringing the ecology of this area to the attention of the walker. The work of Bluebrain and Rueb illustrate how locative sound works can create multi-sensory and embodied experiences, which, unlike visual locative works, do not require the walker to constantly stare at a screen to navigate through the space (Behrendt, 2012).

Mobile media and mapping technologies have also been used in the development of artistic and educational gaming experiences. A prime example is *Uncle Roy All Around You*, a locative art game by the artist collective *Blast Theory*(Figure 5). This art game not only creates a multi-sensory experience in a particular space but, more importantly, acts as a catalyst for intense, unique and meaningful encounters with other individuals in these spaces. The goal of this game was for a player to navigate the streets of a city, for instance in London where the game first premiered, in search of the elusive fictional character Uncle Roy. To do this, the player was given a mobile device with GPS, and an audio-video interface to interact with an online player who may help or hinder their progress. Additionally, the player could interact with random

strangers as well as paid actors placed in strategic locations within the city. Eventually, the player ended up in an empty apartment with a postcard on a desk that asked the question, "when can you begin to trust a stranger?" Players were required to write their responses and then leave the building. Upon leaving this place, they encountered a stranger waiting in a limousine who asked them to enter the vehicle:

> During the ride, the actor asks them a sequence of questions about trust in strangers and tells them that somewhere else in the game another player is answering these same questions. Finally, he asks them whether they are willing to enter a year-long contract to help this stranger if ever called upon. If they agree, he asks for their address and phone number, the car pulls up by a public post box and the player is asked to post their postcard—addressed to Uncle Roy—to finally seal the contract (Benford et al., 2004, section 3, para. 16)

Figure 5

"Uncle Roy All Around You" by Blast Theory

Note. Screen captures taken from the official website of the artists: "Uncle Roy All Around You by Blast Theory, 2003 (https://www.blasttheory.co.uk/projects/uncle-roy-all-around-you/). Copyright 2020 Blast Theory. Reproduced with permission.

What is striking about *Uncle Roy is All Around You* is the way it that requires individuals to engage with those outside of their social circle and community. This artistic intervention can be seen as a tactful strategy to counter the isolating and divisive aspects of mobile and social media, by asking us to interact with strangers we encounter in our everyday spaces (Walkin, 2010). *Uncle Roy All Around You* provides a compelling example of locative art that brings critical attention to our interactions in digitally mediated quotidian spaces and uses mobile technologies to create new possibilities for living with others in shared spaces.

These works by artists who use maps, mobile and locative media some compelling examples of how mobile media and mapping technologies can be used artfully to create powerful narratives and experiences. The common thread among these works has been that they imagine relationships of people and things in space in non-hegemonic ways, and these works acknowledge the embodied and subjective presence of the individuals who co-constitute any given space. These examples of creative cartography and locative art provide some inspiration for how artists and art educators can approach the representation of space in ways that account for the multiple layers of subjective, interpersonal, and socio-political structures. An art education curriculum that incorporates the practices of creative and mobile mapping can create a space for students to reflect on the multiplicity of the everyday spaces they inhabit. In this sense, the students' learning is contingent on connecting with their surroundings and others. In the following section, I will look at some instances, in which cartographic and locative art practices have been incorporated in Art Education to engage learners with their surroundings and those who inhabit various — physical and virtual — spaces.

Creative Cartography in Art Education

In Art Education, a number of educators and researchers are incorporating creative cartography in various ways. Researchers have developed educational tools, practices and theories for inclusion in art education curricula of psychogeography (Bertling, 2017; Pérez Miles & Libersat, 2016), place-base sensory mapping (Powel 2008; 2016), and geo-locative mobile learning (Keifer-Boyd, Patton and Sweeny, 2018). These studies suggest great potential for the inclusion of creative cartographies in art teaching to connect youth to their surroundings, to learn about others, and to develop critical digital and civic awareness. However, research in this area is still in its infancy in Art Education, and there remains a need for more empirical research to provide practical and theoretical tools for the meaningful incorporation of creative cartography in Art Education. This research addresses this gap. This research is particularly pertinent in the contemporary context given that smartphones have come into common usage within the last decade, and mapping and geo-location are important elements of these technologies. The inclusion of creative cartography provides opportunities for raising spatial, sensory and place-based awareness. Such teaching can also address important issues related to digital literacy and citizenship. In the following sections, I outline various uses of mapping and geo-location in Art Education, and conclude with a summary of ways in which my research will contribute to the field).

There have been a few recent studies drawing on psychogeographical practices, such as Debord's (1958) method of dérive, or drifting. Bertling (2017) used this approach as part of an undergraduate art teacher training. The pre-service teachers were asked to walk, drift, explore and create visual representations of the neighbourhoods of the schools they were assigned for their year-long internship. These activities helped the pre-service teachers foster a sense of place in their teaching communities. Pérez Miles and Libersat (2016) explicitly explored the themes of

wondering and mapping as methods of "aesthetic observation and play" in art education (p. 345). These activities, they contended, create educational opportunities for learning about familiar spaces "through visual, performative, and embodied interaction and play with the urban landscape" (p. 342). They grounded their research in the spatial theories of Henri Lefebvre (1991), Michel de Certeau (1984) and the Situationist International (Debord, 1995). These theories view urban environments as socially and politically constructed, and suggest various methods that incorporate walks and maps as forms of resistance to power structures in urban spaces. An inspiring case for them was the aforementioned method of the dérive. Pérez Miles and Libersat (2016) also presented the work of artists Francis Alÿs and Jorge Macchi as examples of artists who use walking and mapping for playful interactions within the socio-political structures of cities. Based on these approaches, Libersat developed a mobile game application called ROAM. This application enables learners/players to get lost within an urban environment by randomly cycling through a series of directions and documentation prompts, such as "take a picture of something very close-up" (p. 350). According to Pérez Miles and Libersat (2016), the educational value of the ROAM application is in allowing learners to become "reoriented" within a familiar environment, thereby discovering nuances, details, and new perspectives in their space (p. 352). For these authors, the prevalence of mobile technologies in an increasingly networked society presents the educational opportunity to explore local places through playful and artistic interactions. Their approach to walking and mapping combined elements of mobile learning, psychogeography and gamification to create opportunities for spatial learning.

Powell (2008, 2016) has utilized the activities of walking and mapping in her educational research and teaching at Penn State University in order to encourage learners to engage deeply with places. A case in point is Powell's (2008) examination of mapping practices in an interdisciplinary field research course for graduate and undergraduate art education, geography,

architecture and integrative arts students. The objective of this course was to "document and account for multiple narratives and viewpoints" of a particular neighbourhood in Panama City, Panama (p. 6). To achieve this objective, students combined ethnographic methods such as interviews and field note observations with arts-based methods such as photography, mapping and sound recording. Powell (2008) discussed in-depth the collage mapping project of one student, who, during walking surveys, became interested in the textures of the neighbourhood and began photographing close-ups of its buildings, floors and streets. The activities of walking and mapping made this learner more aware of the sensory richness of the neighbourhood. Additionally, the student conducted several interviews with local residents about their connections to their community. She created collage maps to amalgamate this data, presenting both the history of the city through the textures of its material, as well as the local people's personal narratives. As Powell (2008) pointed out that this student's "examination of the built environment was infused with her subjective experience of the neighbourhood" (p. 12). By walking through the streets and speaking to the residents, the student was able to create a cartographic representation of multiple narratives and viewpoints. This cartographic representation is valuable in illustrating the possibilities of exploring and representing a place as multifaceted, relational, and sensory.

In a more recent article, Powell (2016) reflected on the multimodal and multisensory nature of mapping. In reference to the Panama project, Powell described that during the trip,

> Participants often told unprompted stories about important places while they were mapping their neighbourhoods. They discussed the smell of the weekly fish fry—a locally famous event in El Chorrillo—or the sounds of Reggaetón in the street after a soccer match (and how you knew who won based on the type of music played. (p. 403)

In these instances, the specific smells and sounds were integral to the experiences and memories of a place. This indicates that attending to the senses can be deeply valuable for the process of mapping places. Powell (2016) argued, multisensory and multimodal mapping can be a powerful means of evoking "the ways in which we are always emplaced" (p. 405). Drawing on the sensory ethnography of Sarah Pink (2009), Powel defined emplacement as the "interplay of bodies in places" (p. 405). In this view, multimodal and multisensory cartography can be applied as a method for exploring, researching and representing "the mutually constitutive nature of place, identity, and/or social relationships" (p. 405). This research illustrates that the conscious and explicit integration of the senses in the cartographic processes is enriching for eliciting, capturing, and representing emplaced narratives.

Powell offered several examples from different educational contexts that illustrated the value of attending to the senses for emplaced and place-based learning and teaching. One context was a grade 4 and 5 combined class in rural United States. The teacher of this class, Lisa Riley (pseudonym) participated in the Literacy Through Photography (LTP) program, which was implemented in rural schools in Pennsylvania. The teacher participated in narrative and memory mapping activities as part of the LTP program and later introduced these activates in her teaching. For her class, the teacher used memory maps to get students to reflect on their connections to the place in which they currently lived. The students were prompted to draw a map of the place and memories in this place. Students were encouraged to focus on their senses in relation to these memories. While students drew, the teacher walked around the room, initiated conversations, and promoted students to "visualize streets, trees, things found in the home, sounds, and other sensory information that might help them remember" (p. 410). During this time, many unprompted and spontaneous stories emerged about students' memories of homes and local neighbourhoods. Favourite memories often related to places that afforded greater

freedom and agency (p. 410). This is a theme I have found in my research, as well. For the teacher and students, the making of the memory maps was an entry point for storytelling and writing activates. Later, the teacher theorized that her use of sensory prompts produced more detailed and descriptive writing.

Powell (2016) incorporated a similar activity in her graduate course on educational ethnography at Penn State College of Education. She asked her graduate students to "think of a place that they consider special from their childhood," and after some sensory prompting "(e.g., 'what did the place feel like, smell like, sound like?')" to "draw a map of that place" (p. 415). In both instances of grade-four class and the graduate course, the sensory prompts had an effect on the learners. Powell (2016) posited that these prompts helped them "configure their sense of place," and to open up "access to memories and a sense of place that they wouldn't have thought of otherwise" (p. 415). For Powell (2016), viewing mapmaking as a multimodal practice enables one to evoke "narratives of self that are emplaced through one's cartographic engagement" (p. 416). Thus, the maps have the power not merely to represent, but also to act "upon people, producing sensory experiences, memories, new insights, and new meanings pertaining to place" (p. 416). Powell's argumentation and examples provide evidence of the value of explicitly attending to the senses in cartographic processes that aim to engage learners with place.

Keifer-Boyd, Patton and Sweeny (2018) offered pertinent insights for mobile learning and geo-location in Art Education. They proposed a theoretical framework that expands on mobile learning in Art Education to include the geo-locative functions of mobile and digital media. They offered a "posthumanist movement art pedagogy," which investigates artistic and educational uses of mobile media through a post-human lens, paying particular attention to geo-locative awareness, m-learning, and co-figurative agency (p. 23). Post-humanism, in this context, implies not just relationships between human and non-human agents, but also the "entangled histories of

locations," which are "filled with data and diverse potential narratives" (p. 25). There is an important acknowledgement here of the layers of meanings and narratives embedded in places, and the entanglements of the physical and virtual. The authors also acknowledged that their approach is in many ways aligned with the approaches and objectives of Place-Based Education. They also identified practices in Art Education that illustrate the opportunities afforded by mobile media to expand learning spaces beyond formal classrooms, such as the MonCoin project. However, the author also insisted that their theoretical framework focus more explicitly on "geolocative critical awareness that decenters humans as co-figured movements of bodies and things" (p. 25).

Keifer-Boyd et al. (2018) presented four categories that illustrate the potential for applying their theoretical framework in Art Education. These include limit cases, the inversion of dataveillance, human-satellite co-figuration, and gamification of geolocative technologies. Limit cases refer to artistic interventions that enable an imaginative transformation of space. Dataveillance refers to the capacity of mobile devices to collect vast quantities of personal geo-locative data. The authors provided examples of artistic interventions that expose and make visible surveillance regimes embedded in social and mobile media (for example, Hasan Elahi's "Tracking Transience"). The category of human-satellite co-figuration describes artistic and educational uses of digital maps and GPS. They provided the examples of Art Educator Aaron Knochel's (2017) collaborative workshops in which GPS images are used as drawing tools, new media artist Yassan's large scale GPS drawings, and a project called "Transborder Immigration Tool" (TBT), developed by the artist-activist collective Electronic Disturbance Theater, which used mobile phones to provide "poetry to immigrants crossing the U.S.–Mexico border, leading them to water caches in the Southern California desert" (p. 29). Stephen Lund's GPS drawings

also fit into this category. Keifer-Boyd et al. (2018) argued that these various forms of human-satellite co-figuration articulate a complex interrelation of data, body and space.

The final category is mobile digital gameplay, which can involve various approaches to the gamification of mobile learning. The aforementioned mobile application ROAM, and mobile art games of *Blast Theory* provide precedents for the use of games in art and education contexts. There are also useful platforms for art educators to create locative mobile games, such as *Arisgames* (arisgames.org).

ARIS is an open-source platform, which means anyone can use its user-friendly interface to design games that meld the physical and virtual world. This platform was originally designed as a response to a number of theories in learning science, curriculum studies, media studies, contemporary social media and game design. The first prototypes of this platform were designed out of a desire to create a conversational and interactive art history lesson (Gagnon, 2010). These prototypes aided the game designers to develop a number of location detection strategies, which included using GPS, providing situated clues, making use of unknowing actors, and implementing QR codes that can be scanned by a mobile device to provide further information (Gagnon, 2010). Since 2008, educators in a variety of fields have used ARIS to design interactive and locative experiences. This platform offers an intriguing possibility of exploiting the locative capabilities of mobile devices in art education to engage students in their everyday surroundings. For Keifer-Boyd et al. (2018), designing locative games in educational contexts provide an opportunity to engage learners in a critical awareness of public spaces.

The theorization and examples presented by Keifer-Boyd et al. (2018) suggest some ways art educators can incorporate geo-locative tools and strategies for mobile learning in Art Education. This framework is particularly pertinent for one of the primary objectives of this research, which is to develop tools and theories for incorporating the geo-locative features of

smartphones to enrich teaching and learning in high school art classrooms. However, the authors' theorization also highlights the fact that there exists a dearth of empirical research on geo-location in Art Education. I aim to address this gap by conducting empirical research in collaboration with art teachers and students to investigate how mobile media, geo-location, and creative mapping can be incorporated into Art Education to connect youth to their everyday spaces.

The studies cited above contextualize my research on creative cartography and mobile photography in art education. This body of research suggests that walking and mapping as artistic practices are powerful methods that engage learners with their environments. These activities are relevant for place-based learning, as well as mobile and digital learning in Art Education. Furthermore, attending to the senses enriches cartographic engagements with place. Researchers in various disciplines have been attentive to the multimodal and multisensory nature of cartography (see for example, Pink, 2009; Powel, 2016; Taylor, 2014). The existing research on mapping in Art Education suggests that while there is great potential for creative cartographies in this field, there is also a need for the development of tools and theories for effective integration based on empirical studies. I aimed to address this need by conducting research in real-world high school art classrooms, in which I incorporated various approaches to creative and mobile mapping. By developing and implementing a curriculum based on these approaches to cartography, I created occasions, artifacts and spaces that allowed students to reflect on the personal and collective relationships to their everyday surroundings. Through collective mapmaking, students learned from each other's experiences and gained a sense of the multiple layers that exist in their everyday surroundings.

In the following chapter, I discuss the methodology I used to develop the educational interventions that incorporated mobile sensory photography and creative cartography in high

school art teaching. My approach to the integration of these tools in art education has been informed by this literature on Visual Culture, Mobile Learning, Place-Base Education, Sensory Studies, and Creative Cartography.

CHAPTER 4 — METHODOLOGY

In order to develop the curriculum and theoretical model for mobile sensory photography and creative cartography, I used the methodology of Design-Based Research (DBR). This methodology is used by educational researchers to develop systematic yet flexible design principles and theories, which are tested in real-world settings in collaboration with teachers and students (Barab & Squire, 2004; Brown, 1992; Collins, Joseph & Bielaczyc, 2004; Design-Based Research Collective, 2003). In the following sections, I describe the main tenets of this methodology and its limitation. Then, I will describe the design of the "Map My World" curriculum, and how it was conducted in two different art classes in two Montreal high schools in collaboration with the teachers. I will conclude with a discussion of the data that was collected, and how this data was analyzed to develop the findings of this dissertation.

Design-Based Research

Design-Based Research (DBR) is an interventionist methodology often used by educational researchers to integrate new technologies in formal educational settings. Although many of the tenets of DBR can be traced to the research of educational psychologist Anne Brown (1992), this methodology has only begun gaining widespread recognition within the educational research community in the last fifteen years. In 2004, the Journal of Learning Sciences (JLS) released a special issue, in which different researchers sketched out some of the main principles of DBR (Barb & Squire, 2004; Collins, Joseph & Bielaczyc, 2004; diSessa & Cobb, 2004), and debated its limitations (Dede, 2004; Kelly, 2004).

The key characteristics of this methodology include the emphasis on conducting empirical research in educational settings in collaboration with teachers in iterative cycles. The emphasis on conducting research in real-world learning spaces was a reaction to the tendency in educational psychology to examine learning within contrived laboratory settings. DBR

researchers stressed that learning emerges, and is inseparable from the messiness and relationality of learning spaces. Collaborating with teachers is an essential part of this process, as teachers act as gatekeepers and intermediaries between the existing spatio-temporal relations within a context, and the educational researchers' interventions. Furthermore, DBR calls for an ongoing process of implementation and refinement. It is through this iterative cycle that DBR researchers are able to develop tools and theories that are transferable beyond the local context.

DBR has been used by Art Education research for a variety of purposes. Mary Erickson (2005) conducted a study on how the integration of Web-based environments influenced students' ability to retain and transfer their learning. This study involved implementing both traditional and Web-based instructional programs in collaboration with teachers in secondary art classes over a span of three years and led to the development of a hybrid online-offline art instruction program. Melissa-Ann Ledo (2017) worked with six art teachers in two elementary schools to develop an LGBTQ sensitive Visual Arts curriculum. This led to the creation of a series of lesson plans and best practices guides. I used DBR for designing tools and strategies for integrating Soundscape Compositions in Visual Arts classrooms by collaborating with secondary art and music teachers, and their students (Akbari 2014, 2016b). Key features of DBR can be observed in these studies, which all involved the development of new educational tools through a process of collaboration and iteration.

In 2012, Anderson and Shattuck conducted a quantitative study on how this methodology was being implemented in educational research and found that two-thirds of these studies involved designing learning interventions that integrate online and mobile technologies in formal education. They characterized DBR as a mixed methodology; pointing out that the majority of DBR studies incorporate both quantitative and qualitative research methods. The rationale often given by DBR researchers for using mixed methods is that DBR is rooted in a pragmatist

worldview—in the philosophy of Dewey, Peirce and others—which is less concerned with the questions of truth and the nature of knowledge, and more oriented toward theories and inquiry "to produce change in the world" (Barb & Squire, 2004). Accordingly, the value of educational research can be judged by its usefulness and ability to make an impact in the world. This criterion for the usefulness of research, and the connection it establishes between theory and practice, is a vital contribution of DBR to educational research.

Limitations of DBR

Rourke and Friesen (2006) noted there is an inherent contradiction in the epistemological position of DBR. Quantitative and qualitative methods are rooted in the philosophical assumptions of post-positivism and interpretivism, respectively. The former makes assumptions that knowledge is objective, and research must adhere to scientific standards such as generalization, reproducibility and verifiability. Interpretivist epistemologies, on the other hand, understand knowledge to be constructed, situated, experiential, social and cultural. Within this framework, researcher bias, the teacher's role, social relationships among students and the local context are inseparable from the learning outcomes. The basic philosophical assumptions I make for my research about space, learning, and the integration of mobile technology in art classrooms are based on interpretivist worldviews.

The theoretical frameworks of complexity and spatiality are rooted in the ontology of indeterminacy, multiplicity, and emergence. In this view, learning emerges from interactions among individuals within space and time. Subjective experiences and social relations are inseparable from this process. Furthermore, the literature that inspired this research is rooted in an understanding of space as subjective, interpersonal, and socio-political. Approaches such as psychogeography, Indigenous cartography, and sensory education are aligned with the theoretical frameworks of complexity and spatiality, which view space and learning as inherently

interpersonal, and social.

For these reasons, I relied on qualitative instruments to capture the perspectives of the students about their experiences and the multiple spaces in which this project occurred. For instance, I asked students during interviews about their feelings towards their schools, how the project affected their perception of their everyday spaces, or what they learned about their classmates from their photographs and maps. To make sense of the large sums of data I had collected, I developed themes that attended to the spatial and relational aspects of learning in the project. My approach to data collection and analysis was based on an interpretivist worldview, which sees value in the subjective perspectives and experiences of individuals. Thus, I believe the creditability and usefulness of my doctoral research can best be measured based on qualitative research standards.

Transferability and Credibility

There is an existing taxonomy in qualitative research, with a rich history and expansive body of literature with advice on how to ensure research is creditable and useful. Lincoln and Guba (1985) suggested the terms transferability and credibility as alternatives to generalizability and scientific validation, which are more consistent with interpretivist epistemologies. Transferability refers to the degree to which knowledge can be transferred from one context to another. For research to be transferable, the particularities of context and learners must be taken into account, and researchers must provide rich and thick descriptions so as enable others to judge in what way and to what degree knowledge gained from one context can be transferred to another. Additionally, researchers are encouraged to use various strategies to ensure the creditability of their claims. Creswell (2013) offered a synthesized list of such strategies including prolonged engagement and persistent observation, clarification of researcher bias, triangulation of methods for data collection, negative case analysis, member checking, and thick

description.

I have deployed a number of these strategies to ensure that the claims I make are plausible and credible. The data collected captures multiple perspectives and viewpoints. In my analysis, I carefully considered the interviews with the teachers and students, their photographs and maps, as well as my own notes and reflections. It was also vital for me to capture negative cases that complicated any generalizations about the project. I made the point of speaking to students who did not actively engage with the project and those who engaged in problematic ways. Exceptions, outliers, and those who challenged the project turned out to provide valuable insights. For member checking, I developed detailed reports of my analysis for the teachers at SVH and RMA, in which I presented my findings. I incorporated all of their feedback in my analysis. In the findings chapters, I provide thick descriptions of students' engagement and learning in the project at each site, focusing on the themes of spatiality, creative cartographies, and sense and photography. In my analysis, I relied heavily on the reports of the teachers and students during interviews, and the visual media produced by the class.

Theory Building

One of the key objectives of DBR is to "generate and advance a particular set of theoretical constructs that transcends the environmental particulars" (Barb & Squire, 2004, p. 5). While it is vital for researchers to address the limitations of the transferability of knowledge from one context to another, building theoretical models that explain learning and teaching beyond local contexts is an important undertaking for DBR researchers as well. Theory is a laden term with divergent connotations. diSessa and Cobb (2004) characterized the kind of theory building DBR researchers should engage in as *ontological innovations*, which are "theoretical constructs that empower us to see order, pattern, and regularity in the complex settings in which we conduct design experiments" (p. 84). This ability to identify regularities and patterns can be valuable for

orientating educational research and practice. However, I maintain that the theoretical constructs I aim to develop in my research are not generalizable, in the sense that they cannot be separated from researcher bias, context, teachers and learners. Rather, the theoretical frameworks of complexity thinking and spatiality offer me a lens to focus on and emphasize particular aspects of learning such as connectivity, collective learning, nested structures, and spatio-temporal relationships. These theories inspire me to design interventions that harness the connectivity of mobile devices in ways that enrich peer learning and spatial awareness. By conducting educational workshops in real-world settings, I have gained insights into the kinds of learning dynamics that are possible when harnessing the connectivity of mobile devices. In this sense, theory informed my teaching practice, and practice led to the refinement of theory by grounding it in empirical research. This symbiosis between theory and practice shows that theoretical frameworks are not abstract constructs. Rather, complexity thinking and spatiality are tools for recognizing patterns and emphasizing particular aspects of learning.

The theoretical and pedagogical insights I have gained from this research are, in some ways and to some extent, transferable to other contexts. However, transferability is partially contingent on me to clarify my biases and offer detailed descriptions of the complex and multi-layered factors that influenced my research. I provide much of these details in chapter 5 on the spatiality of the project. In the following sections, I describe the process and final design of the educational interventions.

Research Design

In order to develop transferable and credible pedagogical strategies and theory, I designed and implemented two iterations for educational workshops with two groups of high school students. After the first iteration, I made refinements to the curriculum based on the feedback of the students and teacher. I then conducted a second iteration at a different school and with a

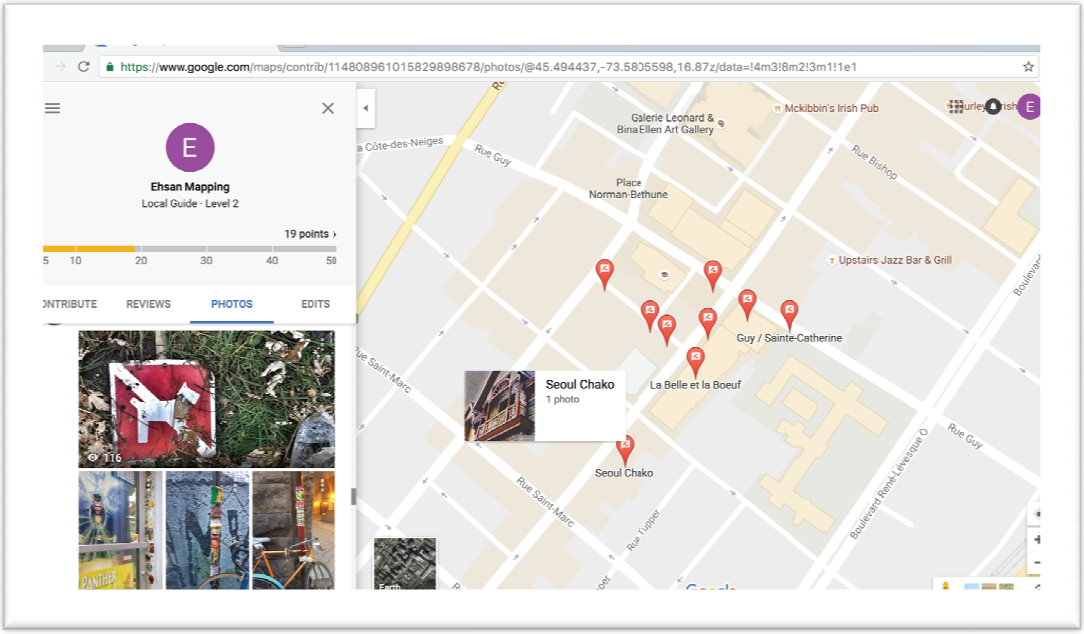
different teacher. I thenanalyzed data from both iterations in order to gain insights into the research questions. To design the curriculum, I piloted two educational workshops on creative and mobile mapping with a group of Concordia Art Education graduate students. These participants have diverse experiences as art teachers and learners and offered invaluable advice and feedback on the proposed curriculum. In the following section, I describe the pilot and distil major findings for the design of the curriculum.

Pilot project procedures and outcomes

The pilot occurred in the fall of 2016 on Concordia University's campus over two sessions in two weeks. In the first workshop, we began with a discussion about the participants' experiences with using the mapping features of their smartphones, after which I introduced the group to a mapping activity requiring us to go on a walk, photograph our surroundings and upload the photographs on a shared account on Google Maps (Figure 6).

Figure 6

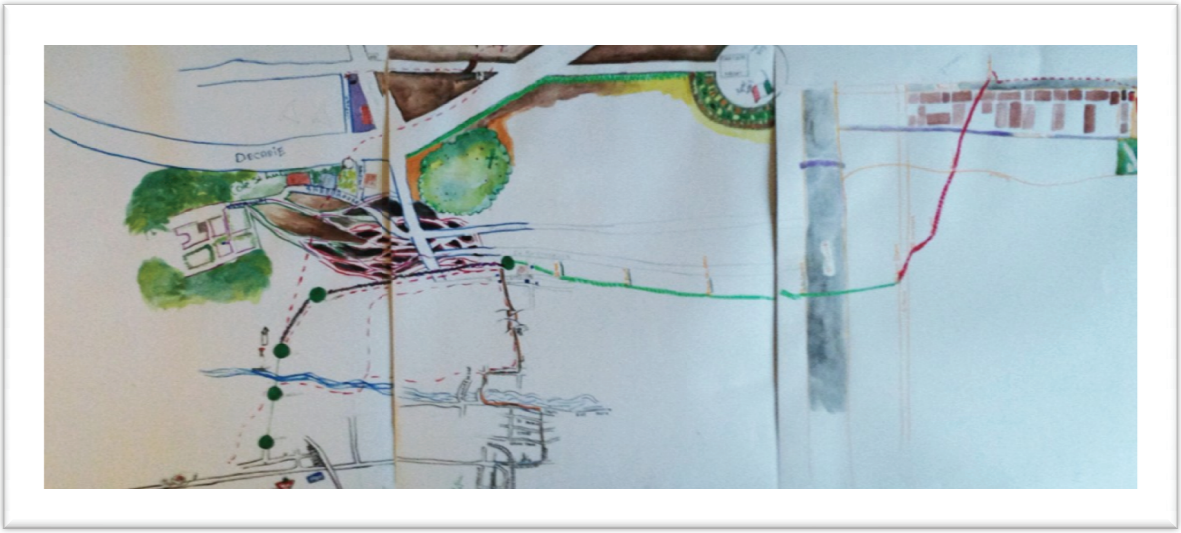
Google Map with Geo-Tagged Photographs taken by Concordia Doctoral Students



We began the second workshop by reflecting on this walk and mapping activity. In response to the question about what they learned, participants talked about becoming more aware of the aesthetic appeal of their surroundings, thinking about their own space within the larger city space, and paying attention to different details in their environment, such as textures, lines, shapes, and colours. We also discussed how, as art teachers, each participant would expand on the Google mapping exercise. Some participants talked about teaching civic engagement through mapping. One suggestion was to use the mapping exercises as a catalyst to discuss how students can make positive contributions to these spaces. Digital citizenship was another pertinent issue that was raised. This topic was raised because of our use of Google Maps, which takes ownership of uploaded images. The consensus among the group was that this curriculum could be a powerful tool for encouraging responsible civic and digital citizenship.

Figure 7

Collective map drawing by Concordia Doctoral Students



Note. Five participants documented their commute from their home to the university campus building where we had all gathered for the workshop.

During the second workshop, I engaged the group in a hands-on mapping activity by providing the group with watercolour paint, oil pastels, pens, pencils and paper, and instructing them to create their own collective map of Montreal. The participants agreed to begin by marking their current location on the map and tracing their routes to get there from their home. This mapping activity resulted in a large scale and colourful map (Figure 7).

While drawing, the map became a catalyst for participants to talk about their connections and experiences in specific places. Through these conversations, we learned things that we would not have without the map. After creating the map, we had a brief discussion on how this exercise can be used in art education. One compelling possibility that was discussed is using both mapping with mobile mapping devices and a physical map to add layers of information over time. In a classroom, a map can be created and placed on the wall, and students can add to this map every week, while they simultaneously contribute Geo-tagged media to a map online. The physical map can be a prompt for students and teachers to explore their everyday spaces.

Conducting the pilot enabled me to better understand the curriculum for creative and mobile mapping. Firstly, it was evident that these educational workshops lead to two kinds of learning. On the one hand, they can raise aesthetic awareness of everyday spaces by encouraging individuals to observe the everyday world through art-making, and to attend to the spatial nature of their experiences. On the other hand, the workshops touched on important issues of civic and digital citizenship by encouraging discussions about individual's rights and responsibilities in relation to their everyday physical and online spaces. Furthermore, the pilot made me aware that conversation about space and places could be enabled through the use of physical as well as online maps. These findings were incorporated into the design of the educational workshop.

Design of "Map My World" Educational Interventions

For the doctoral research, I incorporated in the curriculum both closed social media

network, and collective online mapping. Five workshops were held at each high school, during which students responded to missions by capturing images of their everyday surroundings. In this first iteration at SVH, only a handful of students posted their images on a collective online map. The online mapping component was expanded in the second phase. At RMA, students responded to missions on the social media network, and most posted on the collective online sense maps to varying degrees. Student engagement and learning varied from SVH and RMA partly due to the different ways the workshops were conducted, and partly to the particularities of each context. There were, however, certain continuities in terms of the outcomes between the two phases. These similarities and distinctions are illuminating for understanding the affordances and limitations of the educational interventions. In the following section, I describe the missions and collective online sense maps in detail. Then, I discuss both iterations in detail.

The Missions and Collective Online Sense Maps

I borrowed the pedagogical strategies of using missions to prompt students to attend to their everyday surroundings from the MonCoin curriculum. In MonCoin, missions were developed to create a sense of an educational game requiring learners to visually investigate "ideas of self, moving to spaces and subjects less familiar" (Castro, 2019, p. 10). For me, the MonCoin spatial missions, in particular, provided a powerful tool for prompting learners to attend to various aspects of their surroundings (Akbari, 2019a). This was also a key objective of this doctoral research. The spatial missions provided an entry point for eliciting participants to think about and visually represent their relations to their surroundings. I also connected this theme to the senses, because of the value of sensory art education for examining one's relations to one's surroundings.

There were some differences in the missions used at SVH and RMA, mainly due to

refinements I made to the missions at the end of phase 1. During the first week of workshops at SVH, I deploy one spatial mission daily. These missions included “My City,” “Food,” “Community,” “Notice,” and “Paths I take.” During week 2, I introduced the theme of the senses. This was complemented with the in-class activity of going on Sense Walks in the school. The Sense Missions were “Senses,” “What I see,” “What I hear,” “Taste/Smell,” “Touch,” “Soft,” “Loud,” “Cold” and “Dark.” For the latter missions, I used adjectives that provoked one or more senses. During week 3, I introduced the mission “Map My Walk” for students to post images for the neighbourhood walk.

At RMA, I made a number of refinements based on students’ feedback and responses. I omitted the missions “Community” and “Food,” rephrased some of the sense missions, and added new sense missions to explore food. During week 1 the spatial missions were “My city,” “Art,” “Paths I take,” “Landmark,” and “Notice.” During week 2 the sense missions were “Senses,” “Sound,” “Sight,” “Touch,” “Taste/Smell,” “Dark,” “Soft,” “Loud,” “Quiet,” “Sweet” and “Savoury.” Mission 3 was “Map My Walk,” used to document the neighbourhood walk, and mission 4 was “Map My Neighbourhood.” For this mission, students were asked topost their responses on the collective online sense map. Figure 8 is a screen capture of all the missions I posted on the social media network at RMA.

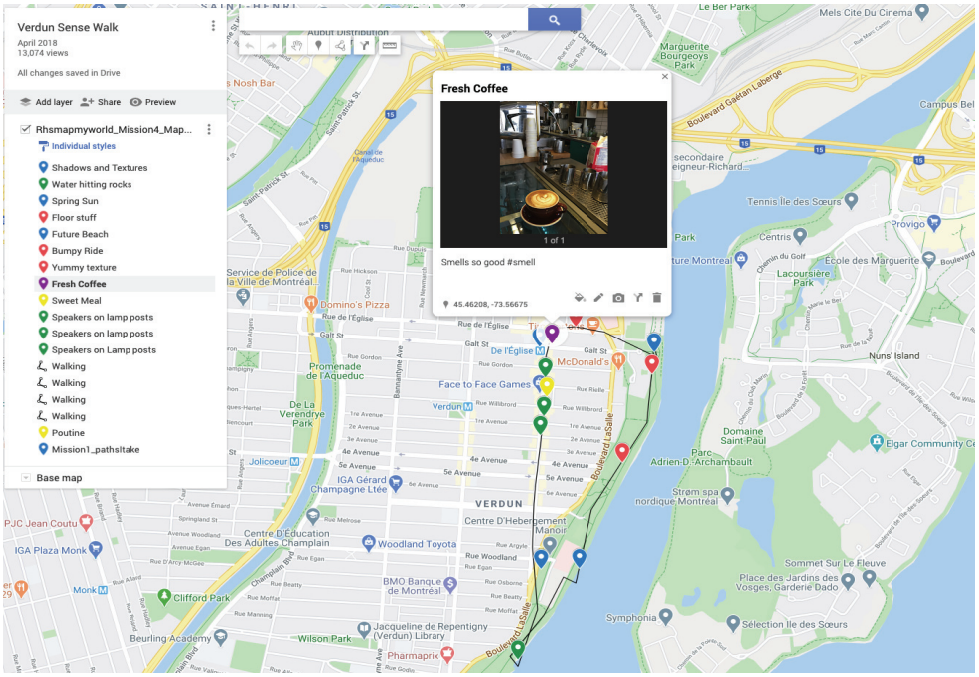
Figure 8

List of the Missions at RMA Created by Ehsan Akbari

The collective online sense map was used during phase 2 at RMA. During phase 1 at SVH, I was able to test out the basics of using Google My Maps for creating a collective online map only during the final workshop. A few students posted images, and this map proved to be valuable for visualizing some of the spatial relations within the classroom. At the end of phase, I became acutely aware of the need to provide an artistic model for students. Models proved to be important for the Sense Missions and Sense Maps, in particular. Between phases 1 and 2, I developed a sense map of my current neighbourhood of Verdun (Figure 9). To create this model map, I used Google My Maps to draw a sense walk for myself, went on this walk to photograph the senses, and then posted photographs online. I showed this as a model to students at RMA, and invited them to use Google My Maps to draw Sense Walks in their neighbourhoods and post images from their walks on our collective online Sense Map.

Figure 9

Screen Capture of "Verdun Sense Walk" Created by Ehsan Akbari



Ethical Protocol

I received the approval to conduct this research from the Office of Research at Concordia University (Appendix A). In accordance with the ethical protocol, it was essential to take steps to protect the participants' privacy and identities. This was particularly pertinent for the use of the online social media network of Instagram and the online mapping platform of Google My Map. I asked all participants to select a pseudonym of their choice at the start of the research project. Each participant's pseudonym was used in all online activities, interviews, and in reports. Participants were asked not to post any digital photographs of themselves. Images that could identify a participant would be removed from the online platforms. Furthermore, I created closed-networks on both the social media and mapping networks. Students were asked to use the account they setup with their pseudonym only for the purposes of the project. They were only to friend the accounts their classmates had created with their pseudonyms. Students' participation in the social media network was conditioned on following these protocols.

For mapping, I created a private, and password-protected online map with Google My Map, which was accessible only to me as the researcher and research participants. During the project, participants were provided with login information to access and post on these maps. I asked them to not post any information that would reveal their identity or other personal information. I have used screen captures from these maps as figures in reports and this dissertation.

Furthermore, I obtained assent, consent, and/or parental consent, where appropriate, from all participants. Participants were informed that the media they posted on the closed social media and mapping networks would be used as data in my research. Those who volunteered for interviews understood that their interviews would be transcribed, used as data, and sections would possibly be published. All participants were informed about their right to withdraw their

participation at any time without negative academic or personal consequences. They understood that by withdrawing from the project, all interviews, and any media they posted would be omitted from the study. In the following sections, I describe both phases in detail by providing contextual information about the schools, classes and teachers, and describing the workshops I conducted in collaboration with the art teachers at SVH and RMA.

Phase 1 — Spruce Valley High School (SVH)

The first site for the research was a public high school located on the island of Montreal. This school places an emphasis on the arts including music, drama and visual arts education. The student population was quite diverse. This school is part of the English Montreal School Board (EMSB), offering most classes in English in a predominately French-speaking part of Canada. According to the Charter of the French language, to be eligible for registration in an English school a child, or their parent(s) or sibling(s), must have received a major part of their elementary or secondary school instruction in English in Canada. The EMSB also accepts students on international exchange. In recent years, there had also been an influx of Chinese international students who spoke little English or French. This diversity was also reflected in the group of students with whom I worked, which included individuals born and raised in Montreal, and those who had recently moved from other parts of Canada and the world. I also observed that students in this school lived all over the city of Montreal. Some lived within minutes' walk, while others commuted for up to two hours a day.

I worked with one Sec 4 (Grade 10) art class and their teacher, *Rosegram* (Pseudonym). There were over 30 students in this class, and 24 of them gave assent and attained parental consent to participate in the research. Rosegram explained the reason she chose this particular group for that project was because there were "a lot of strong artists in the class, and in terms of classroom management, they're one of the better classes." She partially

attributed this to the older age and maturity of the students. Rosegram pointed out that managing such a project with her younger groups would have presented many more challenges. While working with this group, I found that the teacher's assessment of this group was accurate. There were many talented and enthusiastic artists in this class and some troublemakers.

Despite the maturity and talent of the class, I faced a number of behavioural and classroom management issues during the project. These included inappropriate usernames and online posts, and disruptive behaviour in the classroom. I developed an understanding of these behaviours by interviewing some of the students who engaged in disruptive behaviours (Bxtimupp, Guns_are_great, Supremeleaderkimmjongoink). This will be discussed in detail in chapter 5.

Engagement and motivation in the project varied in class. Several highly enthusiastic students enjoyed the chance to create and share their photographs with their peers. These students posted numerous photographs online. Most students posted between 4-7 photographs, while a few did not post at all. To gain an understanding of the students' perspectives on the project, I conducted post-interviews with 6 highly motivated students, 4 students with low motivation, and 4 students with mixed feelings about the project. Interviewing these students gave me a nuanced understanding of spatial and relational interactions that occurred during the project.

The teacher — Rosegram

Rosegram had been teaching at the current school for the first year as a replacement for the permanent art teacher, who had taken one-year leave. Previous to the current position, Rosegram had worked in the "outreach" program for 5 years. These are schools in the EMSB, which cater to students who have not experienced success in traditional school settings. Rosegram compared this previous experience with the situations she was facing at SVH. One big

difference was in the motivation levels of most students. The students at SVH were "producing faster," and she found she needed to "constantly generate new project ideas."

The other challenge she faced at SVH was the larger class sizes. Rosegram had as many as forty students in one class, and most classes with over thirty students. Dealing with these class sizes, particularly with younger groups in sec 1 and 2 (grades 7, 8), meant that she could not give the attention and focus to the particular students with diverse needs and exceptional learners. This was particularly frustrating because Rosegram observed, there were "quite of a few" students at SVH who needed the kind of focused attention she was used to giving her students in the outreach program.

During the project, Rosegram was also a model for many students in our closed social media network. Many students did not know about her participation in the project, yet several students talked about being inspired by her photography. Rosegram already had significant experience and interest in taking and sharing artistic photographs online. She said, "I like Instagram for the photography elements too, I enjoy taking photos and editing them, and creating an aesthetic on my Instagram feed." As such, many of the activities we engaged in during the project were already part of her daily life. However, she was not comfortable with using smartphones and social media in teaching for two main reasons. First, smartphones present a program with monitoring and controlling student activities during class. The power of smartphones to distract students is certainly a limitation of their use in the classroom. This is an issue that educators must consider when incorporating this technology.

Rosegram also had extensive experience with multi-media art such as digital storytelling and mashup videos, and while she enjoyed working with these media, she found it challenging to incorporate these projects in her teaching because they are time-consuming and require access to computers. Access to computers, at SVH, meant booking space in the library with computers,

which had limited media editing software. Due to these practicalities, doing digital projects were less appealing. An incentive for Rosegram's to participate in the project was to use the practice of taking and sharing photographs online, which she enjoys, with a group of students she described as "strong artists."

The challenges Rosegram described were also challenges I faced during the project. Access to computers was a limitation of using online mapping in this class, and, even though Rosegram had chosen the specific class for the project because of their maturity and artistic talents, there were some disruptive behaviours during the project. Throughout the project, Rosegram played an essential role as a model for students online, as well as a guide and collaborator in planning and delivering the in-classroom workshops at SVH.

The workshops.

I conducted 5 workshops duringApril, 2018 (Figure 10). I led the workshops and managed the online platform. Rosegram was present, and help with all workshops.

Figure 10

Schedule of Workshops at SVH

Date	Time	Workshop Topic
April 4	1:30 p.m.	Instagram Setup of Accounts
April 11	9:45 p.m.	Sense Walk in School
April 17	1:30 p.m.	Creative Cartography
April 24	8:30 a.m.	Neighbourhood Walk
April 26	9:45 a.m.	Google Map Workshop

Workshop 1 — Instagram Setup Accounts. The purpose of the first workshop was to setup an online closed social media network for the class. In preparation for the workshop, I had given out a handout to the class the previous week with instructions on the Application to download and setting up an Instagram account. I began the workshop with a brief presentation to introduce the project, talk about the Terms of Use of Instagram, and explain the rules and expectations of participating in the project. The rules included posting content that is appropriate for school settings, and for the students to protect their privacy and identity online, as mandated by the ethical protocol. For this particular reason, as well as pedagogical ones, students were required to setup a private Instagram account for this specific project using a pseudonym. Once they had created their accounts, I asked them to follow an account I had created for this particular iteration, and also follow the accounts of their classmates. Thus, we established a close and private network consisting only of members of the art class. In theory, everyone was anonymous on this network, but some students shared their pseudonyms with their friends. Creating a closed and anonymous online network in this manner was a pedagogical strategy to encourage student interactions among those who normally do not interact with each other in class.

By the end of the first workshop, we were able to Set up the closed-network, but there were a number of complications. Firstly, few students had followed the instructions on the handout from the previous week and needed class time to choose a pseudonym and set up an account. It turned out that quite a few students found choosing a pseudonym to be the most challenging aspect of this project. Once students had set up their accounts, I immediately began noticing breaches of the project rules. Some students chose inappropriate usernames, while others posted offensive material, and some began following their friends outside of the classroom. I had to immediately find these students and ask them to respect the rule of the project by removing inappropriate material, changing usernames and "unfollowing" those not in the class.

Overall, the first workshop met its objective of establishing an online network for sharing photographs. However, this experience also made me cognizant of some of the classroom management issues one could encounter while setting up a closed social media network. This also led me to make refinements to the procedures of setting up this network in the next iteration, which will be discussed in the RMA section.

Workshop 2 — Sense Walk in School. The second workshop involved doing a sense walk in the school with the entire class. In preparation for this workshop, the teacher and I decided it would be best for her to plan the walk as she was far more familiar with the spaces of the school. I began this workshop by reminding students about some of the rules of the projects, and about how to give constructive comments on their peers' photographs. I then gave the group a bit of time to look at and comment on the photographs that had been posted on our network since the previous week. After this brief introduction, we began the sense walk

After this class, the teacher and I had a few minutes to discuss what had happened. Generally, we felt good about the outcomes of this workshop, and there was a clear spike in the numbers and quality of images students posted by students online. This Sense walk will be discussed in detail in chapter 7.

Workshop 3 — Creative Cartography and Mapping Workshop. The aim of this workshop was to introduce the concept of artistic mapping, and for the students to draw maps in groups to plan their neighbourhood walk for the following week. The teacher and I divided the class into random groups of 4-5 students by asking everyone in the class to line up according to the distance they lived from the school and assigning them numbers to form into new groups. Once students settled into their new groups —after much chaos and commotion—I presented various artists who use walking and mapping as a key part of their practice, including Guy Debord, Stephan Lund and Blast Theory. Finally, I introduced the mapping activities for

preparing for next week's neighbourhood walk. I instructed students to identify 4-5 places to visit on the walk, and clarified that they could plan to go anywhere, but they must stay within a 15-minute walk to the school, as we only had 35 minutes for the walk. The school also required permission from parents to allow students to leave the school grounds during class time, which I handed out to the class.

During post-interviews, I realized that what students remembered most about this project was not what I had intended. Very few students said anything about artistic mapping or the usefulness of the maps they drew in groups. Rather, almost everyone talked about the experience of being put into a different group with people they did not know. This event revealed the existing spatio-temporal relations that existed in this classroom. This is a major theme in chapter 5. Also, the idea of drawing a map to plan a neighbourhood walk did not prove to be too useful for the actual walk. During the walk, many expressed preferring to move freely as a group rather than following a predetermined path. The teacher also suggested finding ways of connecting the artist maps to the class activities. These experiences and feedback had major implications for how I approached these activities in the next iteration. Major changes included allowing students to choose their groups and move freely during the neighbourhood walk around the school and introducing Google My Maps earlier to plan individual walks in the students' own neighbourhoods.

Workshop 4 — Neighbourhood Walk. This workshop occurred one week after. In order to walk outside school grounds, each group required an adult supervisor. I asked two colleagues to volunteer and help me facilitate the walk with different groups. Also, I had learned my lesson from the previous week and let students choose their own group to go for a walk and photograph. Once students clustered into their groups, I handed out maps from the previous and told students

they have the option of following these maps. It turned out that few found them useful. I also assigned each group an adult supervisor for the walk. These are the assignments:

Ehsan — Guns_are_great, Rhs_imhungry, Bbbknod, J_c_j_ta, Chrisscrossmillhill, and Cloverfieldproject.

Teacher (Rosegram) — Belle_552, Blue_coons, Jolene_Pierree, Theoverthinker134, and Tyronemegnus2.

Volunteer 1— Jxexa, Mint_shiba, New_is_gold, Dra.anon_artist.

Volunteer 2 — Supremeleaderkimmjongoink, Bxtimupp, and others who did not provide assent and consent forms.

This grouping gives a fair reading of the group dynamics within the classroom. The group that walked with volunteer two included a lot of the cool kids. Volunteer one's group included the students who were highly motivated in school, art class, and in this project. The group I worked with included a group that sat near the front of the class. This gave me a chance to get to know Guns_are_great, who had caused a great deal of commotion with his choice of usernames and behaviour online. The teacher also described experiences of interacting with and doing photography with her students. The volunteers also reported similar experiences in which being together as a group inspired students' to engage with photography and their surroundings.

Overall, this activity was highly motivating for students. This workshop provided valuable insights for a number of key themes in the findings including one-on-one interactions, the co-constitutionality of physical and online spaces, spatial interactions in the learning process, noticing, the value of going outside, and the relation of agency and movement. I will elaborate on these themes in chapter 5.

Workshop 5 — Google My Maps. This final workshop took place 2 days after the neighbourhood walk. It was apparent that by that point, student interested in the project had

begun to wane. My main objective of this final workshop was to wrap up the activities we had done, and also to do a trial run with the online mapping platform Google My Maps to get a sense of how this platform would work with a group of 20 or more participants. I began the workshop by asking all students to reveal their online identities and discuss some of their general impressions of the project. Most students were fascinated to learn about the teacher's participation in the project.

After this brief discussion, we made our way to the schools' library in order to access the mapping platform on the schools' computers. I asked students to work in small groups and provided them with a handout outlining how they could post on the map. Posting images on the map offered numerous challenges to students, and, in the end, most students were not able to complete the assignment. However, conducting this workshop enabled me to gain a much better understanding of the affordances and limitations of the mapping platform for future iterations, and gave me the chance to work out some of the technical issues. In this respect, this workshop informed my approach in the next phase of the research, and provided valuable data on the power of this tool to visualize spatial relationships. This is a major theme in chapter 6.

Outcomes of Phase 1

The first iteration at SVH presented a number of challenges and also offered valuable insights. This experience enabled me to make important refinements to the design of the educational interventions, which were immediately applied to the next iteration. First of all, it was made clear to me by the teacher and students' feedback that teaching photography skills needed to be a much more significant aspect of the project. For the next iteration, I addressed this issue in the next iteration by incorporating a number of photography mini-workshops, in addition to the main workshops. This included instructions on how to take and edit photographs on their

mobile devices. I believe teaching these skills at the beginning of the project at SVH would have had a significant impact on the motivation and learning of the students.

Secondly, this iteration validated one of my biggest concerns for these workshops. Initially, I was not certain about how the theme of the senses would be received. Students' engagement during the Sense Walk, responses to the Sense Mission, and feedback during interviews convinced me that this is a valuable and interesting theme, particularly for the educational goal of connecting youth to their everyday surroundings. This is the theme of chapter 7.

This iteration also gave me a much more concrete sense of how to incorporate creative and collective mapping in the design of the interventions. From the mapping workshops, I learned that Google My Map could be a useful tool for planning and guiding walks, and as a form of data visualization. I also realized that there was a missing link between the artists' map I had presented, and the walking and mapping activities. I addressed this gap by creating my own neighbourhood Sense Map as a model for the students in the next iteration. Finally, the first iteration produced pertinent data for the understanding of the spatially and temporality of the learning process in this project. This theme will be discussed in the spatiality chapter.

Phase 2 — Rushmore Academy (RMA)

The second site for the research is a public high school located in Montreal, and part of the EMSB. This school has an enriched science and math program, and students are required to pass an examination to enrol. The vast majority of the students reside in upper-middle neighbourhoods in northern areas of Montreal Island. Many of these students are of Italian-Canadian origins, but there are several exceptions to this. The majority of the students I interviewed were high achieving students who invested a great deal in their educations. The

general consensus among these students was the art class an enjoyable space that provided a break from academic studies.

I worked with one Sec 4 (Grade 10) art class and their teacher, Cardinal (Pseudonym). In this class, 31 out of 33 students provided assent and parental constant forms to participate in the project. At the beginning of the project, I interviewed 8 students; at the end, I interviewed these same students, as well as Mysticalxunicorn and Sandycheeks024 because it was important for me to get the perspectives of these two students on images and text they had posted on Instagram and Google My Maps. Among the students I interviewed, there was a high degree of motivation and engagement in the project, with a few exceptions. These students provided valuable feedback on the themes of spatial learning, collective online mapping, and the senses and photography.

The teacher

Cardinal had 20 years of experience as a teacher first in a community after-school program and later as a public high school art teacher. At the time of the project, she had been an art teacher at RMA for 17 years. She was highly respected by her students, colleagues and principal, and well established in her role at the school. She worked closely with me to inform me about the relational dynamics in the classroom, make recommendations on pedagogical strategies, and other pertinent issues. Part of Cardinal's motivation in collaborating on the project with me was her dedication to using technology in the art classroom to enrich teaching and learning. Although Cardinal was not an avid user of mobile and social media in her personal life, she was a strong believer in using mobile and digital technology in her art teaching. She had used smartphones in her teaching in various ways including for video animation and storytelling. Cardinal's advice and support were critical to the success of this project at RMA.

The workshops

The basic structure of the project was similar between phases 1 and 2. There were, however, some key amendments made in phase 2 at RMA (Figure 11). The most notable change was the inclusion of the photography mini-workshops, during which I discussed various photography techniques. Another important change was introducing Google My Maps earlier in the project, during the third workshop. In the following sections, I outline and describe these and other changes.

Figure 11

Schedule of Workshops at RMA

Date	Time	Workshop Topic
May 8	8:30 a.m.	Instagram Setup of Accounts
May 10	10:16 p.m.	Photography Mini-Workshop I
May 15	2:10 p.m.	Senses Presentation and Photo Walk
May 16	8:30 a.m.	Photography Mini-Workshop II
May 17	9:20 a.m.	Creative Cartogrpahy & Google My Maps Workshop I
May 22	12:20 p.m.	Neighbourhood Walk
May 24	2:10 p.m.	Google My Maps Workshop II

Workshop 1 — Instagram Setup. This process was the same as phase 1, with one exception. In order to prevent students from creating inappropriate usernames, I added the step of checking everyone's usernames before I accepted them as a "friend" on Instagram. This was a more secure process. There were absolutely no behavioural or technical issues during this workshop, and everything went smoothly.

Workshop 2 — The Senses. I introduced the theme of the senses with a presentation on sensory perception. After this, students were asked to work in groups of their choice to draw a map for a photography walk in their schools. After a few minutes of planning their walks, students were sent out in their groups to photograph the senses in their school. Because this activity was occurring during class time, students were told to remain quiet and avoid certain areas. The teachers and I had a conversation about this workshop at the end of the class. We both agreed that the presentation and talking was not the best approach to this theme. Asking students to photograph their senses in the spaces of their school led to some insightful outcomes. These outcomes will be discussed in-depth in the section on the Sense Walk in chapter 7.

Workshop 3 — Creative Cartography and Google My Maps Workshop. One of the most significant changes I made from the first to second iteration was to introduce Google My Maps earlier in the project. I began the third workshop with a presentation on artist mapping, just as I had done at SVH, but this time I ended the presenting by showing the Verdun sense map I had created as a model. This was an essential ingredient for motivating students in the mapping activities of the project. I informed the class that they would be making a similar map in their own neighbourhood. To make their map, students were given a handout with instructions for logging onto our collective online map, and asked to use the line tool to draw a walk in places where they could photograph important sights, sounds, textures, smells and tastes in their neighbourhood. By the end of the class, many in the class managed to draw their walk on the map. I asked the class to use this plan and go for a walk to take photographs on their own time, and workshop 5 would be dedicated to posting their photographs on the map.

Workshop 4 — Neighbourhood Walk. For this walk, students were asked to form in groups of their choice and move freely in the area around their school within a time limit of 30 minutes. At the end of the workshop, they had a few minutes to edit and upload. Most uploaded

multiple images in one post. This was a nice day for a walk, and it was a good chance to get to know and interact with students. During the walk, I ran into several students and had conversations with them about various aspects of the project. In post-interviews, several students talked about enjoying hanging out with their friends and noticing their surroundings during the walk. None of the participating students lived in the area around the school. As a result, several students talked about discovering and noticing a part of the city that they had been commuting to for years but had not previously carefully explored.

Workshop 5 — Google My Map. This class was devoted to posting photographs on the collective online sense map. Students were given a handout and instructions. A few students were able to post and complete the project, but most drew the walk and never posted pictures. In interviews, I learned some of those did the walk and took pictures, but never got around to post it online. A major contributor to this is the difficulty of posting pictures on this platform, which will be discussed as a limitation in chapter 6 on creative cartography.

Furthermore, this class happened during the last period of the school day, and there was that weird, frantic energy in the room. The school year was coming to an end, students were preoccupied with exams, and this was the last workshop of the project. After the workshop, I realized some students had posted lots of funny things all over the world. Also, I noticed a few of them having technical issues, and glitches in the platform because about 30 people were simultaneously logged onto the map. During this class, I sensed some frustration and mischief. This will be discussed in chapter 5.

Introducing Google My Maps turned out to be a positive decision, as many students managed to contribute something to the map. During post-interviews, students' perspectives on this experience were extremely insightful for understanding the potential of online mapping to enable spatial and collective learning. This is to be discussed in chapter 6.

Photography Mini-workshop: I gave two different 15 minutes presentations about photography in between the main workshops. On May 10, I did a presentation on how to turn on the grid in the camera setting, and to use this grid to apply the rule of thirds in their compositions. I then did a quick introduction to Snapseed, a photo editing application. On May 16, I did a presentation on photography techniques, which covered lighting, patterns, close-ups, framing and converging lines. This turned out to be essential for engaging students with the theme of the senses through photography. This is the topic of chapter 7.

Outcomes of Phase 2

In some cases, improvements made to the curriculum in phase 2 resulted in more effective teaching and learning outcomes at RMA. The two most significant examples of this were the more thorough integration of photography skills and Google My Maps during phase 2. The former led to deeper engagements with the theme of the senses, and the latter allowed me to have conversations with students and teachers about spatial and collective learning through collective online sensory mapping. However, there were cases of more effective implementation at SVH. A prime example of this was the Sense Walks, which were more effective at SVH in inspiring conversations about the spaces of the school at SVH. The contrast between the outcomes at these two schools is illuminating, and a central topic of the findings chapters.

Data Collection

The data collected included student and teacher interviews, photographs, online maps, and my journal and field notes. The central goal of data collection was to 1) capture a sense of the students' learning and connection with their everyday surroundings, 2) document the affordances and limitations of the curricular interventions, and 3) gather information on the collective and spatial learning that occurred during the interventions. In order to address these questions, I interviewed students and teachers before and after the workshops. Prior to the first workshop, I

conducted pre-interviews with 6 students at the first site, and 8 students at the second site about their experiences at school, knowledge of mobile media, mobile mapping technologies, and digital art-making (Appendix B). Near the end of the project, I also conducted interviews with 12 students at site 1 and 10 students at site 2 in order to gauge their learning experiences. The questions focused on the mapping projects they created, and what they learned about their surroundings, digital citizenship, and mobile mapping. For the post-interview, I aimed to speak to everyone I had interviewed at the beginning of the project, and I also approach a few specific new students because of their engagement with the project. Interviews also addressed how and what they learned about their everyday spaces through collective mapping activities (Appendix C). I also interviewed both teachers, Rosegram and Cardinal, at the end of the project to get their reflections on the project (Appendix D). Figures 12 and 13 list the pseudonyms of the students who were interviewed at SVH and RMA, respectively. Figure 14 provides information about teacher interviews.

Figure 12

List of Students Participating in Pre and Pos- Project Interviews at SV

Pseudonyms of Interviewee	**Pre-Interview Date**	**Post-Interview Date**
Cassie_jones23	March 29, 2018	May 2, 2018
Chriscrossmillhill	March 29, 2018	May 7, 2018
Heatherb_18	April 9, 2018	April 30, 2018
J_c_i_ta	April 9, 2018	
Jxexa	March 29, 2018	May 7, 2018
Rhs_imhunrgy	April 9, 2018	April 30, 2018
bbbkodnnd		May 22, 2018
Bxtimupp		May 2, 2018
Cloverfieldproject		May 7, 2018
Supremeleader		May 2, 2018
Guns_are_great		May 2, 2018
Mint_shiba2		April 30, 2018
Theoverthinker134		May 22, 2018
Tyronemegnus2		April 30, 2018

Figure 13

List of Students Participating in Pre and Post Project Interviews at RMA

Pseudonym of Interviewee	Pre-Interview Date	Post-Interview Date
3869_lit	May 10, 2018	May 29, 2018
Barthalamue_velvatine	May 16, 2018	May 31, 2018
Bluebean18	May 10, 2018	May 30, 2018
Bgonth019	May 11, 2018	June 5, 2018
Constellation.xx	May 10, 2018	June 4, 2018
Get_chromazone_boi	May 14, 2018	May 29, 2018
Ivan_ivanovich_ivanosky	May 15, 2018	June 4, 2018
Pink_sparkles_cream_pie1620	May 9, 2018	May 30, 2018
Sanycheeks024		June 5, 2018
Mysticalxunicorn		June 5, 2018

Figure 14

Dates of Interviews with Teachers at SVH and RMA

School (Pseudonym)	Teacher (Pseudonym)	Interview Date
Spruce Valley High (SVH)	Rosegram	May 7, 2018
Rushmore Academy (RMA)	Cardinal	June 21, 2018

Additionally, I collected the images, videos and text posted by students and the teachers on the closed-network on Instagram, and the collective online maps on Google My Maps to triangulate what they say in the interviews with their artistic productions. Photographs and screen captures of the online maps were valuable sources of data for analyzing students' engagement and learning with sensory photography and creative cartography. I also collected

field notes, lesson plans and material used during the workshops. I maintained a research journal in which I recorded my reflections after each workshop. The interview transcripts, the students' and teachers' media and maps, and my field-notes were the primary data sources I used in my analysis.

Data Analysis

Wang and Hannafin (2005) distinguished between two levels of data analysis: Level I Data describe the exact research setting and the research processes; Level II Data represent a distillation of Level I Data and are used to explain the design and to construct design principles. During the first iteration, Level I data was analyzed to improve the design of the workshops for the second iteration. This analysis was largely focused on practical, procedural and technical issues; namely, identifying what worked, problems that were encountered, and the aspects of the design that needed improvement. The second iteration improved on the first iteration, and it was also adapted to the context of a different classroom.

After the summation of the fieldwork, I used the qualitative data analysis software MaxQDA to analyze data from both iterations. The interviews transcripts and media produced by students were coded with specific keywords related to the research questions. Saldaña (2013) described the coding of qualitative data as a process of applying an "analytic lens" to frame and understand phenomena (p.7). The first phase of generating codes involved applying the theoretical lens of complexity and spatiality to interpret the students' and teachers' accounts of their experiences in the project. Codes were also generated based on themes from the literature review such as place-based learning, sensory education, mobile learning and art education. My analysis involved thematic coding, as well as open coding, as several new codes emerged while I was analyzing the transcripts.

Figure 15

Screen Capture of Code System Used to Analyze Interviews and Student Artwork

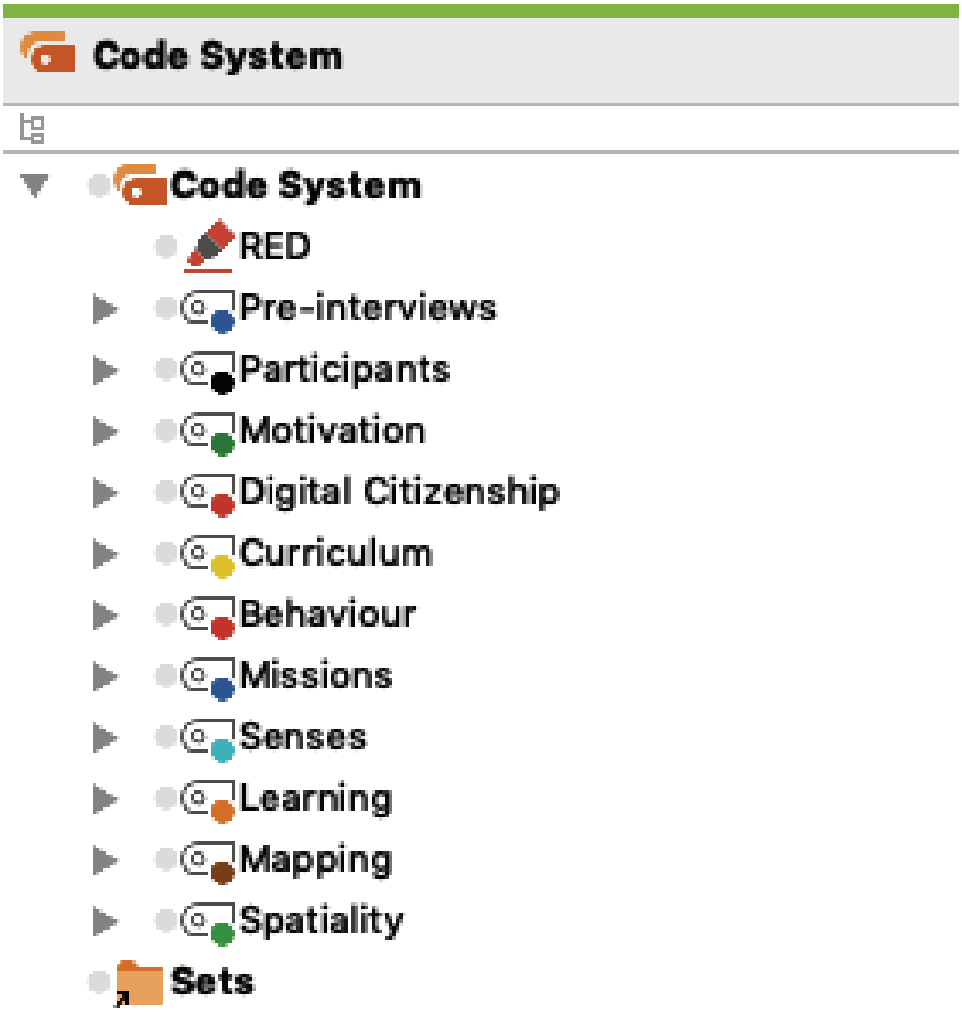


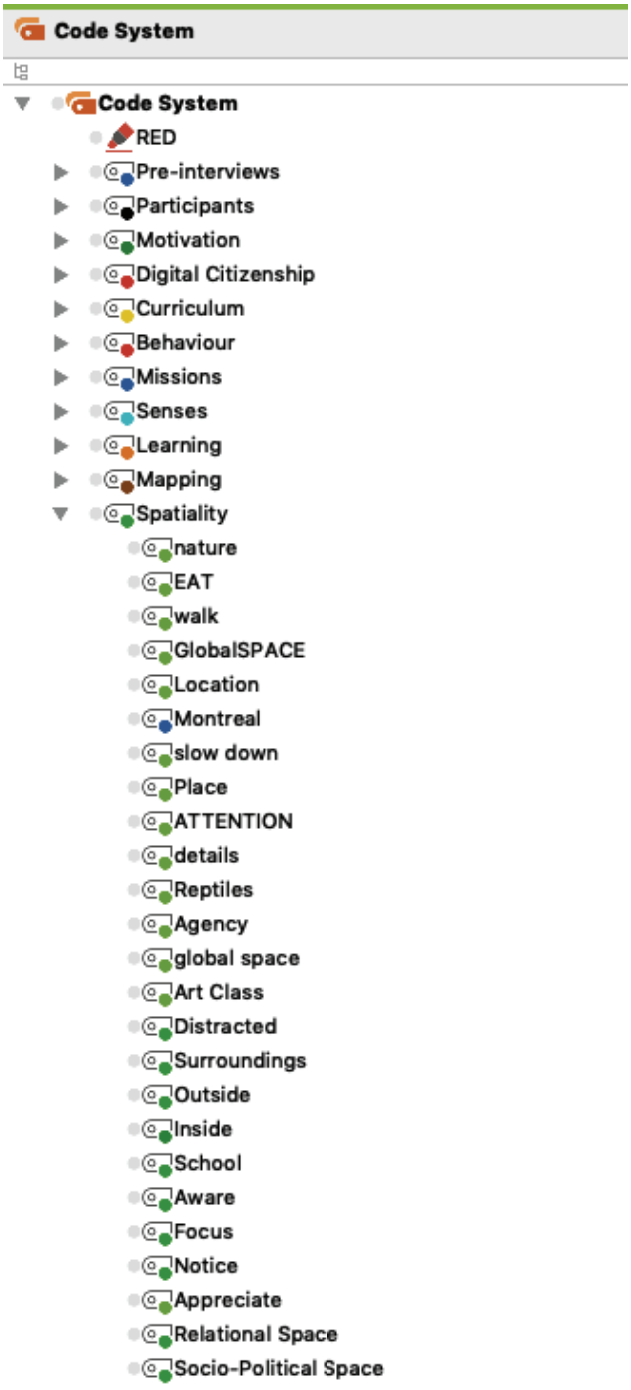
Figure 15 is a screen capture of the code system I used on MaxQDA. The main categories of codes were: Motivation, digital citizenship, curriculum, behaviour, missions, senses, learning, mapping, and spatiality.The code of "motivation" included the sub-codes of motivation in the project, the art class, and in school. Digital Citizenship included the sub-codes of smartphones, privacy, digital practices, and school policy. These codes aimed to assess participants existing relations with online and digital practices. The category of curriculum addressed numerous

aspects of the project including affordances, limitations, sense walks, presentation of artist maps, neighbourhood walks, and sense maps. These latter codes allowed me tosynthesize students' and teachers' feedback on the workshops. In this category, I also included the code of "funny," which emerged as a major theme in my analysis of the interviews from phase 2 at RMA.

Behaviour is another category that emerged during the analysis, and it includes the in vivo sub-codes "meanness," "we're a bunch of animals," "narcissistic," "I don't care," "troll," and "Guns_are_great." This theme will be discussed in chapter 5. The missions and senses codes include all of the spatial and sensory missions used in the project, which will be discussed in chapter 7. The category of learning addressed the theme of spatial, collective and peer learning. One-on-one interactions emerged as an important sub-code of this category. Under the mapping category, maps as data visualization emerged as a key theme, which is a major theme in chapter 6. Finally, the category of spatiality aimed to capture all references to the spatiality of the project, or spatial learning (Figure 16). Several important sub-themes emerged in my analysis including movement and agency, notice, go outside, and global space. These became the central theme of chapter 5. In the proceeding chapters, I present my findings from this analysis.

Figure 16

Spatiality — Final Code System Used to Analyze Interviews and Student Artworks



CHAPTER 5 — SPATIALITY OF "MAP MY WORLD"

In this section, I offer description and analysis of the spatial aspects of the learning that occurred within the numerous online and physical spaces of the "Map My World" project. In the theory chapter, I defined learning as "a dynamic, adaptive, relational and open-ended process of interactions." Marturana and Varela's (1998) conceptualization of autopeisis and structural coupling inform this understanding of learning. Learning emerges from interactions among individuals, or autopeitic unities, which lead to stable connections, or structural coupling, among individuals in their surroundings. Third-order unities emerge from recurrent and stable interactions among individuals. These are the social bonds that develop from recurrent interactions within one's environment and others. Such complex and stable social interconnections are a prominent feature of all classes. Rooting research in a complexity thinking framework enables the educational researcher to attend to the social and collective nature of learning. Learning is individual, and, just as importantly, learning is collective that is situated within multiple nested structures. In this project, groups of students in the classrooms, or the classrooms as a whole constituted collective learners with their own identities, histories, patterns of interactions. The curriculum and spaces of "Map My World" were always in relation to these existing social relations. Furthermore, factors beyond the walls of the classrooms, such culture, politics, and personal histories were always implicated in the learning process. Complexity thinking is valuable for attending to the relational and collective nature of the learning that occurred in this project.

Interactions are fundamentally spatial and temporal. In this project, the interactions occurred in the physical spaces of the classroom, school, neighbourhood and the city as well as the online spaces of the social media and mapping networks. All these spaces were relational, and the products of interactions among human and non-human agents in space-time. The researcher,

the teachers, software algorithms, school schedules, the students' personalities, interpersonal relationships, cultures, politics, and many other factors had a role in shaping these relational spaces. To conceptualize the spatiality of learning in this project, I draw on Massey's (2005) theory of space; particularly, her assertion that places should be regarded as spatio-temporal events. I argued that learning should likewise be thought of as spatio-temporal events, in which multiple personal histories and trajectories encounter each other at a particular place and time. I find this view to be invigorating because it demands educators to be aware of the histories and trajectories of the individual and collective learners, and also to recognize the uniqueness of all learning encounters. Furthermore, thinking about learning as spatio-temporal events opens the possibility for what Massey (2005) considered to be the greatest potential of space: "That business of walking round a corner and bumping into alterity" (p. 94). As will be demonstrated, the learning spaces of this project enabled all kinds of interactions, including unintended encounters. Some of these unintended outcomes were productive and positive, while others were polemic and confrontational in nature. These events illustrate that these learning spaces were subject to negotiations among multiple identities and perspectives. Massey (2005) emphasized that negotiations among competing views and interests is vital for enabling an active democracy. Such negotiations were also indispensable to students learning and engagement in this project.

The spatiality of "Map My World" is the product of the existing spatio-temporal contexts in which the project occurred, in relation to the teaching activities, structures, and spaces that were created by the researcher in collaboration with the teachers in each context. The contexts of the two schools, SVH and RMA, the specific culture of and relationship in each classroom were fundamental to how learning developed, and in many ways, shaped how the curriculum and activities evolved. In each context, larger social structures, such as the schools' cultures, where students lived, and the political climate of the time had profound implications on students'

engagement and learning. These educational interventions unfolded within these existing micro, meso and macro spatio-temporal relations. This is the theme of the first section of this chapter.

The educational interventions led to both unintended and intended outcomes. In a few cases, students engaged in the online spaces of the project in inappropriate or malicious manners. In other cases, the project created spaces for students to reveal a light-hearted or funny side of their personalities. These instances illustrated the extent to which what happened in the project was not predetermined, but rather the outcomes of existing spatio-temporal relations interacting within the designed and constructed learning spaces of the project. The case of student participant Guns_are_great is particularly illustrative of the degree to whicha constructed learning spaces are subject to negotiations, and create possibilities with encounters with alterity. This is the theme of the second section of this chapter.

The intended outcome of the research was to develop tools that encourage youth to attend to their everyday surroundings. Evidence suggests that various aspects of this project were effective in meeting this objective. The key factors that facilitated spatial learning included doing photography, the spatial and sensory missions, and interactions in physical spaces. This is the theme of the third section of this chapter. Mapping, which was another important factor, will be discussed in the next chapter. A central idea in the third section of this chapter is that effectiveness of the educational interventions was dependent on the deep integration of physical and online connections. Factors such as proximity, movement and agency in physical spaces, as well as the kinds of connectivity that were enabled in the online space were determinative in how students engaged with the project and what they learned. These were among the various elements that constituted the spatiality of learning in “Map My World.”

1 Existing Spatio-Temporal Relations

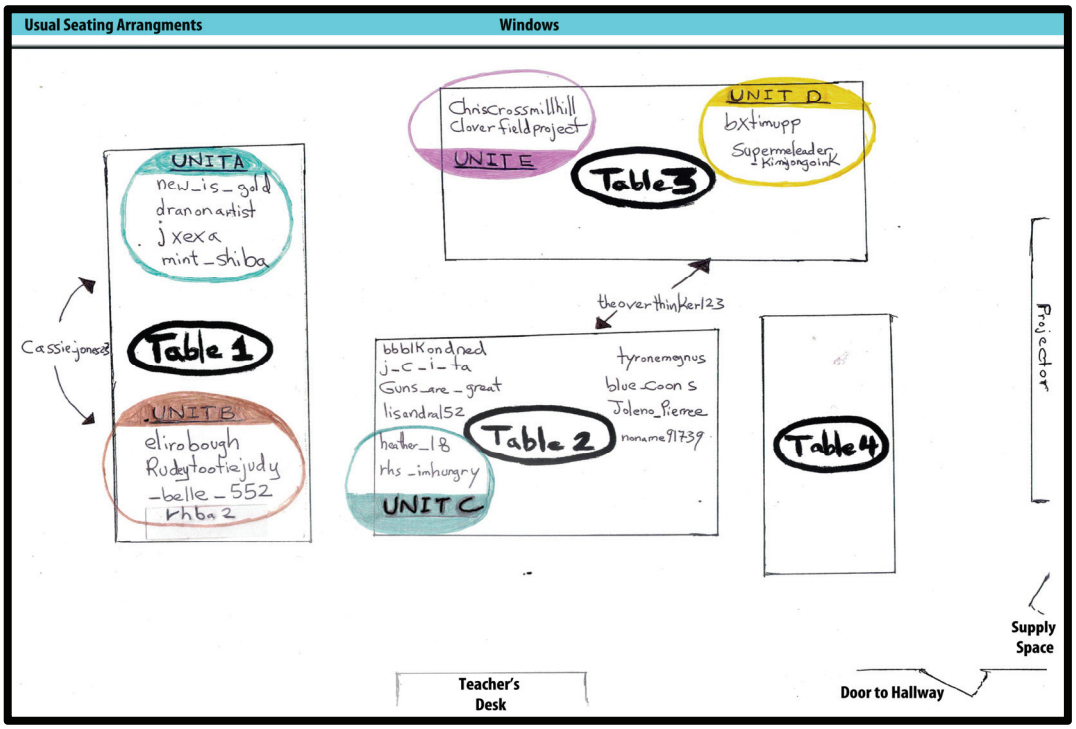
One event that most vividly captured and revealed the existing spatio-temporal relationships within the classroom space occurred during the third workshop at SVH, which began with a presentation on artistic mapping, followed by a group activity in which students were asked to draw maps to plan a neighbourhood walk in the area surrounding their school. I had thought it would be a good idea to assign random groups to provide opportunities for students to encounter classmates with whom they seldom interacted. To assign random groups, the teacher and I asked the class to line up based on distances each student had to travel to commute to school. The process of the class rearranging itself according to commute time was chaotic and noisy, but it led to productive conversations among students. As a collective, we learned that there was great variation in where students lived and their daily travels. Some lived within a five-minute walk, while others had to take multiple buses and/or trains and spend up to 90 minutes to get to school. Once the teacher and I managed to settle the class to stand in the correct order, we assigned numbers to create five random groups. It was fascinating to watch students who normally do not interact find themselves working in the same group. In many cases, students broke off from their assigned group in order to work with their friends. The resilience of existing social bonds was evident in the students' movements from their assigned groups to their usual group of friends, which in this case acted as third-order unities.

I documented the movements by mapping out students' usual seating arrangements and setting during the mapping activity. With the help of the teacher, I developed an illustration of where students usually sat in this classroom, and identified a number of groups as units with collective characteristics (Figure 17). Contrasting the usual seating arrangements to seating during the mapping activity (Figure 18) reveals a great deal about the relationships that existed

within this classroom, and how these relationships manifested as spatial-temporal arrangements with the physical classroom space.

Figure 17

Usual Seating Arrangement of the Art Classroom at SVH



In Figure 17, the teacher and I identified five units, each consisting of two to five students who shared close connections and often worked together on class activities. Because the teacher allowed students to sit where they like throughout the year, students generally sat in the same spot with their friends. Unit A, consisted a group of students who were high-performing high school students, and showed great enthusiasm for art and this project. At the same table sat Unit B—a group of girls' that included Elirobourg, who at times a exhibited disruptive and irreverent attitude in class. At table two, there were a number of students who had recently immigrated to Canada including Bbblknodned, J_c_i_ta, Lissandra, and Heatherb_18 and Rhs_imhungry. I identified Heatherb_18 and Rhs_imhungry as Unit C because these two were close friends and

always worked together in class. Guns_are_great, who had recently moved to Montreal from British Columbia, also sat at this table. He rarely interacted with his peers. At table 2 sat another group of students with varying degrees of interest in art class. Table 3 was occupied by Unit D, or what I refer to as the "too cool for school kids." This group of six included Supremeleaderkimmjongoink and Bxtimupp, who were skilled artists, but they were also disruptive at particular times during the project. Others members of Unit D did not give assent to participate in the research. Unit E consisted of Chriscrossmillhill and Cloverfieldproject, who also occupied table 3. These two always sat together, and continually talked and helped each other in classroom activities. I later decided to interview the two together because of their close relationship. Cassie_jones23 and Theoverthinker134 were two examples of students who moved between two different groups. Cassie_jones23 was an interesting case to observe as she sat with this group and was particularly close to Elirobourg in Unit C, but she also associated with Jxexa and the other members of Unit A. Theoverthiner123 moved between table 2 and the cool kids in Unit D.

Figure 18

Seating during Workshop 3 Mapping Activity at SVH

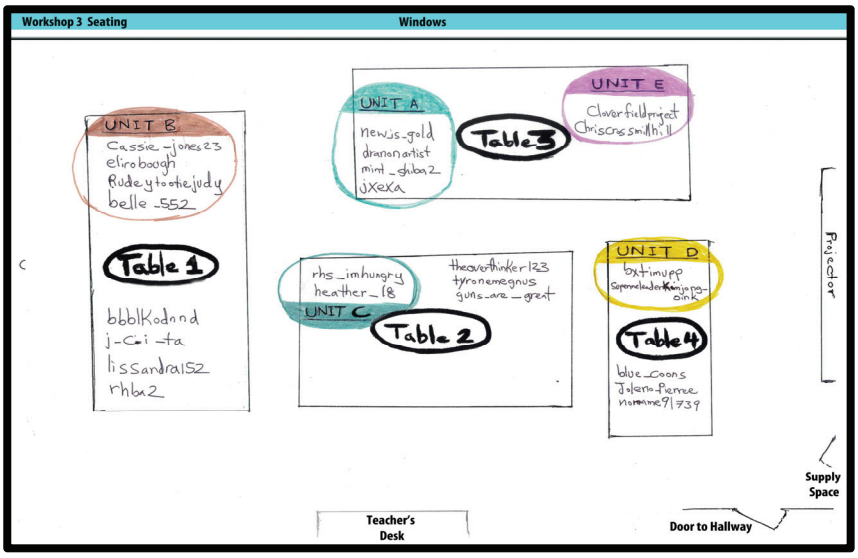
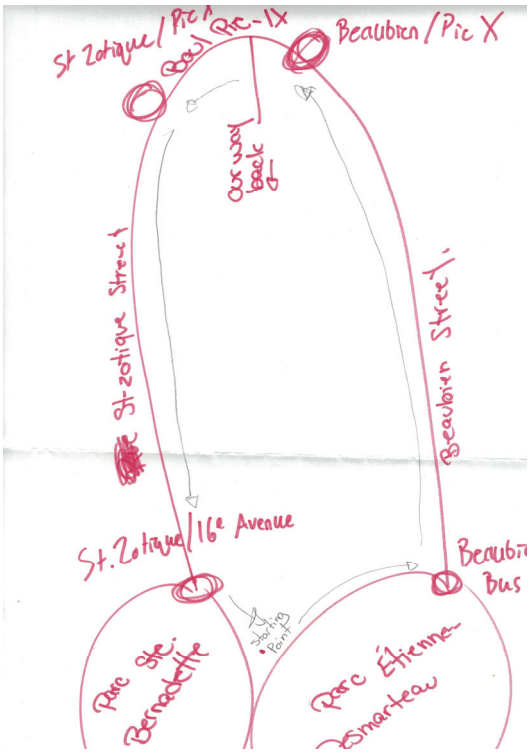


Figure 18 illustrates how individuals broke away from their randomized assigned groupings, and coalesced into their usual units. Jxexa, Mint_shiba2, Dranonartist, New_is_old (Unit A) left their assigned groups to reunite at table 3, after which they began diligently working on their map. Students from Unit B reunited at table 1. I observed Elirobourg making a number of disparaging comments about their assigned task. According to the teacher, Elirobourg manifests this kind ofattitude at times in reaction to certain activities. Heatherb_18 left her assigned group to join her friend Rhs_imhungry (Unit C). Chriscrossmillhill and Cloverfieldproject (Unit E) also left their groups to work together as a pair. Supremeleaderkimmjongoink and Bxtimupp (Unit D) reunited at table 4 to cause mischief. They managed to develop a map that provides a practical plan for the neighbourhood walk, and, at the same time, depicted male genitals (Figure 19).

Figure 19

Penis Map by a Group that Included Members of Unit D



During the post-interviews several students reflected on their resistance to being forced to work in assigned groups without their friends. Mint_shiba2 explained, "I'm not really super social. I feel more comfortable with people I know. Most people are comfortable with working with people that they know. In other classes, they want to pick their own group." Mint_shiba2 ended up leaving her assigned group to work with her friends in Unit A. Jxexa, who was a member of this group, explained her reason for leaving her assigned group was that they weren't "serious." Jxexa recommended allowing students to choose their own groups because although her group of friends like to joke and have fun, they also focus on their assigned tasks. Heatherb_18 enjoyed the activity, but expressed a preference for working exclusively with her friend Rhs_imhungry. She protested that in a larger group "one person tells where to go and one draws, and you don't talk that much." These students clearly wanted to be with their friends. I applied lessons from this event in phase 2 and allowed students to freely choose their groups for all activities at RMA.

This event underscores a number of important points about the spatiality of classrooms. In the particular high school art classroom, there were multiple sets of stable relationships that had developed over time. These relationships constituted one important layer of the spatiality of the classroom. Breaking up these relationships with random group assignments revealed the strength, and resilience of these social bonds. Such relationships were fundamental to how all learners engage with most aspects of their school life. Existing social relations are all the more pertinent in a high school setting with teenagers. Social bonds among a group of learners manifest in spatio-temporal relationships within a classroom space. The social relational of this art classroom were manifested in multiple spaces of the project. This included the physical spaces of the classroom, school, and neighbourhood, as well as the online spaces in which the project occurred;

namely, Instagram and Google My Maps. In the following sections I describe some of the existing spatio-temporal relations of students within the physical spaces of their schools and classroom, and various online spaces.

Physical Spaces - Relationality, Proximity, and Movement

The event during the mapping activity at SVH was illustrative of some of the key ways the spatio-temporal relations within the classroom affected the "Map My World" project. First, the spaces of the classrooms were relational; that is, they are constituted through relationships among learners, teachers, and non-human actors. The existing social bonds within these relational spaces were significant for learning. A key and consistent finding in my analysis is that students also think about their school and classroom spaces in a relational manner. Additionally, there are some key factors that influenced students' engagement in these social constructed educational spaces. The most pertinent factors I have been able to identify in my analysis are proximity, movement, and the related issues of agency.

Proximity of students within the physical classroom, and school spaces shaped students' attitudes, behaviours, and experiences in the school. Proximity of students also had a perceptible impact on students' motivation and learning in a number of ways throughout the project. These relationships in physical space were also present in the online spaces of the social media and mapping networks. One example of this is that students who sat next to each other in the classroom generally knew the pseudonyms of their friends on our network.

Movement was also an important factor. One of the goals of this research was to utilize mobile technologies such as smartphones to expend the spaces of learning. This allowed students to engage with each other asynchronously. However, moments in which students moved together in physical spaces — during the school and neighbourhood walks — were most productive and beneficial for students' learning and engagement. Questions of movement within formal

educational contexts often raised the issues of agency and trust. In many cases, students wanted the freedom to move and be where they wanted to be, and with whom they wanted to be. For the teacher at SVH, the degree agency of movements given to students was contingent on how much she trusted her students.

Relationality, proximity, movement, and agency were the factors that constituted the existing spatio-temporal relations within the physical spaces of the classrooms in which the research was conducted. These factors were also present in students' existing perceptions of their school and classroom spaces. During pre-interviews, I asked students where in their school they liked and disliked spending time, and the reasons for their choice in order to gain an understanding of schools' perception of their school spaces. The Cafeteria, library, some classrooms and hallways were commonly preferred spaces, while some hallways and classrooms were spaces some disliked. The reason for these preferences included factors such as noise levels, and whether the space was suitable for social interactions. Almost all the students provided some variation on this latter rationale. At both schools, students' ability to interact with their close friends was their main reason for liking or disliking the spaces in their school. Here is a sample of students' responses on the spaces they liked in their schools:

Jxexa: There's a quiet hallway that my friends and I like to go to. I like to be quiet and with my friends.

Rhs_imhungry: The Cafeteria because that's the place I can talk to my friends a lot and we always have fun, eat and talk.

Bluebean18: Mostly stay in the cafeteria, or I like to go outside to the park with my friends. The Caf, I'm only there during recess, so it's a good vibe because we're all friendly, relaxed and out of class.

Bgonth0t19: I like the cafeteria. It is a little loud at times, but you have the atmosphere of school.

You have everyone around.

Researcher: What's a good atmosphere?

Bgonth0t19: Being able to talk with your friends and have a conversation and not being super duper loud and hectic.

Ivan_ivanovich_ivanosky: Mostly by my locker because all my friends have their lockers right next to mine. At my locker we're together.

Students' perceptions of the spaces in their school were shaped in large part by the kinds of social interactions the space enabled. Although being together with friends was a common theme in students' attitude towards their school space, there was one exception that proves the rule. J_c_i_ta responded to the question of which space she preferred in her school by talking about "a bench in the hallway" where she always sits because she doesn't "want to talk to anybody." This student preferred to not interact with peers. J_c_i_ta described her friends in the school as other Chinese students, who "help each other in Chinese, not in English." She also said that she had hoped to learn in school **"**communication with classmates because I'm not good at that." In this case, the preference for avoiding others can partially be explained by an introverted personality, and partially by specific circumstances and language barriers that made communication challenging. While this student preferred to be alone in the school, she also expressed a desire for interaction.

Students also viewed classroom spaces in a relational manner. The response of Cassie_jones23 to the question of which spaces she liked and disliked in schools is insightful for understanding how some students view the spatial arrangements of their classrooms. She cited the cafeteria as a favourite space because of a similar rationale mentioned above.

Cassie_jones23: I mostly like the cafeteria, with my friend at the sec 5 table. We spend time there talking.

Researcher: Why do you like this space?

Cassie_jones23: It's mostly because we can be in a group of friends. In the classes most of the time we're separated by rows, and this is a time we can spend time together and talk, without having to talk over other people that are in the next rows.

She emphasized that she disliked being in all classroom spaces "because the teachers separate us by rows, and it'd be way cooler if they put us together in groups". I pointed out to her art classroom at SVH was not structured in rows, to which she responded, "in the art class, it's pretty cool. We get to sit where-ever we want, and we don't have specific desks we have to sit at. In other classes, they tell us where to sit". For Cassie_jones23, the agency to interact freely with peers was the central factor in how she feels about a classroom space. The art classroom provided a freer space because she got to choose with who to sit, and afforded the greater agency to move. A number of other students expressed preference for the art classroom space because of this reason. All the instances above, peer-to-peer communication was a major factor on how students perceived and experienced the spaces of their classrooms and school. The perspective expressed by Cassie_jones23 shows the desire of some students to be given great agency to freely sit, move, and interact in the spaces of their classrooms, and school. In such cases, trust and agency are fundamental to the spatiality of learning.

Space, Agency and Trust

Spatial agency was a central issue in early iterations of the MonCoin project. In the pilot phase, the researchers were surprised to find that using mobile and social media to connect a group of at-risk youth to interact asynchronously online made them want to be together in physical spaces. Castro et al. (2016) identified the freedom of movement afforded by mobile media and the curriculum as a key motivator for students to engage in the education. This was also true in the case of this project, which took place within the context of formal art classrooms.

In this project, movement and the agency to go for walk in and around the school during class time was highly motivating for students. These activities were extremely valuable for the spatial learning that occurred in the project. Spatial agency was also a major concern for some students in relation to spaces of their schools and classrooms. During the pre-interviews, several students, including Cassie_jones23 above, expressed a desire for being granted greater spatial agency. Also, Tyronemegnus2 talked about the "liberty" of being able move and interact within school and classroom space. This "liberty" was highly motivating for him. Tyronemegnus2 expressed his preference for his art teacher and class because she allowed them "to leave the classroom for the painting projects," which made him feel less confined. Tyronemegnus2 also found it liberating to be able to go outside with peers as part of the projects' neighbourhood walk. For these students, there is great value in being allowed to interact freely with others in school and outdoor spaces within the context of an art classroom. Rosegram understood this essential as well, and viewed spatial limitation as a primary concern in her teaching.

> **Rosegram:** I find the classroom size and space a limitation too. I like my classroom, it's bright with big tables, but I often feel if I don't move them into the hallways or into other spaces, they're really limited in terms of how much they can stretch out. In terms of art-making.
>
> Researcher: I noticed you do that a bit, be in spaces of the school.
>
> **Rosegram:** Yes, but I have to trust them. With the younger groups, I don't trust them to stay on task, or to behave themselves or whatever. With this group, they're more autonomous. They're working and not making a lot of noise.

For the teacher, agency was always contingent on trust. On the one hand, some students expressed a desire to have greater agency to move and be with friends. On the other hand, teachers have the responsibility to manage the classroom, ensure students stay on task to learn,

and follow the schools' administrative rules and procedures. Part of the spatiality of these classrooms is the negotiation of these various, and sometimes contradicting, interests and priorities. Part of this negotiation happens by building rapport with students in order to trust them enough to be autonomous in the spaces of the classroom and school.

Online Spaces — Constructed Identities in Relational Spaces

Just as with physical spaces of the school and classrooms, existing online relations fundamentally shaped students' learning and engagement in the project. While one cannot generalize about how teenagers interact online, I was able to observe a number of pertinent patterns in students' attitudes towards online spaces. Similar to physical spaces, students tend to regard and talked about online spaces in a relational manner. That is, how they posted, what they shared, how they interacted depended on the audience on their accounts. This became quite evident to me during the pre-interviews, particularly, in students' responses to the question: "Where are some places online where you feel like you can be yourself?" Generally, students expressed a great comfort with engaging in multiple social media and online platforms. However, during the data analysis, I was struck by the degree of awareness and deliberation in how many students managed their identities and interaction in various online spaces. The comparison made by Bluebean18 between Snapchat and Instagram provides a good illustration of how this student expressed differently depending on whether she was using Snapchat and Instagram.

> [I feel like I can be myself on] Snapchat because I send images to who you want. I have a goofy face to my friends. I can't post that stuff on Instagram because a lot of people see that. On instagram, I'm being watched more. I have to be careful on Instgram, because I know there are people who can hack my account. I don't use geo-tags, even though I have a private one. Also, on Instagram you have to worry about judgements of others. You follow

friends, and people in other schools. Friends of friends. On Snapchat you follow only closer friends.

The key factors for this difference in engagement were which audience viewed what she posted, and how each of the applications structured spatio-temporal connectivity. On Snapchat, images are shared privately and accessible only for a short period of time. This temporality convinced this student that what she shared on Snapchat was more private, personal, and intimate. J_c_i_ta provides another example of how some youth manage and control her relationship within online spaces.

> I have two accounts on Instagram. One is for the friends and classmates and the other one is for my best friends. So only 10 people can see it. Both are private. The smaller account is more comfortable for me. [On the smaller account, I share] …my emotions in every moment….if I'm sad, I will post some black picture, and if I'm happy, I will post a nice selfie.

In this student's case, two different Instagram accounts constituted two different online spaces: one more public, the other intimate and personal. Bluebean18 and J_c_i_ta were two among several students who discussed engaging in different ways depending on the online platforms they used. It should be noted in these instances that the ways a particular online platform enables and constricts spatio-temporal interactions had implementations for how some students engage on that platform. The difference identified by Bluebean18 between Instagram and Snapchat is one illustration of this point. In many ways, youth perform and construct their identities by engaging in a multiple of online spaces (White,). In the MonCoin project, Lalonde et al. (2016) illustrated that "it was through identifying and sharing their everyday experiences that the young people were able to simultaneously develop their own unique online identities and to also develop a sense of common purpose" (p. 52). Such identity construction is not limited to

formal learning networks that are designed and monitored by educators, as was the case with MonCoin. They are part of the everyday practices of youth.

However, it cannot be generalized that all students managed their online presence as conscientiously as the above cases. In post-interviews, students expressed vast diversity of attitudes towards and practices on social media. Some students had few friends on some accounts, while others were connected to a massive network. Heatherb_18, for instance, had 2500 followers, and 7000 following on her public Instagram account. Some students carefully guarded their privacy online, while others were less protective. Some posted often with little reservation, while others posted very few images. Barthalamue_velvatine, for instance, only posted one image on his personal Instagram account because he did not "feel a necessity to" post. Just as in physical spaces, there exists a multitude of ways individuals interact within different online spaces. How one engages online depends on the characteristics of individuals and collectives. Another important factor in how one engages online is the kinds of spatio-temporal interactivity that is enabled by a particular platform.

Within the context "Map My World," the closed Instagram and Google My Maps networks I established for conducting research created another kind of online space. These online spaces were constructed in order to facilitate particular learning objectives. Namely, the online spaces were designed to connect youth to their everyday surroundings using mobile photography and online mapping. There is ample evidence that these online spaces enabled thoughtful interactions among youth in their everyday surroundings. In addition to these intended outcomes, there were also several unintended outcomes.

The Unintended Curricula — Spam Accounts, Trolling, and Funny

Students at both schools tinkered with the official intentions and boundaries of the social media and online mapping networks that were set up for this project. The nature and spirit of

these challenges were somewhat different in the two schools. While at SVH, a few students posted blatantly offensive content, at RMA numerous students posted to get laughs from their peers. The unintended curricula that emerged on our social media and online mapping networks reveal that the designed online learning spaces of this project were relational, and nested within micro, meso and macro socio-cultural relations. How students interacted in these educational spaces depended on their existing attitudes, beliefs, and digital practices. Engagement in these spaces also necessitated negotiations among learners, teachers, and non-human factors such as software algorithms. Just as in physical spaces of the classroom, disruptions on the projects' online spaces were extremely insightful for understanding the critical role students' existing attitudes, beliefs, and practices played in how they engaged with the online spaces of the project.

Spam Accounts

One dramatic rupture in the spatiality of the project occurred at SVH on the first day of the project, during which we setup our private Instagram network. Several students posted inappropriate usernames and content. While the set up was occurring, I immediately had to approach Supremeleaderkimmjongoink and ask him to take down videos he had posted of an interview with a musician using offensive language. At another instant, I had to ask a student to change her username, because she had chosen "BitchImUp." After we discussed and negotiated the matter, we settled on Bximupp. Guns_are_great was another case of an inappropriate username.

During the post-interviews with Supremeleaderkimmjongoink and Bxtimupp, I learned they had what they called "spam" accounts on Instagram. Supremeleaderkimmjongoink mentioned having three Instagram accounts: a main one, a professional photography account, and a spam account. When I pushed him on what he did on the spam account, he responded,

Supremeleaderkimmjongoink: Third one is stuff whatever I feel like posting without having other people judge it.

Researcher: What do you post there?

Supremeleaderkimmjongoink: Stuff you don't normally post.

Researcher: For example?

Supremeleaderkimmjongoink: I can't think of it. Stuff you don't feel comfortable posting in other accounts. Plus, this other account I don't have my parents following me. They don't see the type of stuff I post. It's not for parents and teachers.

By Supremeleaderkimmjongoink's definition, spam accounts are a place he could post material that is "not for parents and teachers." It is quite possible that he posted material from his spam on our closed network during the first workshop. The distinction made by Bxtimupp between her "main" and "spam" accounts was, "spam account is when you post random pictures of yourself with friends, and main account is like nice pictures." She also explained that she has more connections on her main account, and the spam is for an exclusive group of friends. For these students, the spam account is a closed online space that is not for parents or the general public, but rather for specific friends. In this space, students share amusing and possibly inappropriate content. These students' digital practice had a perceptible influence on their engagement with the online space of our project. In the case of Supremeleaderkimmjongoink, our closed social media network afforded him opportunities to share his skilfully crafted photographs in a school context, and also to push the limitations of this online educational space by sharing inappropriate content. The online network of the project presented him a space to construct hybrid identities. Early in the project, he tested the limitation of this space, and figured out how to gain attention from peers. Fortunately, his professional photography garnered a good deal of positive attention, and he was engaged with most of the missions and themes of the project.

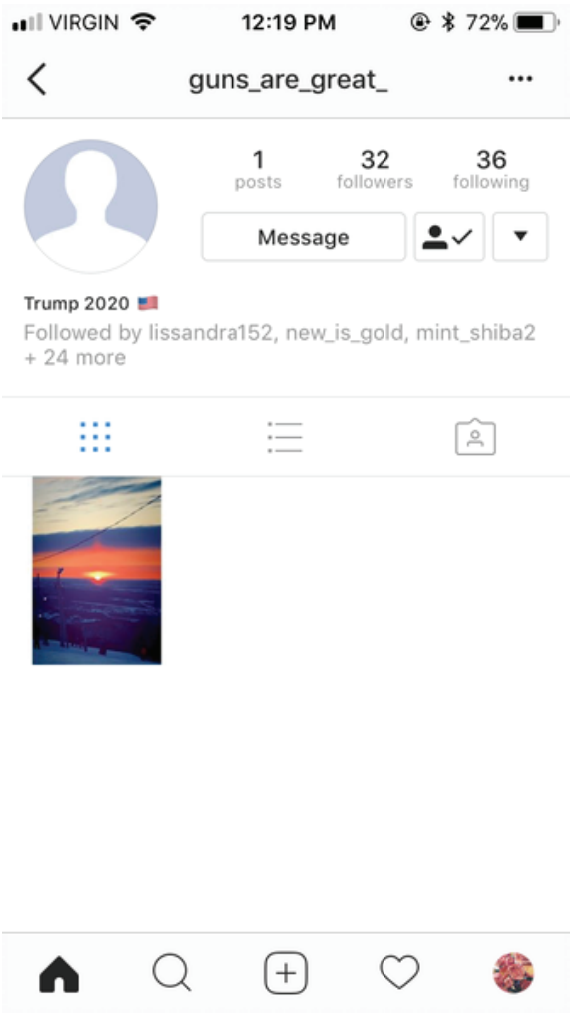
Guns_are_great

The participant Guns_are_great provides one of the most striking and dramatic examples of how existing digital practices and cultural influences affected the project. This case underscored the degree to which creating online learning space in a high school required negotiations among a multitude of actors and trajectories. This project provided Guns_are_great an opportunity to troll his teacher, his classmates and the researcher. The first username that he chose for the project was “Fuck Liberalism.” The teacher and I asked him to change his username, so he changed it to “Trudeau is a Cock,” and later settled on Guns_are_great. The name he registered for the account was “Trump 2020”. The teacher and I informed this student on several occasions that these usernames were inappropriate for the project and school, and they should be changed. Guns_are_great posted only one photograph of a sunset, which received comments from Thorinmalaka, who was his brother. Thorinmalaka was not a member of the class, and it was against the project rules to connect with those outside of the art for the duration of the project. Thorinmalaka commented, “this picture is highly inappropriate. Please remove it before more innocent snowflakes, such as myself become offended by the profanity displayed in the photograph.” The brothers had collaborated for a coordinated attempt at mocking the project and the school by using common right wing tropes such as “snow flake.” His behaviour violated the rules of conduct for a school project, and also the ethical protocol of this research. It was essential to maintain a closed social media network during the project, and for students to protect their identities. For this reason, students were asked to only “follow” members of the class and protect their identities for the duration of the project. Guns_are_great posted inappropriate material, and involved family and friends who were not members of the class. I “unfollowed” him on Instagram because of these various ways he violated the project rules and ethical protocol.

At the end of the project, I interviewed Guns_are_great to better understand his perspective and behaviour. First, I pressed him on why he had chosen those usernames, and the final impression I was left with was that it was just a fun thing to do. He explained the reason he had chosen Guns_are_great as the username was "because I am passionate about my gun right." His justification for this choice was that he had the right to express his political views. It is notable that his justification and political views were centred on American politics, even though he lived in Quebec, Canada.

Figure 20

Screen Capture of the Project Instagram Account of Guns_are_great



I then asked him about the previous usernames "Fuck Liberalism" and "Trudeau is a Cock," and his answer was again "because I just feel passionate about those things." He then explained that he understood they were inappropriate for school, "because it's school," and that is why he changed the name to Guns_are_great. Realizing that expressing political views was a major concern for this student, I decided to ask him how we as educators could accommodate dialogue that would allow him to express his views appropriately.

Researcher: It seems you're very passionate about your political views, but it seems like you felt that we were trying to oppress your political view. Did you have that feeling?

Guns_are_great: Not really, no, because I understood that was not appropriate for school.

Researcher: So, if you understood it was not appropriate for school, why did you do it?

Guns_are_great: *Just for Fun*.

It is this response that has convinced me that Guns_are_great's objective was to troll us. I also learned from his teacher that he had a gang of friends who share similar political views at school, who were not in art class. His brother, who had left troll-like comments about "snowflakes," was a member of this group. The teacher informed me that this had been an on-going issue at school. He had been known to troll the guidance counsellor, and he had started drawing pictures of guns for the studio project. The principal and vice principal had been informed of these issues. The teacher, Rosegram, provided a detailed description of Guns_are_great in the context of the school:

I don't know him that much because he's quiet, and keeps to himself. I have no idea what's going on, and this trend of expressing political views, and trolling the guidance counsellor. Apparently, he goes in there and says, 'you know there's only two genders right.' So he's going there to make people uncomfortable. And he has a little gang of guys, (including his

brother?) and two other two sec 4 students in music. So they get each other going and support each other in their trolly ways.

Rosegram was aware of other instances in which Guns_are_great and his friends have been kicked out of the library or the guidance office for making other students uncomfortable. The behaviour had not trickled in the art classroom until recently. According to Rosegram, "previously he was just making really low effort artwork" and not actively expressing his political view. Rosegram pondered the causes of this recent transformation "maybe he feels emboldened by the political climate and his friends." The political climate was one factor that partially explains Guns_are_great's motivation. Guns_are_great also acknowledged the polemic political atmosphere in the Trump era, and expressed, with some grievance, that he felt conservative views were being repressed in society these days, and at his school. However, politics was not the only factor motivating this student's behaviour.

During the neighbourhood walk, I made a point of joining Guns_are_great's group in order to have a chance to learn more about him. I found out that he is from a small town in British Columbia and recently had moved to Montreal because of his "Mom's boyfriend." He did not really like Montreal, and felt like an outsider. He also did not like the school because they did not offer courses in "shop" and "mechanics," as they did in his previous school. He was exhibiting signs of culture shock and a sense of alienation. He also expressed repeatedly that he "hates art". In the classroom, the teacher pointed out that he never talked to anyone and generally kept to himself. He sat at a table with several students who had recently immigrated to Canada, and rarely talked. His behaviour was affected by these circumstances, and he was seeking attention.

Guns_are_great provides a case of how the confluence of personal circumstance, relationships, and the socio-political environment constitute the spatiality of the classroom, and how such factors affect interactions in physical space and online. The physical spaces of the

school, and the online space of the project, presented him opportunities to combatively express his views. In this instance, one can observe the contemporary debates in the political arena had fueled and motivated some of the student's behaviour. Macro socio-political systems are always implicated in physical and online educational spaces. However, there were other factors that contributed to this student's disruptive behaviour. Personal life circumstances also had a decisive influence. The sense of alienation in a new city and school also contributed to this student's cries for attention.

The disruptions that occurred on the project's close-networks reveal a great deal about how the spatiality of an online space was entangled within existing digital and cultural practices, political beliefs, personal experiences, and connections to a place, and relationship to others in these places. This spatiality is multi-scalar in that micro, meso and macro social structures and relations are always co-implicated. Within various spaces of this project was entangled in classroom and school culture, as well as the cultural and political milieu at the time. Furthermore, these constructed online learning spaces were contingent, emergent and open to negotiations. At SVH, these negotiations, at times, had a polemic tone. Students at RMA also engaged with the online spaces of the project in unintended ways.

Funny

"Funny" emerged as a common code in my analysis of the RMA data. Having a sense of humor, being cheeky and having fun were key characteristics of how some students engaged with the online social media and mapping spaces of the project. The images that best encapsulated this was the response of Sandycheeks024 to the mission "art" (Figure 21).

Figure 21

Response to Mission "Art" by Sandycheeks024

This is the one image that can fairly be described as the "viral post" of the social media network at RMA. It received numerous likes and comments, and a few students and the teacher identified it as their favourite in post-interviews. Pink_sparkles_cream_pie1620 appreciated the creativity of the artist, and Ivan_ivanovich_ivanosky pointed out that the photograph parodied an artwork shown in class "where a man had a bag over his head to show consumerism or something." He thought this was "funny." The teacher Cardinal explained that this post was based on the topic of conversation during her class that day. To introduce a project about masks and identity, Cardinal presented the work of an African artist who had put a bag on his head with political text. Cardinal said of this image by Sandycheeks024, "When she posted that, I thought it

was cheeky, cheeky, cheeky, but it was fun. At least they were listening to my class and it affected them to go out and put a bag on their head." Cardinal observed that this created a fun and playful space, in a positive way. The teacher and students in this context showed an appreciation for having a sense of humor and being playful.

The RMA students also exhibited their sense of humor on the online mapping platform. During the fifth workshop, the students were asked to post photographs from their neighbourhood sensewalks on Google My Maps. This process proved to be arduous for some students, and there were some technical issues. While students were posting on the map, the teacher and I walked around to observe them. During this workshop some students managed to post their images of their sensewalks. However, at the same time, one or more students posted images and text captions hidden in obscure places all over the world. On this map, one can find "enuzzer day in bikini bottom" or "the chum bucket" in the middle of the ocean. Also, a mysteriousmannequinappears in Mali, Australia, Alaska and Greenland (Figure 22).

During post-interviews, Pink_sparkles_cream_pie1620 admitted she was responsible for some of the posts on the online map. Pink_sparkles_cream_pie1620 is the only student that I know with certainty made funny posts. However, she also mentioned seeing others post images around the world, so there is a possibility that there were others. While this kind of engagement was not part of the intended outcome of the mapping activities, it was not offensive and provided the class with some much-appreciated levity.

Figure 22

Screen Capture of Online Map Created during Workshop 5 at RMA

Mysticalxunicorn, Sandycheeks024, and 3869_lit were among students who expressed appreciation for their classmates' sense of humor. In response to the question "what did you learn about your peers, 3869_lit said,

> I learned about their taste. For example, let's say a lot of people put their map in the ocean, and I was laughing really hard, and I realized they do have a sense of humor, because the posts were hilarious. Yah, someone put "spongebob" and "bikinibottom." Just hilarious!

One can sense the joy of discovery in this response. The response of Mysticalxunicorn is particularly notable as it shows that the online mapping spaces presented students a space in

which they could engage with their classmates differently.

Researcher: What did you learn about your classmates?

Mysticalxunicorn: I learned that my classmates have a different side to them. They're not always very serious. They could have fun like this.

Researcher: Do they seem serious in school?

Mysticalxunicorn: Yah. That's why I was surprised when they did this.

Even though these students spend a major part of their days together, the online spaces of the project allowed Mysticalxunicorn to see a different side of her classmates and friends. There are a number of factors that contributed to this. One, this was an art class, which for some students is a relief from the stress of 'academic' subjects, and on top of that, this is a side project by someone other than their teacher. Additionally, the use of pseudonyms and anonymity online allowed students to express themselves in ways they otherwise would not. A case in point is Barthalamue_velvatine, who attributed the use of an anonymous username to a sense of freedom to express his funny side. He referred to an image he called "Geno's" as an example of something he would not have posted had he not been anonymous (Figure 23).

Barthalamue_velvatine: I felt I could post certain things without people judging me. It felt good to have that sort of freedom

Researcher: If your username had been your real-name, you wouldn't have posted the same image?

Barthalamue_velvatine: I wouldn't have. I wouldn't have posted Gino's, for example, because that's something I would have got scrutiny for. Because this is more of a joke

Researcher: What's the joke?

Barthalamue_velvatine: When we went to the Washington and Philadelphia trip, in Philly we saw Ginos and they had a merchandise shop, and basically everyone was

screaming “Ginos” and made fun of it because it was so exaggerated and over the top. So it’s not that I’m making fun of the project. It’s that I can show my character without being judged. I like making jokes, being light hearted, so if I have my real-name, I wouldn’t want to post because I might get scrutiny for not being serious about this.

Figure 23

Response to Mission “Landmarks” by Barthalamue_velvatine

In this case, the online network allowed the student to express himself more freely on the social media network. Likewise, the students’ identities were undisclosed on the online mapping network. There was a significant difference in the two platforms, as the teacher and I knew the students’ usernames of all students, but we were not able to track on the mapping platform. Mysitical_unicorn attributed this fact to the students’ funny global posts on the map. As

Mysticalxunicorn put it, “you can’t know who did it, so they can’t get in trouble.”

In the cases above, we can see that the social media and mapping platforms opened up spaces in which students could express a different side of the personalities and be light hearted. This collective of students constituted a learning system, with existing sets of relationships and histories. These histories were present in the online spaces of the project, and shaped the trajectories of learning.

At SVH, a number of students tested the boundaries and limitations of the online space by spamming and trolling on our social media network. These instances illustrate the first important point about the spatiality of the project: Both the physical and online spaces of learning are relational and open to negotiations, and these relations are nested in other large and small socio-cultural relations. The second important point about the spatiality of this project is that physical and online spaces were deeply intertwined. Interactions in physical spaces affected online engagement, and online engagement affected physical interactions. This theme is explored in-depth in the next section.

Spatial Learning

I use the term spatial learning to describe the transformation in students’ perceptions and engagement with their everyday surroundings. My goal in establishing the online social media and mapping spaces was to engage students in artistic activities that encouraged them to attend to their surroundings. In post-interviews, many students reported that this project encouraged them to notice, focus on and become more aware of their everyday surroundings. Various factors and activities influenced students’ spatial engagement and learning, including the missions, the theme of the senses, being together in physical space, and walking together. The maps are another key factor to be discussed in the next chapter.

Online connectivity and face-to-face connections were integral to students' engagement throughout the project. The importance of face-to-face connections within asynchronous online networks is understood in the literature. The current research on blended learning environments, for one, focuses on how to effectively combine synchronous and asynchronous interactions in online and physical learning environments (Güzer & Caner, 2014). Some researchers have argued for the importance of in-depth integration of physical and online spaces in order to take advantage of the best elements of various modes of interactions. The MonCoin project shared in common with blended learning the aim to create learning environments that allowed synchronous and asynchronous online connectivity among peers, and involved physical encounters in educational and civic spaces (Castro, 2019). Akbari (2019a) argued that a key to the success of MonCoin was in "creating opportunities for students to actively engage with their immediate physical space in their online network through photography" (p. 103). The view rejects the tendency to view online and face-to-face learning as binaries, or oppositional. Rather, the online and physical spaces are seen to co-constitute each other. That is, interactions online affect interactions in physical space; interactions in physical space affect interactions online; Interactions in online and physical space integral to the spatial learning that occurred in this project. Akbari (2019a) provided examples of school walks and neighbourhood walks as instances of peer-to-peer learning in physical and online spaces, and student engagement with their educational and civic surroundings.

The symbiotic relationship between face-to-face and online interactions is a central theme in this section. Relationality, proximity and movements in the physical spaces of the art classrooms, schools, and neighbourhoods played a critical role in students' learning and engagement. I begin this section by providing evidence of students' spatial learning. Then, I

discuss the value of being together, walking together, one-on-one interactions, and going outside for spatial learning in this project.

Notice, Focus, Be aware

Noticing one's surroundings is one of the clearest overall themes that emerged from students' and teachers' reflections on their learning during the project. In interviews, the majority of student interviewees mentioned various ways that the activities of the project got them notice new things in familiar spaces, and encouraged them to explore and discover new spaces in their schools, neighbourhoods and cities. Many students at SVH and RMA talked about the theme of noticing their surroundings in various ways during post-interviews. Jxexa reported that the project got her to "focus" more on her surroundings. She gave the example of walking and hearing a bird. At first, Jxexa explained, "I get annoyed by birds, but this time I heard them tweeting and I enjoyed it, because I focused and realized they're communicating." Mysticalxunicorn also talked about learning to be more attentive to details in her surroundings. She reported learning "there's lots of stuff that we could see in our every day, if we pay more attention we could see more detailed stuff." Ivan_ivanovich_ivanosky and Bgonth0t19 both connected the act of doing photography to noticing and paying attention to details in their surroundings.

Figure 24

Posted by Ivan_ivanovich_ivanosky during the Neighbourhood Walk

Ivan_ivanovich_ivanosky: When you're doing photography you're paying a lot more attention to detail. So, the small detail, the things you would never really notice had you not been paying attention.

Researcher: Can you give me an example?

Ivan_ivanovich_ivanosky: Well, I posted a picture of a path, with trees on the side. I'd never noticed that, even though I had been in that area many times before.

Researcher: The picture on map my walks?

Ivan_ivanovich_ivanosky: Yah.

Bgonth0t19: I noticed new things. On the street outside of the school there's a street of a mini-house, it's like super small, it's not even a house. In between two houses I had never noticed that until last week while I was taking pictures. I've been here three years and I didn't know their was mini-house.

Bgonth0t19 stressed that, overall, the project made her analyze her surroundings a lot more, and to look around her surroundings to find pictures. The examples provided by both these students occurred during the neighbourhood walks. The teachers at SVH and RMA also discussed various ways the project got students to notice their surroundings. Similar to the students, they provided examples from the neighbourhood walks as instances in which learners engaged in their environment differently. This is how the teachers responded to the question, "What do you think students learned about their surroundings?"

Rosegram: [Students] noticed things that were already there, and they were more tuned in to them. Especially, when we did the neighbourhood walk, and school walk too. For example, at Dairy Queen, someone had dropped their ice cream and it was on side-walk. This is something they'd walk past normally. There're just a lot of quirks and details, like signs or evidence of humans that were there before, and I think they were paying more attention to that stuff. So, in that sense, being aware of their surroundings. They paid more attention.

Cardinal: It slows you down. It slowed them down to look. When we did the walk there, you were slowing down and looking at what's a good picture. I think it slowed them more and made them more aware of their surroundings, or the visual of their surroundings, and of their school. For example, you had the pictures of the bathroom (PIC) scene there, and you know there was a really cool picture of the materials in the class, so again it slowed them down, and made them become a little more aware of what was …is in their school . So, I

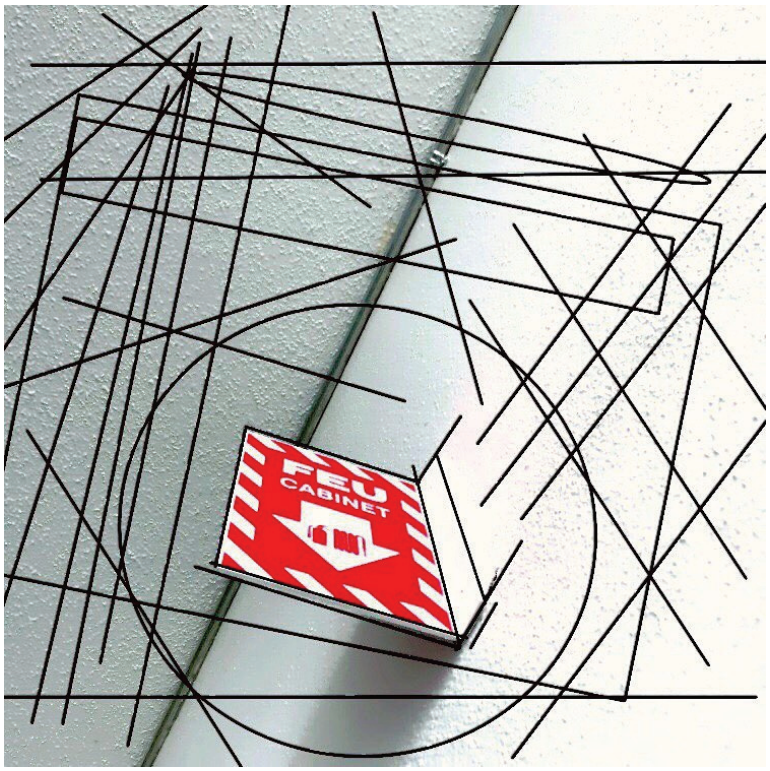
think they learned to slow down a little bit.

Rosegram observed that this project encouraged her students to pay attention and be aware of details in their surroundings, and Cardinal expressed this in terms of slowing down. Both teachers witnessed their students attending to their surroundings during the school and neighbourhood walks. Being together in physical spaces provided the teachers opportunities to see students' engagement with their surroundings, and it also provided learners with opportunities to notice, and engage with their surroundings differently. Walking together was a critical factor for learners' engagement with their surroundings.

The missions were another key factor. Mint_shiba2 provided a vivid example of how the mission got her to notice something about her surroundings and herself. She described a photograph she took in the school highway as her response to the mission "Notice" (Figure 25).

Figure 25

Response to Mission "Notice" by Mint_shiba2



Mint_shiba2: I realized I don't really focus on a lot of things. For example, I posted an image of the fire sign, which I noticed. This made me realize that I look on the floor a lot. I don't really look up and see what's happening.

For the mission "Notice," students were asked to look carefully and closely at their surroundings, and identify details that generally go unnoticed. This particular mission is one of the more explicit examples of spatial mission from the MonCoin project. I described spatial missions as "visual prompts that encourage students to observe, photograph and share various aspects of their everyday surroundings" (Akbari, 2019b, p.131). These prompts intervene in the automatic functions of human perception, and raise awareness of that multitude of details one's surroundings, which is experienced and sensed semi-consciously. In the case of Mint_shiba2, the missions "Notice" intervened in her automatic way of being and moving in her school. Chriscrossmillhill provided another example of how this mission influenced his habitual engagement with his surrounding. He responded to the mission "Notice" with an image of garbage on the street (Figure 26). He identified this images as an instance that got him to start paying attention to the "smallest bits of details" in his surroundings.

Chriscrossmillhill: I always come across garbage on the floor, and that's something I didn't notice until this project, because most of the time I walk and take the bus to school. I always notice some garbage on the floor, and I always think why don't they clean it up?

One important issue this account given by Chriscrossmillhill raises is that noticing does not always mean noticing pleasant things. This point is made explicitly clear in the section on smells in the Senses and Photography chapter.

Figure 26

Response to Mission "Notice" by Chriscrossmillhill

The senses were also a critical factor in encouraging learners to attend to their surroundings. Connecting spatial awareness to the senses turned out to be an effective strategy as a number of students reported that the sensory missions attuned them to the sensorium of their everyday spaces. Particularly in response to the question of what students learned about their senses, several students discussed the connection between spatial awareness, noticing and the senses.

Jxexa: The hearing and Smell. I smell oil on the street now. I'd never noticed that before. Or sightseeing. I walk by and I see things are connected to each other with the poles, and I

think why I didn't notice this before. And I pass by it every day but I took the time to look for photos.

Cassie_jones23: I noticed there are really pretty flowers everywhere we go. There are nice things anywhere we go, and we don't take enough time to notice them.

Cloverfieldproject: You barely take a notice of your senses. How stuff smell and tastes you like. You don't see that. You barely get details.

Researcher: So do you notice your senses more now?

Cloverfieldproject: Yah! For example, about food, what you like, and how this thing smells. How music sounds.

Pink_sparkles_cream_pie1620: Now I can look at how things look, and smell. The senses, basically. That helps me know things about my surroundings.

Tyronemegnus2: Whenever there was a sense project, it made me notice things. I looked at things differently. Like I said before, I never really used to look and take in things, but now I do. It influenced me to.

According to these reports by students, the spatial missions in general, and the sense mission specifically were effective in meeting one of the key educational objectives of the project, which was to connect youth to their everyday surroundings. One notices details in one's surroundings when focusing on photographing what one sees, hears, tastes, and smells. These missions also had an impact on students' photographic practices. The comparison made by Theoverthinker134 between his usual photography practice and this project is particularly illuminating in this regard.

Theoverthinker134: So in my town I go on walks with my mom during sunset. So during the sunset, we take pictures with the phone…

Researcher: It sounds like you're usually paying attention and photographing

surroundings? **Theoverthinkers123:** but I feel like, it's just sunset, sunset, sunset. With these missions…you had to look, or even take pictures to show or find that word in that picture.

Researcher: do think this will affect how you photograph?

Theoverthinker134: Yah, because now every time you take a picture you're gonna think about those…does this pic have senses, dark, loud. Oh, maybe it does.

Theoverthinker134 is an example of a youth with an on-going practice of digital and mobile photography, but he indicated that had a limited lexicon in landscape photography. Sunset photography was a familiar theme for him, and it is also a popular social media topic (McLennan, 2016). The spatial and senses missions also expanded this student's understanding of the elements in the environment that can be photographed and shared. These missions were an essential factor in encouraging several students to attend to their everyday surroundings.

Being Together in Physical Spaces

In the "Map My World" project, I have found plenteous evidence that being together in physical spaces was vitalfor all aspects of learning and engagement throughout the project. Interactions among learners, teachers, and researcher within the classroom space, school hallways, and in the neighbourhoods during the walks provided important opportunities for learning and engagement. Relationality, proximity, and movement in physical spaces were significant factors in students' engagement and learning online.

Proximity of students in physical space in many cases affected how they interacted online. One example of this was students who sat near each other at times mirrored each other's behaviours and attitudes. These students' also tended to know each other's identities online. In other words, one's friends shaped and coloured how one perceived and engaged with a particular activity, mission, or idea. One illustration of this is the case of Cassie_jones23, who sat with

both Eliobough in Unit B and Unit A, which included Jxexa. Her rationale for sitting with this group was that **"**they took really good pictures. This one person, (Jxexa) took good pictures and had good editing skill, and that helped to maybe I should try harder." Sitting with this group had a positive impact on this students' motivation, while sitting with Unit B brought out her rebellious side. The importance of proximity was not limited to the classroom space. Tyronemegnus2 talked about being encouraged to take pictures by friends outside of the class: "Whenever I took a picture, for most part I was never alone. I was with friends. They'd be like, 'Hey don't you have that project? Shouldn't you take a picture of this?'"

This was also evident during the neighbourhood walks. At SVH, members of unit A talked about how they helped their group members with doing photography during the walk. Mint_shbia described how members of her groups, who were a close unit of friends (Unit A), helped each other during the neighbourhood walk: "We were on the children's playground, and we thought it'd be interesting if we were to pose in it, because no-one was there. If you put people in it, it makes the image more lively" (see Figure 27). In many cases, peer-to-peer interactions in various physical spaces were a key motivator in the project.

Figure 27

Photograph Taken by Volunteer during the Neighbourhood Walk

Walking Together

The various walking activities in this project were particularly effective because they provided students opportunities to be together, and also to move freely through the spaces of their schools and neighbourhood during class time. Movement, and the related issue of agency, were key factors to students' engagement as well. Several students and the teachers identified the

neighbourhood walks as instances when they slowed down to focus on their surroundings. Rosegram vividly described this process of slowing down during the neighbourhood walk at SVH.

> At first (my group) was just on a mission, plowing straight ahead . We got to our first point, and they weren't really noticing …. They took a couple of pictures and they sat down on a bench. I asked them to get up. It took them a little while, and actually when we got to our next destination…that's when they started noticing oh, a bird in the tree. I think they were in a different mode of thinking in the beginning and as we progressed they started getting more creative with their pictures and noticing things around them

In this passage, Rosegram described a transition that occurs between two modes of thinking. At first, they were not engaging with their surroundings deeply, and photographing automatically and without much effort. At the second site, there was a transformation that led students to pay careful attention to their space, and, simultaneously, to be more creative and thoughtful with they're photography. There is a symbiotic relationship between attending to space, and thoughtful photography.

The transformation for the automatic photographer to what I call a "sensory photographer" is a transformation of someone who is in an automatic mode of engaging with his or her surroundings to someone who is engaged aesthetically with space. Robison (2018) articulated the aesthetic experience as "one in which your senses are operating at their peak; when you're present in the current moment" (p. 13). Engaging with one's surroundings in an aesthetic mode implies heightened sensory awareness. To enable this transformation in the above example, the teacher played a significant role by modeling to the student. At the first stop, she was paying close attention, picking out details, getting close, bending down or leaning over to get the perfect shot. Doing photography has a body language, which at times may involve strange and unusual

postures for the sake of taking the perfect picture. Students can observe and learn this body language by being and doing photography with their peers and their teacher in physical spaces.

The case of Bxtimupp provides an excellent illustration of the value of being, and moving together as a group. Bxtimupp was generally an unmotivated student in school and in this project. For the first two weeks of the project, Bxtimupp had only posted a few photographs that were taken prior to the project. During the neighbourhood walk at SVH, she posted two new photographs, in which it seemed she had invested more thought and effort than previous posts. During post-interviews, she described her process of taking these two photographs during the walk (Figure 28&29).

Figure 28

Posted by Bxtimupp during the Neighbourhood Walk

Researcher: Tell me about this one, the tree bark.

Bxtimupp: I had my wallet and I had a piece of play-dough so I just kind of stuck it on the tree.

Researcher: Did you take time to think about what to photograph?

Bxtimupp: Well, the (earlier posts) no because I already had the picture, but (during the neighbourhood walk) me and Supremeleaderkimmjongoink were walking and then I saw an ant on a tree and I thought oh I'll take a pic of that.

In her response, Bxtimupp admits putting little effort in her previous posts, but also that going on a walk with her friend Supremeleaderkimmjongoink got her to notice her surroundings. Supremeleaderkimmjongoink and Bxtimupp were part of Unit D, and during the walk, they were chaperoned by a volunteer teacher.Supremeleaderkimmjongoink had come with his DSLR camera, and was highly engaged in the photography aspect of the project. Walking together with peers contributed to Bxtimupp engaging more deeply in the project. Bxtimupp also described the important role the teacher volunteer played in motivating her to take what became one of her stronger photographs.

Bxtimupp: The teacher told me to just take a picture of my shoe and let's go, so I took my shoe.

Researcher: Why did you post this?

Bxtimupp: because I like the shadows

In this instance, the volunteer teacher forced the students to engage with the activity of photographing her surroundings. This was possible because she was standing next to the student and walking with her. Physical proximity of the volunteer teacher and peers was critical to motivating this student. In this and many other instances, one-on-one interactions between learners and teachers in physical spaces were essential for motivating students.

Figure 29

Posted by Bxtimupp during the Neighbourhood Walk

One-on-one Interactions

Both the teacher at SVH and RMA were aware of the criticality of one-on-one interactions for motivating students in their art classroom. For these teachers, sitting with students and interacting with them one-on-one was particularly vital for dealing with unmotivated and difficult students. Rosegram eloquently articulated the importance of putting pencil in the hands of at-risk students.

> And I know (these at-risk students) are the type who will fall between the cracks if you don't follow up with them. If you don't kind of get them going and put the pencil in their hands, and be like "time to start now" and also show that you believe in them.

The teacher at RMA also talked about the importance of one-on-one interactions for

motivating students who are not interested in a project, or art in general. The teacher pointed out that sometimes, there are students who just do not like art. For Cardinal, motivating these students begins with sitting down with the student:

> Researcher: What do you do when you have a student who just doesn't like art?
>
> Cardinal: I'll sit down with them. I try to demystify that idea that technique is so important, and there are other things you can do, and sit down and talk with the student. Ok. You're doing a mask right now, tell me about your personality. Now let's do this. Just sitting down with them one-on-one, and giving them that attention. The minute they get going, you go over, and say "you're a genius." I'll do that on purpose with certain kids.

Both teachers understood that one-on-one interactions were vital to student engagement in more challenging instances. I argue that one-on-one interactions are generally vital for students, and also particularly valuable for mobile and blended learning. Throughout the project, students, teachers and researcher being together in the physical spaces of a classroom or on walks provided valuable for student engagement and learning.

Student-researcher interactions were an important aspect of this. As a researcher-teacher, my one-on-one interactions with students were critical moments for observing transformations in students' engagement with the project. One illustration of this was my run-in with Psychocritias. Up to the midway point of the project at RMA, Psychocritias had only posted one image. I approached him during a group in class and talked to him about the project. I learned that he is reluctant to share images, and mostly prefers to watch other's posts on our network. Posting and sharing is an obstacle to engagement in some cases. Also, Psychocritias showed me a few images he had been editing using Snapseed, the editing application I had shown the class. Over the previous weekend, while he was bored at home, he had edited several pictures of the hockey player PK Subban. He showed me other cartoon and anime images to explain to me his aesthetic

tastes. After this interaction, Psychocritias posted several pictures for the walk, and was one of the few to finish the Google My Maps project. By interacting with the student in physical space, I learned that while he did not appear to be engaged in the online network, was in fact learning and adopting aspects of the project. Also, after this interaction, the students began posting more in our online networks.

My interactions with the students in this project, the above accounts of the teachers, as well as my life experiences as a teacher and learner have convinced me of the value of physical interactions to the learning process. The instances above illustrate that proximity and movement are vital considerations for motivating and engaging learners.

Going Outside

Another central theme that emerged in analysis was strong preference for going outside. Particularly at SVH, the neighbourhood walk was a huge hit because the students got to go outside with their friends on a beautiful day during a school day. Almost all of the students I interviewed at SVH identified this as their favourite activity.

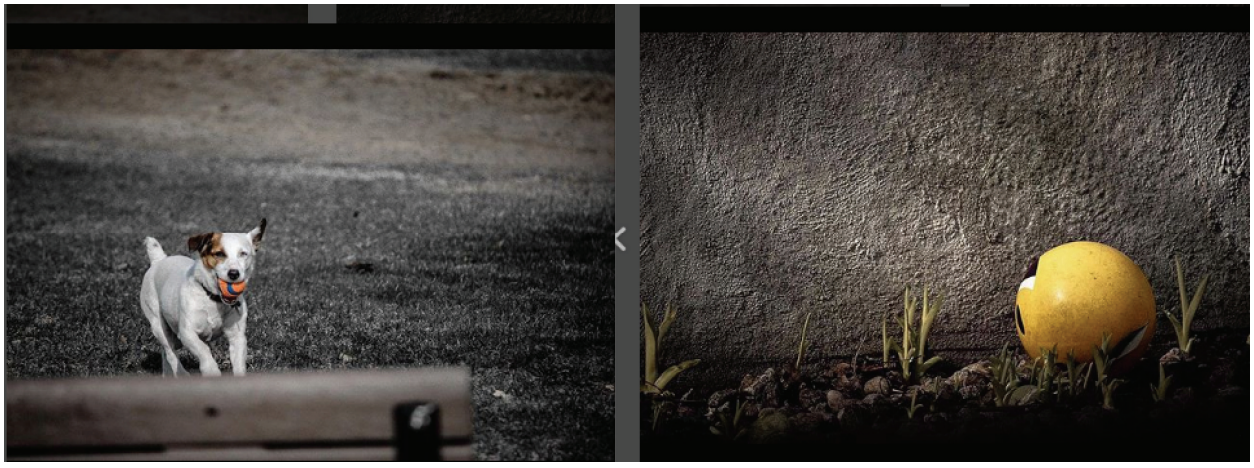
> **Jxexa:** It was so fun. I loved that one. My favourite. I love going outside, but I don't always go. I got to take awesome pictures.
>
> **Mint_shiba2:** It was fun, because we got to see around the area, that we don't get to see that often, because usually we're inside the school, and we don't really get to go out that often.
>
> **Tyronemesns2134:** it was different from being stuck in a classroom, so I enjoyed it. I already knew the area, so I didn't learn much.
>
> **Guns_are_great:** I guess it was kind of fun being outside. I just enjoy being outside over being inside.

The students above had various degrees of engagement and motivation in the project.

However, all of them enjoyed the opportunity to spend part of their school day outside of the confines of the classroom. Guns_are_great is an example of a student who was not engaged in any of the activities of the project, yet enjoyed the opportunity of spending time outside with a group of peers and the researcher. He identified this as the only activity he enjoyed in the project. Supremeleaderkimmjongoink is also another interesting case. Throughout the project, he posted images from his photography Instagram account. The neighbourhood walk was the first and only instance he posted images taken during the project. To take these photographs, he used what he described as his "professional camera" and edited the images he posted. In post-interviews, he also identified this as his favourite activity.

Figure 30

Photographs Posted by Supremeleaderkimmjongoink during Neighbourhood Walk



> **Supremeleaderkimmjongoink:** I really liked the (neighbourhood) walk. I did take a lot of cool pictures on the way that we walked, and like that it got us to walk and stuff like that. …. It really woke me up at the time because I was pretty tired.

Supremeleaderkimmjongoink had brought a DSLR camera and put in a serious effort to post highly crafted photographs (Figure 30). I find this response to be quite pertinent, as it highlights an important, and, at times, under-appreciated value of going outside. Going outside,

for this student and others, meant exercise, changing their mood, waking up, in addition to photographing and paying attention to his surroundings. Within formal educational contexts, providing opportunities for learners to move their bodies is essential. That is why Physical Education is a critical part of the school schedule. Art classrooms can also be an important and valuable space for allowing students to go outside and explore. The integration of mobile media in art classrooms can enable an expansion of learning space within the temporal constraints of the school schedule; and thereby, provide students opportunities to wake up and become more focussed and attentive. Practitioners of Place-Based Education often place an emphasis on asking students to go outside to interact with their local communities and environment (Ball & Lia, 2006; Gruenewald, 2003; Gruenewald& Smith, 2008; Sobel, 2004), and, within Art Education, the integration of Place-Based Education can enrich students' connections to their surroundings (Graham 2007, 2008). However, my experience with this group of learners shows that there is an additional benefit of Mobile Learning and Place-Based Education in Art Education. Within the context of a high school classroom, going outside also provides valuable opportunities for students to move their bodies while learning and engaging with expanded learning spaces.

While many identified going outside to be highly motivating, this question is also entangled in questions of agency. Agency and movement have already been identified as critical aspects of the spatiality of the classroom, and this was all the more evident during the neighbourhood walk at SVH. Cassie_jones23 was among the most vocal advocates for going outside in the art classroom. In response to the question of what would motivate her in her art projects, Cassie_jones23 stated,

> Art project that we would have to go outside. Like more free space to find different things outside, like pinecones and stuff like that to make an actual project, like as if we were little kids, and find stuff we can stick on a piece of paper. That'd be cool.

The phrase "free space" is revealing in this response about the students' association between going outside to explore, and being given the freedom to move and explore. Ironically, Cassie_jones23 was one of the few students who refused to participate in the neighbourhood walk. When asked about this during the post-interview, she raised the issue of having to submit a parent's permission form to be allowed to go outside and participate in the walk as a major disincentive. This student clearly wanted to be trusted and given agency, but teachers have the responsibility to manage the classroom, ensure students stay on task to learn, and follow the schools' administrative rules and procedures. Part of the spatiality of these classrooms was the negotiation of these various, and sometimes contradicting, interests and priorities.

The Limitations of Time for Teaching and Research

There is considerable evidence that physical as well as online interactions were decisive factors in students' engagement and learning throughout the project. This evidence suggests that teachers, generally, and teachers using mobile devices in Art Education, specifically, need to give thought and attention to how they structure spatio-temporal encounters online and in physical spaces in order to enrich students' learning. In the case of this project, going outside, walking together, and one-on-one interactions were among the most important factors in engaging the students. While close and personal contact may be vital factors for motivation, there are clear limitations in many classroom settings.

Rosegram talked about one major limitation for teachers. She expressed her frustrations of not being able to provide adequate support to at-risk students who needed her support. Rosegram lamented, "because I have 30 to 40 kids in my classes, I can't get them the attention they need." Although this teacher wanted to provide one-on-one feedback, and build connections with the students who most needed the attention, she was not able to do so because of the large class sizes. Teachers do not always have the time for the kinds of connectivity advocated here. Furthermore,

the use, access, and monitoring of the computers, mobile devices, and smartphones in classrooms can be time consuming, and present many challenges. This was also a major limitation of online mapping.

If learning is relational, then the qualities of the relationships within classrooms depend on spending the time to build connections. Bergson's (1911) conception of duration as the "continuous progress of the past which gnaw into the future and which swells as it advance" (p. 63) is relevant here. Duration is an essential ingredient for relationships. Teachers and learners, both collective and individual, develop relationships over time. In some instances, teachers do not have the time and resources to invest in all students. Without time, the quality of relations, and therefore, the quality of learning suffer.

Time is also a limitation of educational researchers who only spend a few classes with a group of students. If one views a class as a collective that evolves in time, then a few classes provide very limited opportunities for encounters and building of relationships. Effective teaching necessitates building rapport. This is time and energy consuming. In this project, being together during the neighbourhood walks provided excellent opportunities for rapport building. One example of this was my conversations with Guns_are_great during the walk, which informed me about many of the personal issues in his life that may have affected his disruptive behaviour on the project's online spaces. This encounter underscores the value of activities such as walks to create possibilities for serendipitous interactions among learners and teachers.

For both teachers and researchers, there are institutional and practical barriers that limit investing time to build relationships. For researchers, this underscores the importance of building working relations with teachers. The teacher is the one who is embedded in a classroom's culture and space. As such, they are indispensable for the development of educational interventions in real-world settings. One illustration of this was the sense walk at SVH. I suggested the activity,

and the teacher planned out and led the walk. The teacher was effective in leading her students through the spaces of school because she had developed a relation to this place and the people in it.

Despite these limitations, conceptualizing learning as spatio-temporal events has great value for teachers and researchers. This notion reminds one to be attentive to the existing spatio-temporal relations in learning spaces, to be open to the new and unexpected, and to engage in the on-going negotiations that are integral to relational space.

Conclusion

In this chapter, I discussed the spatiality of learning in the "Map My World" project. I began with a description of the existing spatio-temporal relations within the context of the classrooms that were consequential for students' learning and engagement in the project. Particularly, the unintended outcomes in the project were insightful for the understanding learning as relational and situated within numerous nested interpersonal, cultural and political relations. Next, I discussed the spatial learning that occurred in this project, and identified a number of pertinent factors that affected students' engagement in positive ways. In this research, the effective use of mobile and online technologies in educational contexts required the thoughtful integration of interactions in both physical and online spaces.

In the next chapter, I discuss the online and creative mapping activities in the project. Maps were valuable for a number of reasons. One central theme of this chapter is that space is relational and nested within larger contexts. In many ways, the maps visualized these spatial relationships. The maps also made explicit the connections that existed in the classrooms to global space. Maps are also practical tools for planning walks.

CHAPTER 6 — CREATIVE CARTOGRAPHY

A key objective of this research was to investigate how the act of mapping can be incorporated into a mobile photography curriculum, and how this would influence spatial and collective learning in the art classroom. During both phases, I incorporated both hand-drawn and online mapping activities in order to guide students' engagement with their everyday surroundings. My approach to mapping was inspired by various critical cartographical practices, which view the act of creating maps as subjective, interpersonal, social, and political processes within relational space. At the core of these various practices, and also of this research, there is a conviction that subjective, social, political, and collective cartographies are powerful tools for social and political engagement. In chapter 3, I offered various examples of critical cartographic practices that used maps for these purposes.These varied cartographic practices visualized relationships of people to place, represented subjective and personal narratives, expressed individual and collective identities, and engaged in the politics of place. The collective and narrative nature of these practices offers exciting possibilities for Art Education. An insightful antecedent in Art Education is research by Powell (2008, 2016), who used the activities of walking and mapping in educational contexts to encourage embodied and multisensory engagement with place.

Two aspects of critical, creative, and multisensory cartography were most pertinent for this research: Maps as collective representations of subjective, social, and cultural experiences; and maps as tools for sensory engagement with place. I use the terms "collective online mapping" and "sensory mapping" interchangeably throughout this chapter to emphasize different aspects of the mapping activities. The former relates to learning as collective, and learning from and about others, while the latter relates to individuals' engagement with and learning in their surroundings.

The analysis of data from SVH and RMA indicates that some of the mapping activities were conducive to both spatial learning, and collective learning.

In my analysis, the maps generated on the online mapping platform of Google My Maps proved to be particularly effective tools for facilitating spatial and collective engagement and learning. At SVH and RMA, I was able to integrate this online tool to varying degrees. At SVH, access to this platform was limited only to the final day of the project, and only a handful of students were able to post images they had taken in the project, including their responses to the missions, and photographs from the neighbourhood walk. The resultant map created a limited visual representation of the spatial relations within the class to the city of Montreal and global space. This activity allowed me to identify some of the affordances and limitations of using Google My Maps and make necessary amendments for phase 2 at RMA. At RMA, the online mapping tool was introduced earlier in the project; moreover, I presented my version of a Sense Map in my neighbourhood created with this tool as a model for students.

As a result, the students at RMA had the opportunity to engage in the creative process of developing a neighbourhood Sense Mapsusing Google My Maps. This process involved, first, using the online satellite map to draw the sights, sounds, tastes and smells in the neighbourhood; next, going on a walk and photographing the senses; and finally, posting the photographs on the online map. Students completed these activates to varying degrees. Many drew a walk on the map, some went on the walk but never posted the photographs, and a few completed the entire process. The ensuing map and students' feedback on their experiences with these activities has provided valuable insights into the potential of using such maps in Art Education. My experiences at both schools have convinced me of the potential for maps to enable expression of one's identity in relation to local and global space. Such visualizations can help facilitate spatial and collective learning.

One of my main questions, when I started this research, was what could one learn from a map. In the following sections, I will describe the main ways maps have been enriching to teaching and learning in my research. First, data from SVH and RMA reveals the potential of collective online maps to visualize spatial relations, and thereby empower individuals to express their personalities, identities, and life histories. Secondly, using maps to guide walks can be a powerful way of exploring with the sensorium of a place. At RMA, there is ample evidence that engaging in the process of designing neighbourhood sense walks and sharing these posts on a collective online map encouraged students to learn about their surroundings and their classmates. I will outline some of the spatial and collective learning that occurred from engaging in the activity of design a sense map. I will conclude by addressing some of the key limitations of using such online tools in classrooms, and I also emphasize the affordances of these tools.

Maps as Data Visualization

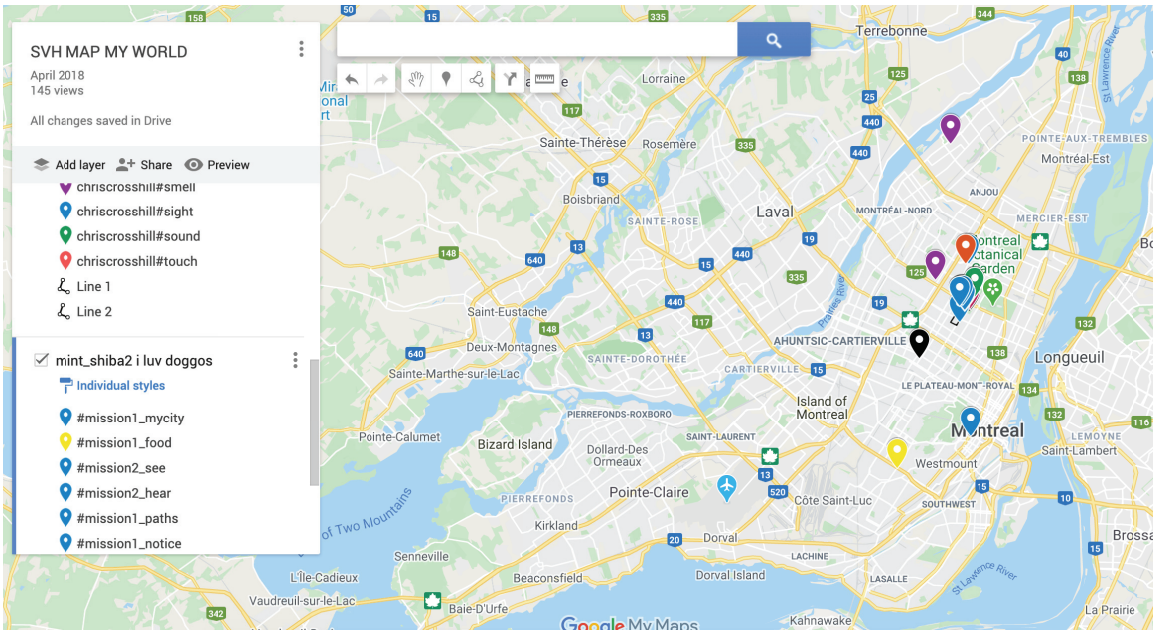
In my analysis, I found that the collective online maps at SVH and RMA to be particularly insightful representations of the identities and spatial relations of individual students and the classes as collectiveswithin the city and the globe. These online maps visualized the spatial distribution of the class within their neighbourhoods and the city of Montreal, and also the students' connections to global space. Such representations revealed various aspects of the students', and the classes' personalities, cultures, and socio-economic backgrounds. My conversations with students and teachers and my analysis of these maps have convinced me that collective online mapping is a powerful tool for representing, expressing and sharing one's identity with others. After all, where you have been says a great deal about who you are.This has convinced me that online maps are effective tools for enabling one to learn about everyday space and also about others. In the following sections, I provide examples of various ways the maps visualized spatial relations of individuals and the collective classes at SVH and RMA.

Spatial Distribution of the Class

During the final mapping workshop at SVH, few students managed to post on the online map (Figure 31). The images were posted in various areas of the Island of Montreal including the north, west and downtown. This distribution is indicative of the diversity in the location of the students' homes and neighbourhoods. I observed this diversity during the third workshop when I asked the class to line themselves according to their commute times to school.

Figure 31

SVH - Screen Capture of Students' Online Collective Map from Phase 1

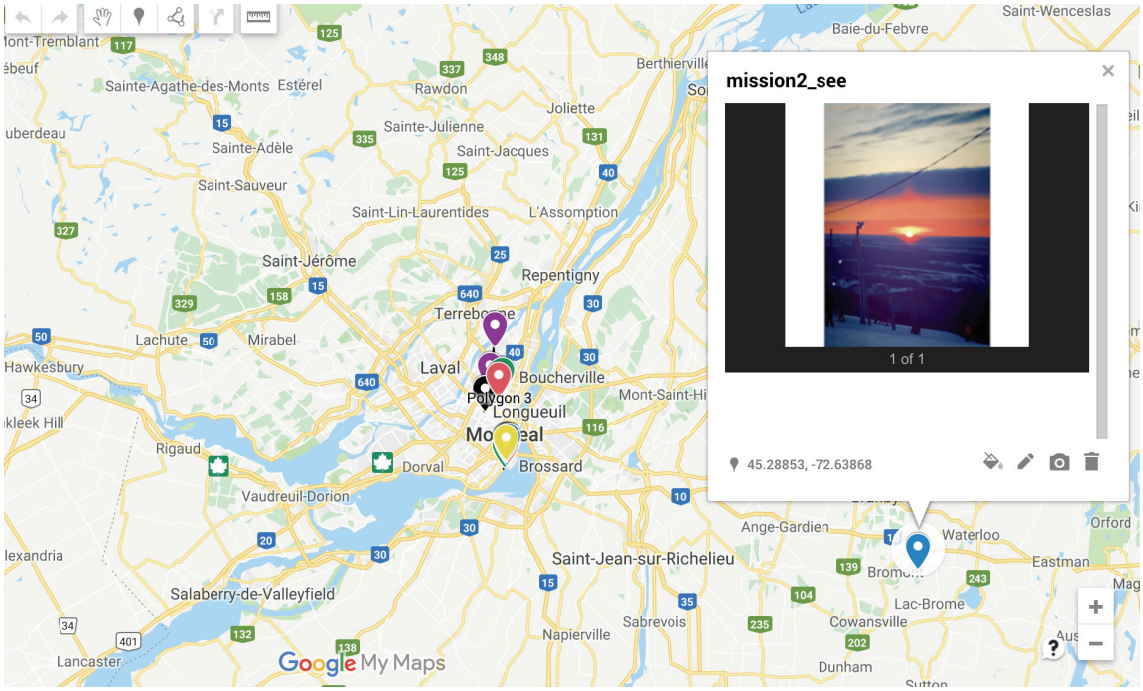


However, due to the limited sample size, this map does not adequately visualize the spatial connections of the class to the different neighbourhoods of Montreal. The most notable cases were the images posted outside of Montrealand in other parts of the world. One peculiar case was Guns_are_great. As discussed in the previous chapter, Guns_are_great was a loner, who generally sat by himself and rarely interacted with his peers, and during the project, he engaged in disruptive behaviour. This image was taken beforethe project, in the scenic Eastern Townships

in Quebec (Figure 32). It was the only one he posted throughout the project. It is interesting to observe how his post on the map looks isolated and detached from his classmate.

Figure 32

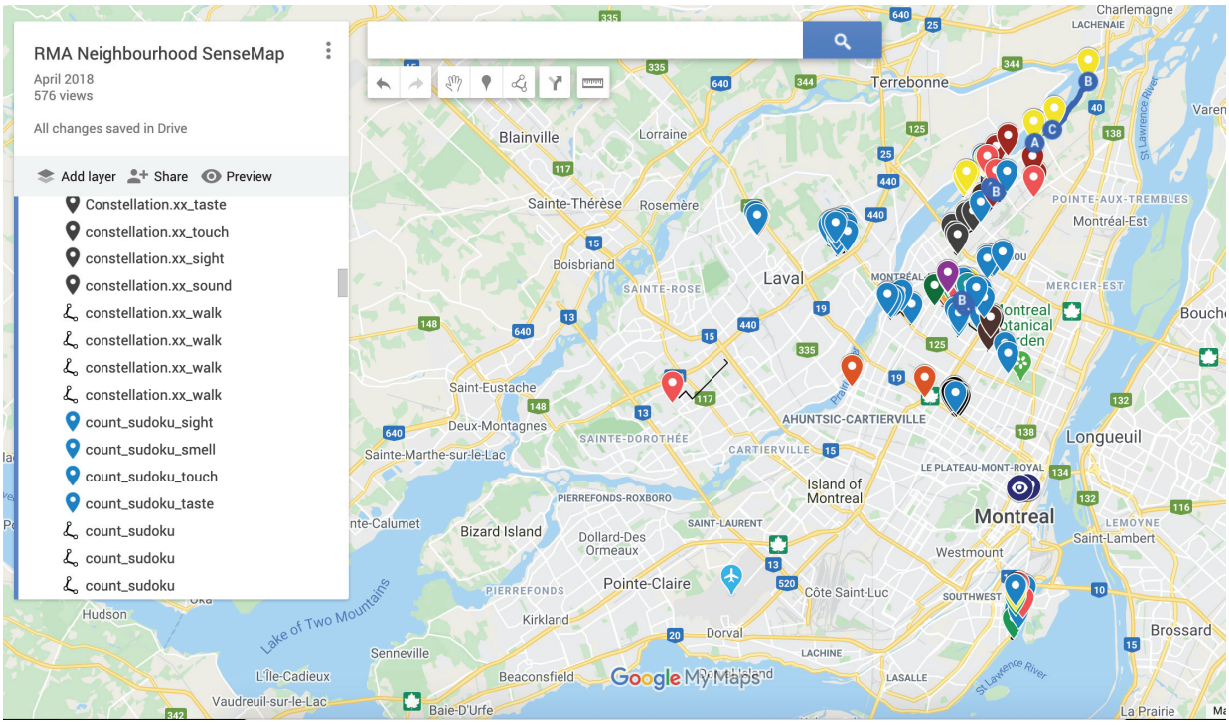
Online Collective Map Post — "Mission2_see" by Guns_are_great



At RMA, the majority of students were able to draw a neighbourhood walk on the collective online map. Particular patterns emerged in where students drew their walks. The resulting collective map made visible the classes' spatial relations to the city (Figure 33). Most students lived in the Northern neighbourhoods of Saint-Leonard, Rivière-des-Prairies, and some in Laval. The two exceptions to this were Get_ chromazoned_boi, who posted from downtown Montreal, and the researcher who posted from the borough of Verdun. During post-interviews, a number of students and the teacher at RMA talked about how the collective online map made them aware of certain aspects of their spatial relationships within the city of Montreal.

Figure 33

RMA - Screen Capture of Students' Online Collective Map from Phase 2



One instance of this is Mysticalxunicorn, who reported noticing the location of her posts on the map in relation to her peers' post. She said,

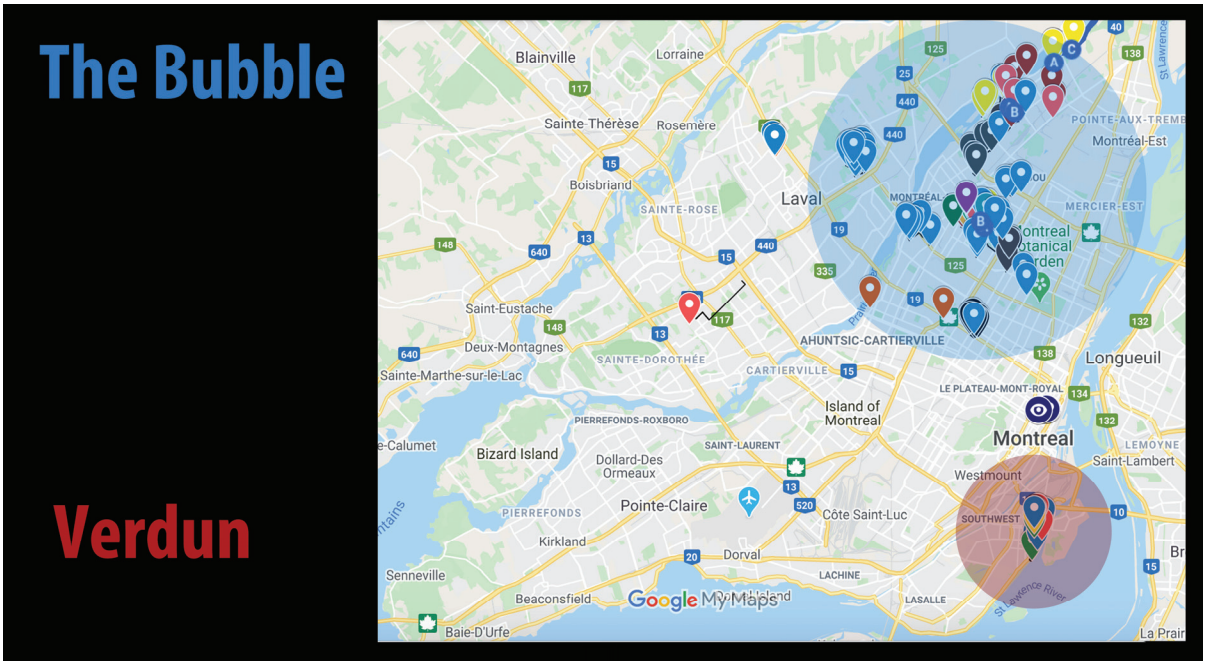
> I think it's cool that you could see how many people are spread out over a map, and people live in the same area. I'm in a completely different area. There's no-one around me, and in RDP, there are so many people over there. And Saint Lenard too.

The online map enabled this student to see the spatial relations of the collective and her relation to where her classmates lived. At one point during the project, the teacher Cardinal and I had a conversation about students' engagement with the map. According to Cardinal, one benefit of doing such mapping activities in these classrooms is to make students see the world outside their bubble and become aware of different places and neighbourhoods in their city. Cardinal recalled a conversation she had with a student who found the model Verdun Sense Map to be

interesting because she had never been to Verdun, and never knew it existed. This made her realize that she and her friends "lived in a bubble." The placement of the researcher's walk in relation to that of the students is made visible on this collective online map. This affected the student's perception of her situationality within the city (Figure 34). Cardinal commented on this.

Figure 34

"The Bubble"– A Student's Observation about the Collective Online Map



Cardinal: I've had students that have never been downtown. They've never been on the Metro. They're in that neighbourhood, and that's it. RDP, or Laval. And I'm the same. I stay in my neighbourhood. How many times have you been to Laval?

Researcher: None. I've only been through.

Cardinal: Exactly. You become accustomed to your neighbourhood. If you had students from different neighbourhoods, it'll be a bit different.

This case underscores some important points about the spatiality of RMA. This is an elite science school, and the vast majority of the students hailed from the same neighbourhoods and

communities. There were some exceptions to this, including the researcher's Verdun walk and the student who posted a walk in downtown. The evidence suggests that some students and the teacher at RMA were able to observe the relations of the class within the city of Montreal. Such geographic distributions are often rooted in the culture and socio-economic background of the individuals in the class. The RMA collective online map made visible the spatial distribution of the class within the city and encouraged some students to step out of their situated bubbles. By making spatial relations to the city visible, the map played an important role in facilitating some students' learning about their peers in relation to the spaces of the city. This will be discussed in the spatial and collective learning sections.

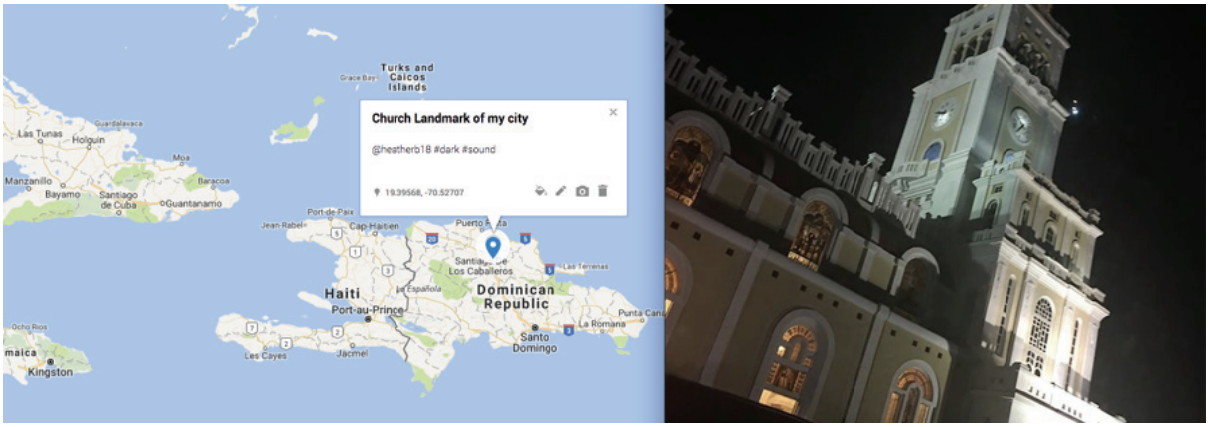
Global Space

At both SVH and RMA, the collective online maps visualized students' connections to global space. Global space was alrxeady implicated in the spatiality of the project in various ways. The collective online maps made these connections explicit by making them visible.

At SVH, several students who had recently migrated to Canada posted images on the social media network that were taken in different parts of the world. During the post-interviews, I learned about the origins of some of these images. Bbblkodnnd informed me that the image she posted in response to touch was taken in her previous home in Thailand, and Rhs_imhurgry talked about her response to "Sight," taken in Singapore. Heatherb_18 posted an image in response to the mission "Dark" that was taken in her hometown of Santo Domingo in the Dominican Republic. She later also posted this image on the online map. When I asked her about this photograph, she proudly described it as the main church and the landmark of her city (Figure 35).

Figure 35

Online Collective Map Post —"Church Landmark of my City" by Heatherb_18



In the case of Heatherb_18, the placement of this image on the collective map made visible something important about her identity. This student's connection to a church in Santo Domingo is an important aspect of who she is. She has an emotional connection to a different place in the global. The map made this connection visible to her class and teachers. The map enabled the student to share an important aspect of her identity by enabling her to place her photograph on a global map. At SVH, the fact that many students had lives, experiences and connections to different parts of the world was made visible on the online platforms. This is one of the main attributes of collective online mapping in educational contexts: This tool can explicitly and clearly expresses students' connection to local and global spaces.

At RMA, the connections of the students to global space were manifested in various ways, some of which were unexpected. In response to the mission "My City" many students posted photographs they had taken during their recent school trip to Washington D.C. During the trip, many students had taken pictures and they took this mission as an opportunity to share their images with their classmates on the social media network. Some students questioned whether this constituted an appropriate response to "My City." During post-interviews, Barthalamue_velvatine protested against his classmates' response to this mission.

I didn't like "My City" because when you say "my city," it's supposed to be the city you

come from and I just didn't like people were posting pictures of places all over the world. My city is something more personal. So I thought, maybe they didn't appreciate the history of the city or the things around the city.

This student found his peers' interpretation of "My City" to be impersonal and lacking awareness and respect for the local places in which they lived. 3869_lit provided a contrasting perspective with his interpretation of "My City." He posted an image taken in New York City in response to this mission because he felt New York was his city (Figure 36).

Figure 36

Response to Mission "My City" by 3869_lit

Researcher: Why did you choose this response to my city? You're not from New York.

3869_lit: Because, well, it's more about travelling and seeing different parts of the world instead of being locked up in your own city, and locked up in your own bubble.

Researcher: So "My City" can be any city?

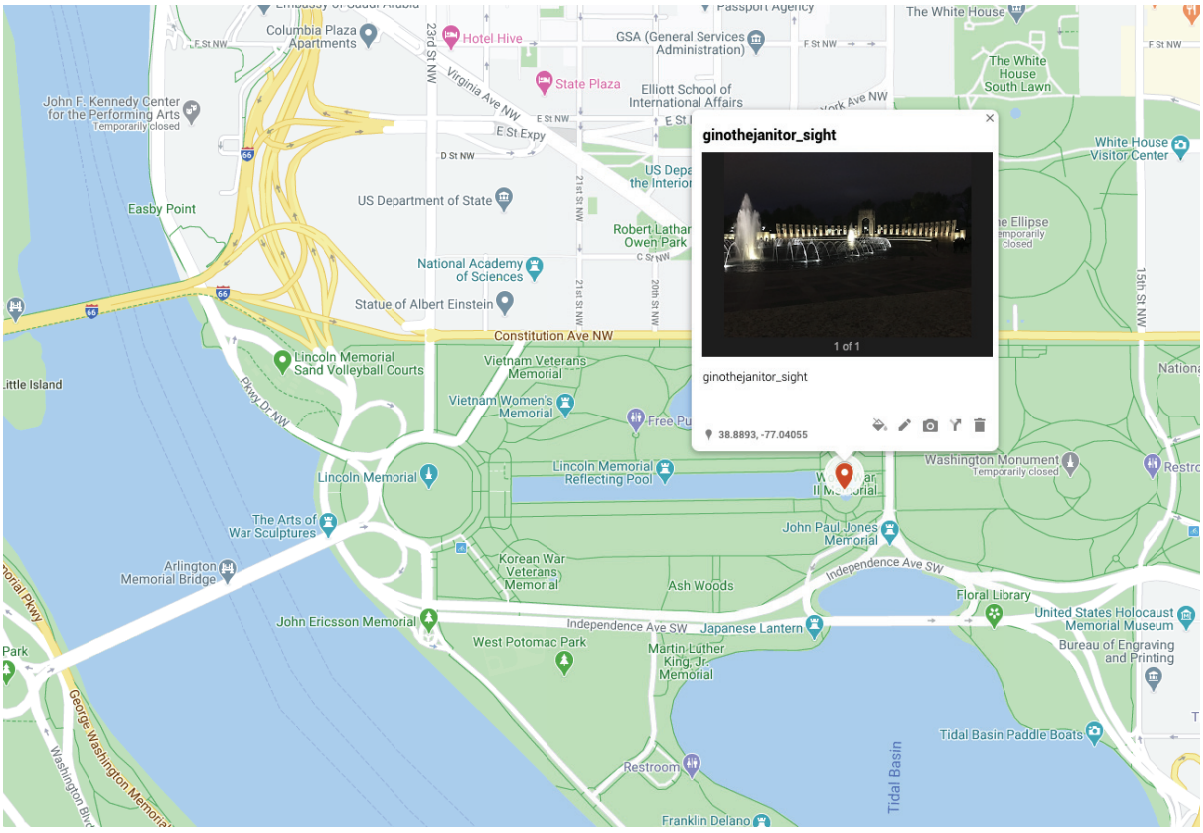
3869_lit: Yah it could be my favourite city, which is probably New York mainly because it's like home because I love the urban life.

The contrasting interpretation of "My City" by Barthalamue_velvatine and 3869_lit

shows some of the different ways individuals are connected to local places and global space. Barthalamue_velvatine values local history, while 3869_lit yearns for a cosmopolitan globalism. These divergent views also echo some of the debates about local places and global spaces in Place-Based Education and Human Geography. An important insight from these fields is that the global is always implicated in local places. The responses of students at RMA also illustrate how the concept of my city can be interpreted by one student as any city in the world, and by others as an opportunity to share images of the monuments from their school trip in Washington, DC.

Figure 37

Online Collective Map Post — "Sight" by Ginothejanitor

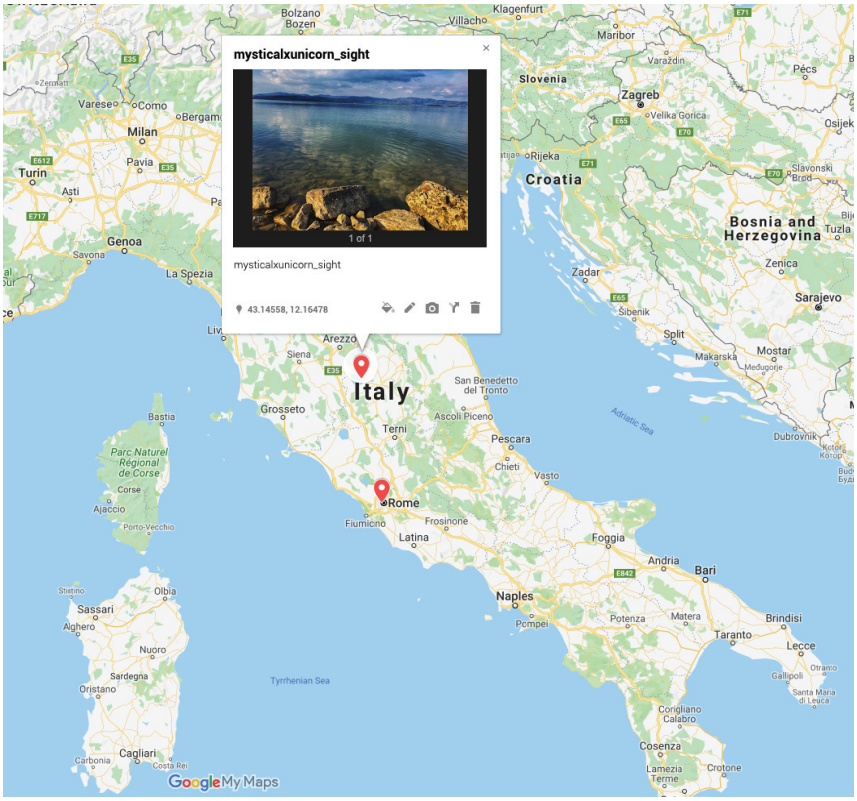


While the connections of the class at RMA to global spaces were present on the social media network, these connections became clear on the online collective map. One student, Ginothejanitor, posted an image from the school trip (Figure 37). Mysticalxunicorn posted

several images of her trip to Italy and talked about how she appreciated the chance to share with her peers' images from her travels to Italy. Mysticalxunicorn provided an interesting perspective as she found the ability to post images taken around the world more motivating than photographs from her neighbourhood. For her, taking photographs of ordinary surroundings presented a challenge. She stated, if "it's a normal thing to see, I don't really take something extraordinary. I don't want to take a picture of a sidewalk." For this student, there was an association between doing good photography, and travelling to scenic places (Figure 38).

Figure 38

Online Collective Map Post — "Sight" by Mysticalxunicorn



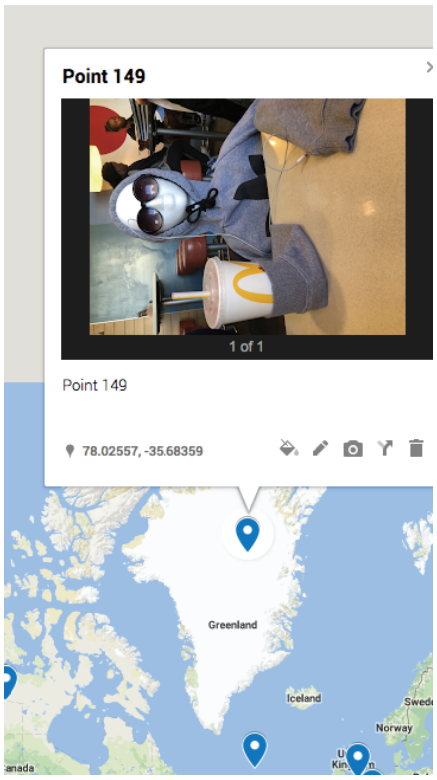
In the cases above, the online collective maps revealed something about the students' preferences, identities and backgrounds based on what they posted in the different places in the globe to which they have connections. Some students are from other countries; others have

ancestral roots; others are connected through travel or a sense of cosmopolitanism. The RMA online map visualized some of these relations to global space.

Global spaces were implicated in another way. As discussed in the previous chapter, the mapping activity during the fifth workshop at RMA provided an opportunity for comic relief. Funny posts appeared in obscure places all over the world during the mapping activity. An example of this is a mannequin, which appeared in Mali, Australia, Alaska and Greenland (Figure 39). I later learned about the significance of this character from the culprit who posted these images.

Figure 39

Online Collective Map Post — "Eric Dylan O'Neal" by Pink_sparkles_cream_pie1620



Pink_sparkles_cream_pie1620: I posted one of the mannequin because this mannequin we have a name for it, "Eric Dylan O'Neal." So, it's a joke because I brought it to school

one time and we went to McDonald's and we made it into a person, so people thought it was an actual person. So, it was an inside joke.

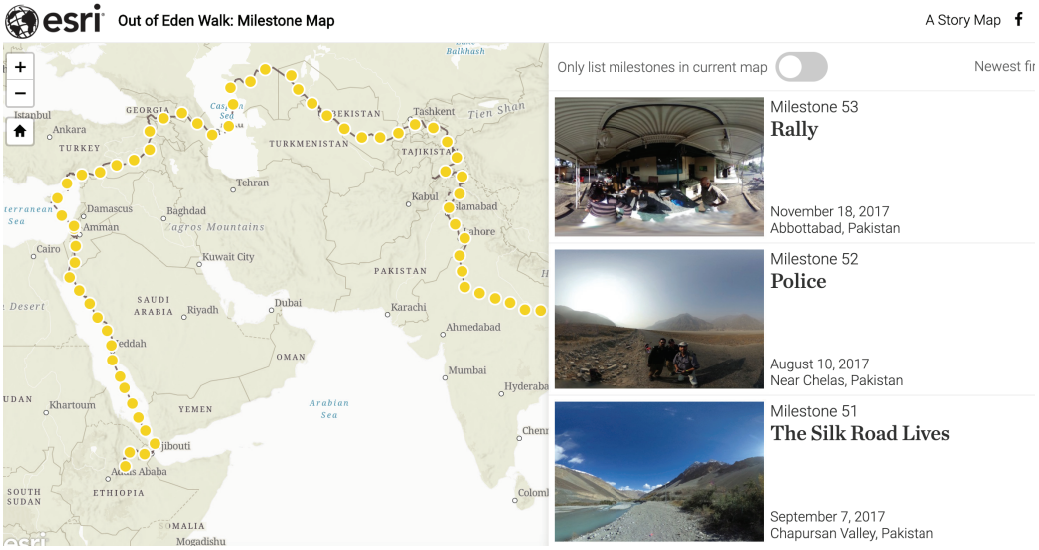
This well-travelled mannequin was a part of the spatial interactions of a group of friends and provided some comic relief in some of the different spaces of the school, and McDonald's. The online mapping platform provided "Eric Dylan O'Neal" the chance to travel the Globe. In this case, the global map offered a chance to be playful with global geography. This is illustrative of the personalities of individuals and the collective of this class, as discussed in the previous chapter. It is also another example of how using Google My Maps put students in global space.

Identity

My experience at both schools has convinced me of the richness of maps as tools for expressing one's identity in relation to local and global space. One thing that became apparent from the mapping exercise is that some students in the class have connections to other places, and they can trace their identities and experiences to different parts of the world. This highlights the potential for maps to represent one's identity.Scholars in human geography explored these themes by developing maps that represent life histories. For example, Caquard (2019) used collective online maps to tell the life stories of Rwandan refugees. By spatializing people's life stories, one can represent the richness identity. Such work provides a powerful antecedent for educators who wish to use maps to empower students to express who they are, by showing others where one has been.

Figure 40

Screen Capture of ESRI Storymap Platform



There are also a number of platforms that allow users to create stories or journals on a map. One such platform is designed by ESRI (Environmental Systems Research Institute), which is an international supplier of geographic information system software, including online mapping tools. Their storymaps enable users to create narratives of travel experiences or journeys that can be accessed on an online map (Figure 40). Similarly, Tripline is an online mapping tool used primarily for planning and sharing travel stories, but it can be adapted for any other use. When using any online mapping tools in educational contexts, technical issues and limitations must also be taken into consideration. No matter the tool, I have found collective online mapping to have the potential enabling groups of learners to teach and learn about each other in relation to the spaces of their everyday spaces.

Maps to Guide Walk

Another important affordance of maps in art education is to serve as guides for going on walks to explore a local environment. In this section, I draw on my experiences at SVH and

RMA, as well as my cartographic art practices to provide illustrations of various approaches to using maps to guide walks. I have found the combination of mapping and walking to a powerful means of attending to and learning about various localities and environments. When using maps to guide walks, two key factors need to be considered.

Firstly, one must consider whether planning out a route before going on the walk is the most effective strategy, or to approach the walk as dérive. Debord's (1958) theorized the dérive as a method that counters the demarcation of urban spaces according to the values of the consumerist societies. In the context of this research, the dérive provides opportunities for aesthetic engagement with one's everyday surroundings through mobile sensory mapping. This approach to mapping involves simply drifting freely through space while being pulled by impulses and reactions, and mapping out the dérive later as psychogeographic representations. An alternative to the dérive is to maps to make a plan and then go on the walk.

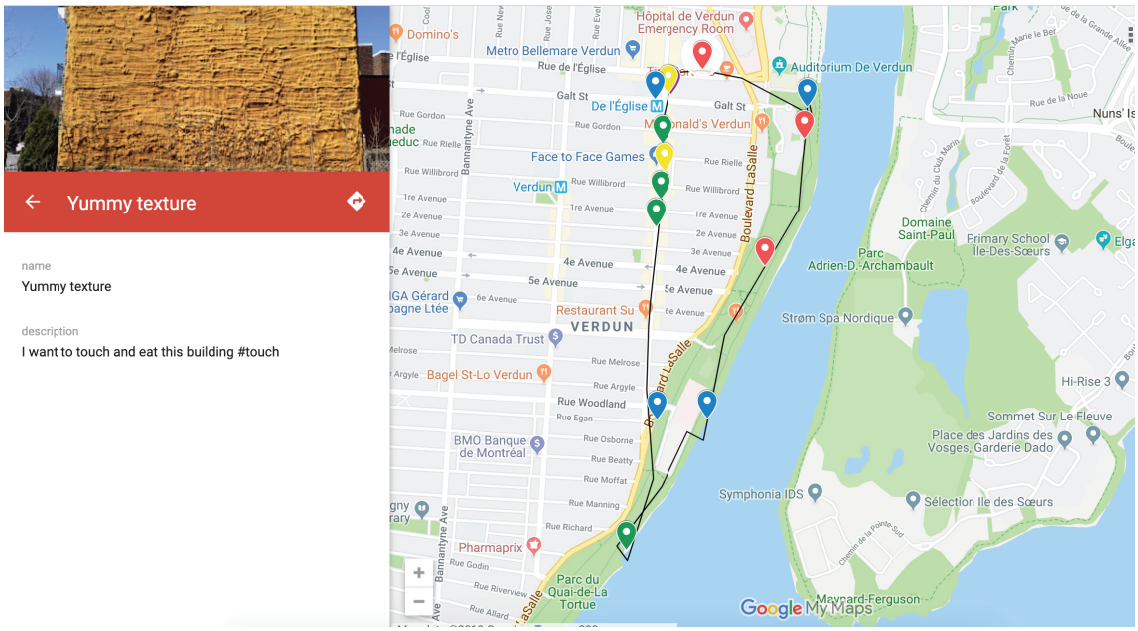
Another issue to consider is whether one should use hand-drawn or online maps to best serve the goals of the map-making activity. Both can facilitate spatial conversations among peers, and create a visualization of spatial relationships. Hand-drawn maps avoid the technical issues, which were a significant limitation in using online maps in the classrooms at SVH and RMA. Online maps, however, have several key affordances, such as enabling a collective spatial representation of a collective of learnersand allowing learners to explore places through the juxtaposition of the satellite images and walking in physical spaces. At both schools, I used variations of these approaches to using maps to guide photo walks. At SVH, the first map-making activity was done in workshop three, during which I asked students to draw maps of where they were going to go with their group during the neighbourhood walk scheduled for the following week. While some students found it enjoyable to plan out their walks, the maps turned out to be of minimal use for the walk. This was partly due to the group dynamics discussed in the previous

chapter. During the walk the following week, many students ended up in different groups with a different map than the ones they had drawn. Most groups ended up not following these maps and instead walked freely around the school for 30 minutes. These experiences led me to revise my approach to the neighbourhood in phase 2. At RMA, we did not plan the walk, but rather students were allowed to cluster in groups of their choice and freely move through the space surrounding the school within the thirty-minute time limit. The advantage of this approach was that it required less planning and coordination, and students enjoyed it more. 3869_lit is one example of a student who expressed a preference for drifting rather than planning. He said, "I prefer Mission 3 (Map my walk) because I didn't know where I was going so I didn't know what to expect. So, I just walked around and I took a bunch of pictures."

After phase 1, I was convinced that the best approach to the question of whether students should plan a walk or move freely should depend on their familiarity with the space. In spaces that are less familiar, drifting might be best, while in familiar spaces planning a walk might inspire more deliberate reflection and thoughtful representation of one's relationship to a place. Thus, for the neighbourhood walk at RMA, students were encouraged to go where they wanted since most of them did not live in the same neighbourhood as the school. The use of the online map for planning was reserved for walks that students designed in their neighbourhoods, which were much more familiar to them. To plan these walks, students were asked to follow similar procedures to the ones I used to create the Verdun Sense Map (Figure 41).

Figure 41

"Verdun Sense Map" by Researcher, Ehsan Akbari



To create the map, students were asked to make a list of places in their neighbourhood where they could photograph something to represent each of the five senses, and then use the online tool to pin each point and draw lines to create a path that they could follow. The act of making a list and drawing a path on the map inspired students to reflect on their personal connections to the familiar spaces in their neighbourhood. This activity required them to think about specific spaces that they would want to represent photographically to their peers, which required some degree of personal reflection on what specific places had value and meaning to them individually. Engaging in this process was conducive to the RMA students' spatial and collective learning.

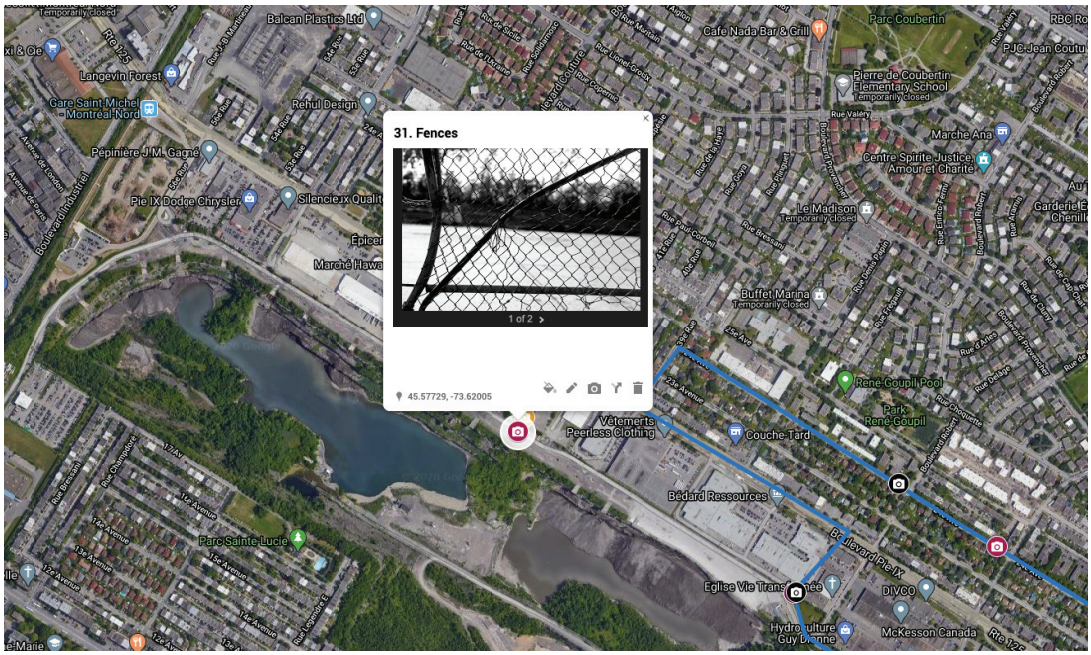
Since the end of the fieldwork, I have developed these ideas and procedures further through my cartographic art practices, which involve using Google My Map to guide and document my photo walks. I used two different approaches to such walks. One approach involves

asking a friend to draw me a path to walk somewhere in Montreal on the satellite image. I then go on the walk to explore the place and take photographs, and, finally, I post the images on Google My Maps. This approach was inspired by the Argentine artist Jorge Macchi's psychogeographic explorations. For Buenos Aires Tour (2004) Macchi placed a cracked glass pane on the map of the cityand traced the line of the crack to outline his walk through the city. Platforms such as Googe My Maps allow everyone to use satellite imagery to find interesting places and to draw and plan walks in these different places. What is most fascinating about engaging in this process is the juxtaposition of the city from the bird's-eye perspective of satellites to the experience of putting one's feet on the ground and walking the territory. Google Street Map allows users to see a place from the perspective of someone on the ground, but this is a place frozen in time. Walking in the physical allows one to experience places in the terms Massey (2005) used to describe space: Teeming with life, temporal, spatio-temporal events, and the meeting trajectories. The contrast between the map and territory is a rich area to explore in educational contexts.

A case in point is the Park Extension Photo Walk. To design this walk, I asked a colleague and friend who had previously lived in Montreal to design a walk for me anywhere in the city. He chose a walk in the Park Extension neighbourhood in the north of Montreal. This is an area of the city that I had heard about but never really explored. When I first encountered the satellite map of this neighbourhood, I was most intrigued by an area that looked like a massive green space, unmarked on Google Maps. When I visited the actual place, I discovered that the entire area was fenced off, with signs warning against trespassing (Figure 42).

Figure 42

"Park Extension Photo Walk" by Researcher, Ehsan Akbari



As I strolled around the fenced space, it became clear that mining operations took place there. I had previously known this is a working-class area of the city, with a high density of immigrants living there. Walking in this neighbourhood allowed me to encounter some of the faces and hear the voices and languages of the residents. This walk also made me aware of the spatial relationship of an urban mine, which generates noise and pollution, to the low-income housing and residents who live there. Engaging in this, and other similar mapping and walking activities in various regions of Montreal has made me aware of how the geographic contours of the city, such as mines, valleys, rivers and train tracks, serve as boundaries among social and economic classes. In other words, the combination of mapping, photographing and walking has provided me with an embodied awareness of the spatially of a place.

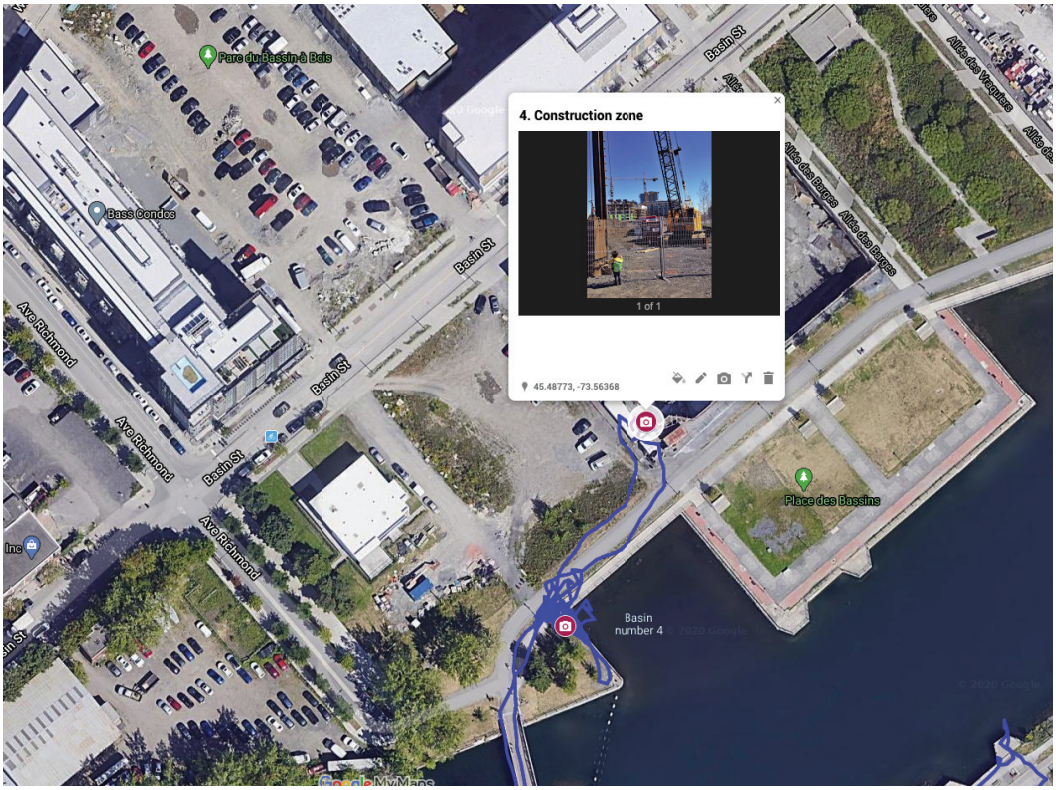
Another approach to the photo walk that I have used is a variation on the dérive, for which I use my toddler son as a randomizing factor for moving through space. Essentially, the

two of us go to a place, and I allow my son to lead the way. I follow him around to see what catches his eyes, and where he leads me. Generally, we end up at construction sites looking at big excavators and dump trucks. On occasion, he may spot a flock of birds overhead, or his attention moves to a stream of water in the sewer underneath the city sidewalks. This is a remarkably different experience than walking by myself or with another adult. Adults tend to focus on what's in front of them rather than what is above, below and off to the side of the chosen path. This approach is a variation on the sense walk. A toddler senses the world differently and paying attention to what they pay attention to offers different ways of sensing one's surroundings.

This experience also validates the notion that how one moves through and perceives a particular place depends a great deal on whom they are with (Figure 43). On my walks with my son, my perception of my everyday environment is transformed by his presence. There are antecedents in the literature to this notion that walking with another can have a transformative effect on how one perceives a place. For example, Vaughan & Pyne Feinberg (2016) explored co-mentorship through walking, art creation, and writing. Pink's (2009) approach to sensory ethnography is also rooted in a notion of embodied and emplaced co-presence of the ethnographer and participant. In my case, walking with my son and letting him determine where to go and what to sense made me experience and perspective my environment in different ways than my habitual engagement. I began to notice and sense countless details in my environment, some of which were pleasant and others not. The online map provided a documentation of the walk. Based on my experiences, I believe the process of walking with someone can be beneficial for learning about different spaces, and also about the lives and perspectives of others. Sharing the documentations of such a walk can enable collective learning. As was the case with the RMA collective online map, when a group of learners share personal maps, they teach and learn from and about each other.

Figure 43

"Photo Walk with Two-year Old" by Research, Ehsan Akbari



Spatial Learning through Mapping

3869_lit: (I Learned that) sometimes you don't even know what's inside your own neighbourhood that you live in. For example, I didn't know that we had ducks in my neighbourhood, and we found ducks. I learned that I'm not seeing the full picture in my city, in my neighbourhood, and I think more people should be like open up and see what really is outside

Constellation.xx: I didn't know there was a pond near my house, I knew there was a park but I'd never gone in it, so it didn't know there was water in it.

Researcher: So you made the map, then went to the park?

Constellation.xx: I knew there was a park, we drive by it often, but after I made the map,

I went there and saw it.

In the previous chapter, I discussed the role of the spatial missions, the senses, and being together in physical space as key factors that encouraged students to notice, focus on, and become aware of their everyday environments. The online collective maps were also effective tools for spatial engagement and learning. Particularly at RMA, there is evidence that suggests mapping encouraged students to go outside, move, get exercise, notice and attend to their everyday environments.

During the first phase at SVH, we were able to use Google My Maps only on the final day of the workshops, and merely a handful of students were able to post images on the map that they had previously taken in response to missions. As a result, students did not mention any form of spatial learning or engagement because of the map. However, some students expressed the potential for spatial learning from online mapping. Mint_shiba, who was one of the few students who managed to complete the map in phase one at SVH, talked about how the map could encourage students to rediscover their city. She pointed out that if one sees something interesting on a map, this might be motivating to go to see the place and learn something new about the city. For Mint_shiba2, this would be a positive outcome because "if you live in a city for a long time, you start to wonder what's new about it, but once you see something new, it's like oh I learned this today." In this students' view, seeing images of peers posted on an online map can awaken one's sense of exploration, and encourage the rediscovery of a familiar place. Mint_shiba2's account illustrates how cartographic posts by peers can encourage the discovery of her city.

This is strong evidence from phase 2 at RMA that engaging in the process of sensory and collective online mapping enabled some to notice and discover new things about their neighbourhoods, and also their classmates. At RMA, most students were able to do the online

mapmaking activity to varying degrees, but few were able to complete their maps given the time limitations. From the students I interviewed, 3869_lit and Get_chromazoned_boi managed to draw a path on Google My Maps, go for the walk, and upload several pictures; Mysticalxunicorn and Pink_sparkles_cream_pie1620 created the map, but posted pictures they had in camera roll; Sandycheeks024 wrote text to describe the sensory experience of different places in her neighbourhood; Barthalamue_velvatine and Constellation.xx drew paths, went for walks, but they did not upload the pictures; Bluebean18 and Ivan_ivanovich_ivanosky drew the path only.

During post-interviews, a number of students described noticing new things in their familiar spaces by engaging in the mapping process. In the above quotes, 3869_lit described how the activity of designing a walk in his neighbourhood online led him to discover new things in his neighbourhood, which was a space that he knew quite well. Similarly, Constellation.xx realized something new about a place she passed by often. Both Constellation.xx and Barthalamue_velvatine drew on the online map and went for the walk, but they did not post their images. Barthalamue_Velvatine described how taking pictures for the map incentivized him to explore areas in his neighbourhood that he had never noticed before.

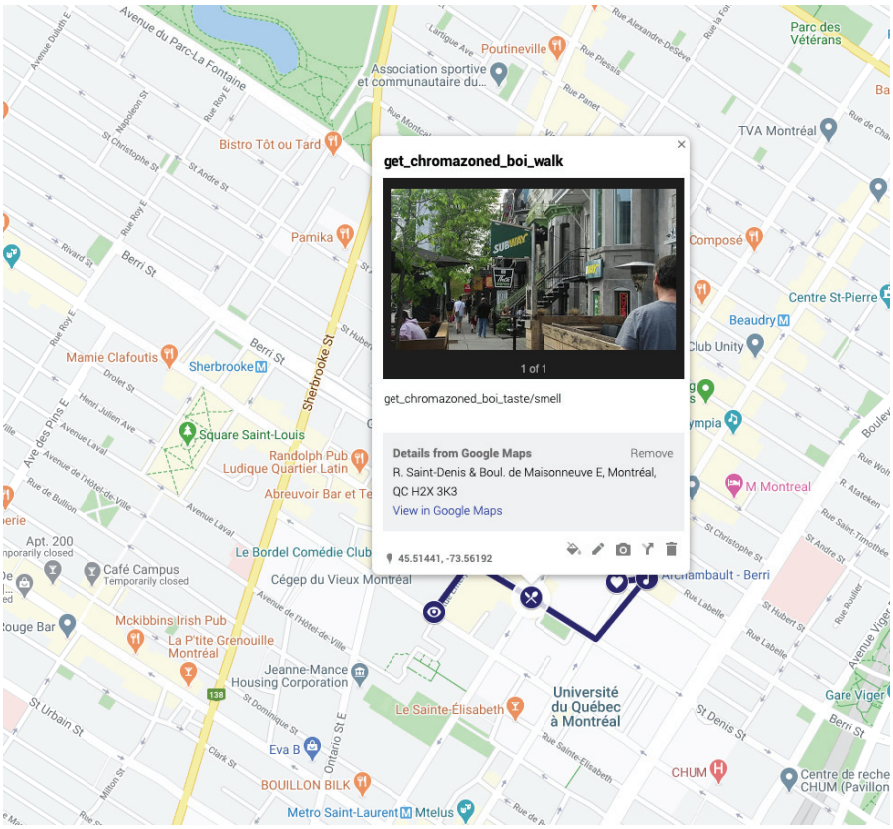
> I went for the walk and I started, usually I go down the big streets, but that day I decided to go down little streets I'd never gone down before because I said if I'm gonna take a photo, I know there's nothing interesting that I should take pictures of this way, so why don't I try taking a way and try to discover new places. I saw a house falling apart that, I live in a pretty good neighbourhood where you don't usually see that, and I was surprised.

The activity of mapping and then walking to photograph a familiar area had impacted the students' behaviour and movement through the space. This prompt encouraged him to move through different spaces and notice aspects of his neighbourhood that had not entered his awareness previously. Get_chromadzoned_boi provided another interesting perspective on the

map. He was a high achieving student, in general, but he had low motivation in the project. He explained his lack of engagement to being busy with exams and more academically pertinent tasks. When asked what aspect of the project was not motivating for him, Get_chromadzone_boi responded, “actually having to go outside and find pictures, because I’m kind of lazy, so often I don’t really feel like going outside or walking around. I usually like to stay home after school.” Although he was not motivated to go outside, he, paradoxically, identified going outside to take photographs for the online collective Sense Map to be his favourite activity (Figure 44).

Figure 44

Online Collective Map Post — “Smell” by Get_chromazoned_boi



Get_chromadzone_boi: (My favourite theme was) the senses, just in general, but especially the map-making thing because I felt kind of good walking around, trying to

look for things, even if I don't do it that often. It felt nice to take some time to observe where I live because usually I stay at home after school, so it was a nice change.

This example shows that sometimes students have to be forced into doing something that they later identify as helpful. For this student, being forced to take pictures to post on a map had the positive outcome of getting him out of the house and observing his neighbourhood. In the cases above, students reported learning about their city and neighbourhood through the activities of drawing online maps to guide walk, and going for walks to take photographs for the map. The online sense map activity encouraged students to go outside, notice, and explore their familiar spaces in new ways.

Collective Learning through Mapping

Learning by looking at the photographs of peers has been extensively explored in relation to peer-learning networks (Castro, 2012; Castro, 2019). There is also evidence in this research that students learned from and about their peers by looking at the collective maps, particularly at RMA. A key theme that emerged from the interviews was the potential of online collective mapping for enabling students to learn from and about their classmates. The interview question "what can you learn from peers through photography and online mapping" generated a varied array of answers. Mysticalxunicorn talked about learning what her peers are "interested in, where they've been, where they like to go, their way home." Bgonth0t19 added to the list: "What they think is nice. Who they're with sometimes. Maybe they're walking their dog, or they're with family." Constellations.xx mentioned learning, particularly fromthe photography of her peers, "what details other people pay attention to, what they notice, and how they see things." In these instances, students identified being able to get a glimpse into the lives and perspectives of others through the acts of taking photographs of their surroundings and sharing these images with classmates online.

The act of mapping these images situated this peer learning in the specific spaces of the students' neighbourhood and city. Several students talked about learning about where their classmates are situated from our online map and the flavour of the different neighbourhoods in the city. For Ivan_ ivanovich_ivanosky, this collective map presented the opportunity to "get a feeling for" the different neighbourhoods and areas of the city. Barthalamue_velvatine and 3869_lit spoke about the positive learning potential of collective online mapping for gaining deeper insights and making connections with peers. For Barthalamue_Velvatine, this map could provide new insights into a peer's character.

Barthalamue_velvatine: A lot of them try to act the same to act cool. but in the end, they're all different, they all have their own character.

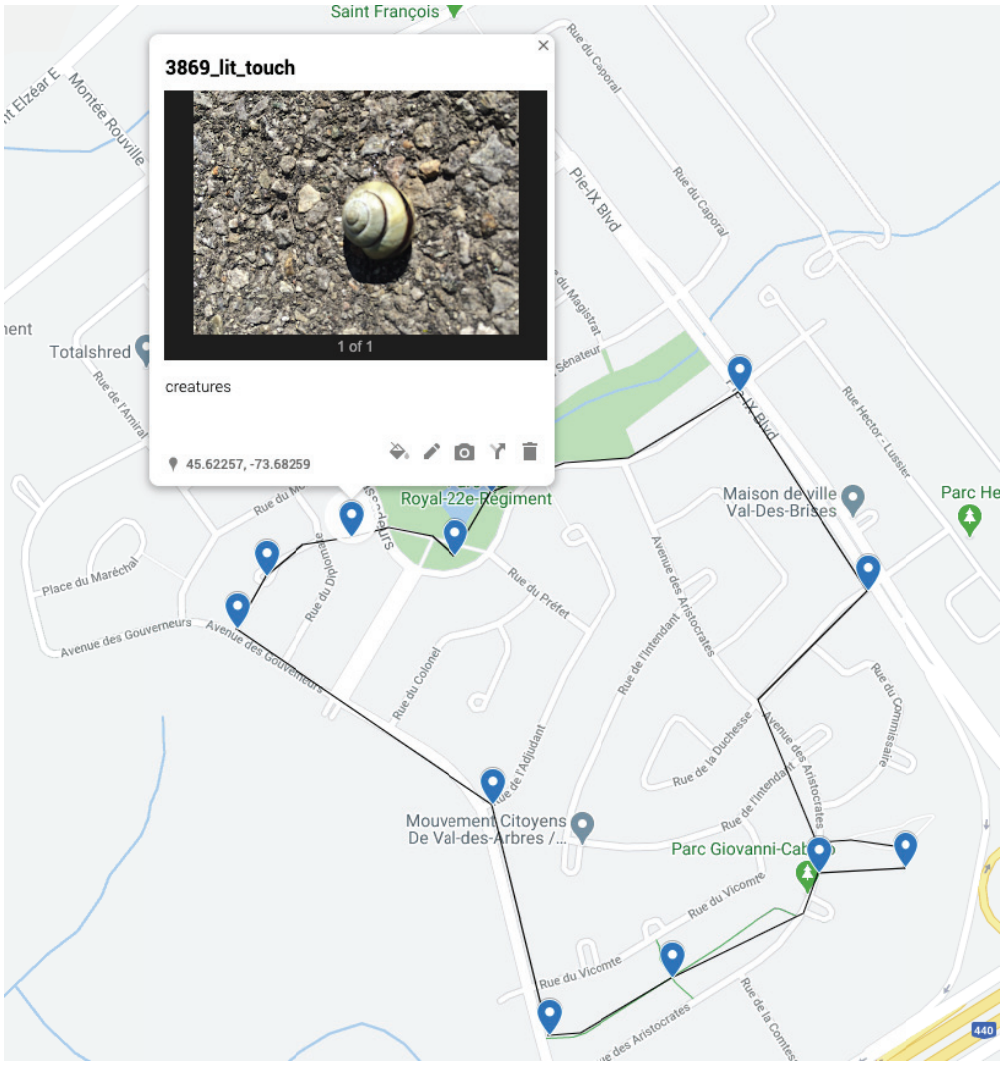
Researcher: You can learn that from the map? How?

Barthalamue_velvatine: A person that you just see they like going to the park, and you didn't know the other person, you just thought they stayed at home all day. It changes how you see people.

Not only can this map reveal different aspects of an individual's character and temperament, but maps can also create positive social interactions. 3869_lit was a strong advocate for maps being used as a tool to encourage real-life connections with peers (Figure 45). His answer to the question "how can this tool be used for learning in an art classroom?" was "if you figure out where a person lives then you can just interact and see what the surroundings are around both of you, and you can meet up and have fun together." For 3869_lit, knowing that someone lives or hangs out in similar places was regarded as an incentive to spend time with that person. Later, he discussed why he believed the online mapping tool could be used in his Ethics class.

Figure 45

Online Collective Map Post — "Touch" by 3869_lit



3869_lit: Ethics class, because usually Ethics is a place you learn life lessons and values, and this could really help by communicating with other people.

Researcher: What do you mean communicating?

3869_lit: You should value more your time with other people instead of technology

Researcher: How does this teach you that?

3869_lit: Well, it teaches you how, as I said before if you can connect with someone through a map, then you can connect with them through real-time.

This account suggests that learning about the relationship of others to their everyday spaces can influence relationships and connections in physical spaces. The collective learning that emerges from this process of mapping can influence students online as well as in their everyday surroundings, and with the people who occupy those spaces.

My discussions with students have convinced me of the value of collective sensory online mapping for peer learning. By sharing photographs of familiar surroundings on a collective map, students expressed something about who they are, and what they prefer. In some cases, this revealed something different about their character than what they presented in class. The collective online maps, particularly at RMA, revealed something about the identities of the individuals and class collective. In a previous section, I discussed the efficacy of collective online mapping for visualizing and expressing one's identity in relation to local and global space. My analysis of these maps and the accounts of students about learning about their surroundings and peers have convinced me of the value of this tool in education. Maps can allow individuals to express their identities by revealing their connections to local places and global space. Using this tool collectively enables a group of individuals to learn about the identities, life histories, and cultures of the people with whom they share space.

The Technological Limitations and Affordances of Using Online Maps

While using online mapping tools can be valuable in art education contexts, there are important limitations to consider. One of the main limitations of using online mapping platforms in the art classroom is the availability and accessibility of technology and the feasibility of using online mapping platforms in the classroom. This presented major issues in my research due in part to the lack of the availability of online mobile mapping platforms suited for the specific educational purposes of this research. As such, I had to appropriate and adapt existing tools for

my specific purposes. At the time of conducting the fieldwork, I had focussed mainly on the platform offered by Ushahidi and Google My Maps. Ushahidi offered a robust means of gathering and sharing geo-tagged photographs through mobile devices. However, when I ran trials prior to the fieldwork, I encountered numerous technical difficulties, such as images disappearing after being posted, and restrictions on the numbers of images that could be posted. For this reason, I opted for Google My Maps, which provided a slightly more stable platform, although it was not entirely issue free. I encountered several problems when using this tool in the classroom. For one, having over thirty students accessing the same map at the same time caused glitches such as students' posts and images disappearing. Students who were not particularly tech-savvy struggled with using the platform a great deal. Bgonth0t19 described some of the issues she faced while creating the map.

> Bgonth0t19: I just couldn't figure the site out. I got on, but I couldn't figure it out. So I would put points but they weren't where I had put them. Maybe it's just me, probably just me because can't figure things out.
>
> Researcher: No, it was hard?
>
> Bgonth0t19: Instagram is easier, you're on it everyday.

Bgonth0t19 comparison of Instagram to Google My Maps is pertinent. Instagram is familiar, and easy to navigate, while neither the students nor teachers at either SVH or RMA had experience with creating maps on Google My Maps. Bgonth019 was not an exceptional case as t several students struggled with different aspects of the platform. Generally, the students who had the most success with uploading online maps tended to have greater familiarity and interest in using digital technologies. However, while these students had little difficulty with accessing the map and drawing a walk on Google My Maps, they did face immense challenges with uploading their photographs on the map. Mint_shiba2 and Get_chromazoned_boi were two students who

were able to successfully complete all aspects of the map but expressed great frustration about uploading images.

> **mint_shiba**: (It was) not too fun (to use Google My Maps). The fact that I had to download the images and it didn't work the first time, so I sent them to Google Photos, but that didn't work, so I had to re-download them again.
>
> **Get_chromazoned_boi:** (It was challenging to) figure out how to use it on the phone because I didn't have the pictures uploaded to my (Google) drive, and it didn't work the same on the phone as the computer so I didn't know how to upload the pictures.

The particular issues these two refer to is that Google My Map did not accept photographs that were in a certain format or came from different sources, so in some cases, students were forced to upload their images on Google Drive, and then transfer the image to the map. These two tech-savvy teenagers were able to resolve this issue independently, but many others struggled.

Such technical difficulties are significant challenges for integrating online collective mapping in art classroom settings. These issues are also recognized in the literature on spatial learning in education. The National Research Council (2006), for example, advocated for a strong inclusion of GIS across disciplines. However, theyacknowledged that there were major obstacles to implementing expert technology in K-12 settings. Gryl and Jekel (2012) advocated instead for using everyday geo-locative technologies. There are, for instance, some social media applications that have mapping functions. One possibility is using Flickr maps, which combine the capabilities of the social media photo-sharing platform, with Google maps. This allows users to easily create a collective online map from geo-tagged images uploaded on Flickr (https://www.flickr.com/map). The aforementioned ESRI storymaps and Tripline are other platforms that can be used for creating and photographing walks and sharing images on maps.

These different applications can make online collective mapping more accessible for teachers and learners. However,using any online tool will likely present its own set of challenges and restrictions. Technical issues and limitations such as the one described here are integral to teaching with technology. The teachers' at both schools identified this to be a major disincentive for bringing technology into the classroom. Cardinal summarized this sentiment, by providing various examples of the limitations of using technology in the classroom.

> **Cardinal:** I have chrome books out and it crashes**.** Once, I filmed with iPads at senior residence, and the next class erased All the video. (If I want students to use computers, I have to) make sure Chromebooks are available. We share resources and it affects how you run your class.

In spite of these limitations, Cardinal was a strong believer in the value of using technology in the art classroom, and she did many art projects that incorporated different technologies. Rosegram also pointed out the limitations she faced when incorporating technology in her classroom at SVH.

> **Rosegram:** I like mixing music, sound art, I know how to do video editing and Photoshop. I have those skills to bring in, but also here, I also find it annoying there are no laptops, so we have to go to a computer class, where they're all spread out and the software's not good. The computers are not good.

Although this teacher is skilled in using digital technologies in her art practice and personal life, accessibility presented an obstacle to using these tools in her art classroom. Availability and technical problems are important considerations for using any form of digital technology in art classroom contexts, and it is not limited to online mapping platforms.

One way to avoid these issues is to avoid using technology by using hand-drawn maps instead. Previous to doing the fieldwork, I had done a pilot workshop with a group of art

educators, which was attended by the RMA teacher Cardinal. During the workshop I used a poster-sized paper and asked a group of five participants to draw a map of where they lived and how they commuted to the university campus. This generated conversations among them about places and spaces they knew, shared, liked and avoided. Cardinal noticed similar kind of spatial conversations happening among students during the Google My Maps workshop at RMA. She observed,

> What was interesting when students were at tables and putting in the geo-tags is that if you listen to some kids that lived in similar neighbourhoods, they were saying 'oh yah, I know that place,' and they were having conversations about their neighbourhoods.

Cardinal pointed out that such spatial conversations could occur with hand-drawn or online maps. The hand-drawn maps have the added advantage of avoiding the technical challenges of using computers in the classroom. However, online maps have some advantages as well. They allow an entire class to generate a single collective map with relative efficacy. Additionally, the juxtaposition of the satellite images and physical spaces can be a rich area to explore with students.

Designing walks on a satellite map enables what Keifer-Boyd et al. (2018) called human-satellite co-figurations. To plan a walk, the photographer-cartographer first experiences the space for the bird's-eye view of a satellite then experiences it by walking and photographing the space. In my experiences creating online sense maps, such as the Park Extension Photo Walk, I found the contrast between the satellite images to the experience of walking in a place to reveal pertinent insights about places and the people who live there. A student at RMA, Sandycheeks024, also commented on how this satellite representation of her neighbourhood contrasted with her lived experiences of the place.

> It was also really fun when I was like oh my god that where my house is, and this is where I get off the bus, this is where my mom goes grocery shopping. It was stuff like that that was really cool that I could that.

This student was superimposing her personal experience and daily life onto a satellite map. When a collective of students does this, what emerges is a collection of such lived experiences on the singular frame of the online map. The surface of the satellite images became the base onto which diverse individuals placed their own unique identities, connections, tastes and preferences. As such, one of the positive benefits of using an online map like this was to provide a platform onto which the personal experiences of numerous students could be placed, and viewed.

Conclusion

In the two iterations at SVH and RMA, I experimented with various approaches to mapping, including creating hand-drawn and online maps to plan walks, and to document dérives. I have found that while both hand-drawn and online maps were effective at facilitating spatial conversations, there were particular valuable affordances of online mapping. The collective online maps developed at SVH and RMA visualized spatial relationships within the class to places in the city and global space. The online maps were also effective tools for encouraging spatial awareness and peer-to-peer learning. Particularly, the activity of using the online platform to drawing a sensory walk in the neighbourhood, and going on the walk encouraged students to go outside, to notice, and rediscover familiar places. Sharing their walks on the collective online maps allowed these students to also learning about their peer's personalities and preferences. These findings have convinced me that collective sensory online mapping is a powerful tool for expressing and sharing spatial identities and histories. In the next

chapter, I describe in-depth the role of the senses and photography in facilitating students' learning in this project.

CHAPTER 7 — SENSES AND PHOTOGRAPHY

The senses play an integral role in achieving one of the main objectives of this study, which is to use mobile photography and critical cartography to connect youth to their everyday environments. In chapter 3, I anchored this study in the literature on Sensory Anthropology (Howes, 2003, 2005, 2011), Sensory Ethnography (Pink, 2007, 2008, 2009), and the Sensual Curriculum (Gershon, 2011, 2019). These theorists draw attention to the significance of the senses for social life, culture and our connections to places. I also presented various methods for engaging the senses in Art Education (Akbari, 2014, 2016b, 2020; Ceraso, 2014; Powell & Uhlig, 2019). There are two common themes in this literature that are pertinent for my research: Separating the senses and focusing on a single sense is educationally productive, and the senses connect us to places. These ideas provided the bases on which I designed the educational interventions, as well as my analysis of the data.

In this chapter, I focus specifically on the relation of photography to the senses. One of the clearest outcomes of the fieldwork was my realization of how important it was to explicitly teach photographic skills in order to enable and empower students to engage with the theme of the senses. The differences between how I conducted the interventions during phase 1 at SVH and phase 2 at RMA were particularly revealing in this regard, as well as other aspects of sensory photography described in this chapter.

I begin the chapter with a description of the students' engagement and learning of photographic skills at the two sites. Then, I describe students' engagement with and feedback on the Sense Missions and Sense Walks. Many students viewed the Sense Missions as positive creative challenges for doing photography. This highlights the symbiotic relationship between engaging with the theme of senses and photography, and also the challenge of translating various senses to the visual medium of photography. In another section, I explore various ways students

dealt with this challenge of translation, and factors educators can consider when developing sensory prompts to help with translation. The Sense Walks were also an important activity for exploring the theme of the senses, and also the spaces of the schools. The students' responses to the smells of their schools, in particular, underscored the important and often unacknowledged role sensory experiences play in students' perceptions, attitudes, and engagement within the spaces of their schools. This finding affirms Gershon's (2011, 2019) assertion that there is great value in explicitly attending to the sensuous in education.

Photography

Photography offers students the lexicon and grammar to express themselves visually. It was vital for the success of the educational interventions to spend time to explicitly explain and model specific tools, techniques and approaches for taking and editing pictures. Such skills enabled students to express a diversity of ideas about themselves, their surroundings, or their senses through photography. The importance of teaching photographic skills was also an important insight from the MonCoin research (Pariser et al., 2016). As Castro (2019) put it, learning "the grammar of Visual Culture" was essential for motivating students to examine their civic and educational environments (p. 3). I have found that to be especially relevant for the curriculum that focused on sensory photography. The contrast between phase 1 at SVH and phase 2 at RMA provides a clear illustration of the salience of teaching photography skills for engaging learners in the themes of the senses and their surroundings.

At SVH, I spend a bit of time during the second and fourth workshops to discuss photography composition and editing with the class. Based on feedback fromthe students and teacher, it became clear that the teaching of photography skills needed to be integrated earlier and more thoroughly. At the end of phase 1, Rosegram reflected on the positive impact that teaching composition might have had on students/ engagement with the project.

Rosegram:I think if they had more encouragement to think about visual perspective to take photos, for example, they can take a picture of a sidewalk but get down on the sidewalk, so that you see the actual grid and pebbles, and you see it vanish.

Technical elements such as one-point perspective were one critical component. There is evidence that students SVH became encouraged to do photography by looking at their peer's images, and also by being and walking together in physical spaces, as discussed in the spatiality chapter. However, it was also clear that photography skills needed to be addressed more explicitly during classroom activities.

For the next iteration at RMA, the teacher also emphasized the importance of covering photographic techniques. We agreed on doing two 15-minute workshops on photography in between the main workshops. During the first mini-workshop, I introduced the mobile photo-editing Application Snapseed. In the previous phase, I learned that some students were posting old photographs. I figured if that was the case, they should at least have a chance to edit them before posting. I also demonstrated the basics of doing photography on a smartphone. I showed students how to turn on the grid for the camera in the settings, then I demonstrated how to compose a shot, using the rule of thirds, tap on the screen to focus the shot and to brighten or darken the focal point. The next week, I did a presentation on photographic techniques, such as lighting, patterns, close-ups, framing and leading lines, by showing samples of photographs and discussing how the pictures were taken.

These mini-workshops had a perceptible impact on the students' engagement and learning in the project. At the end of the project at RMA, several students talked about "the grid" and editing with Snapseed as key learning outcomes. Some students reported enjoying photography as a motivator for participating in the project. In contrast, the students at SVH reported learning

little about doing photography, which impacted their perceptions and attitudes towards mobile photography and the Sense Missions.

Phase 1 at SVH – "Learning by Looking" "The eye" "authentic photo"

In phase 1, although students generally reported they learned little about photography, some students reported learning by looking at the photographs posted by their peers and teacher on our peer-learning network. Cassie_jones23 talked about improving her photography skills by "going through other people's pictures and saying maybe I should include," for example, a "different angle". Rhs_imhungry, who reported little learning during the project overall, talked about the value of being able to view her peers' photography online. She said she learned "how to take pictures from the classmates' photography and from how they took the pictures, and how they edited." The teachers' photography, in particular, severed as a positive model for students. Several students talked about various technical and stylistic aspects of their teachers' photography.

> **Cassie_jones23:** I found she was finding very good angles, and she was putting very colourful items.
>
> **Supremeleaderkimmjongoink referring to the picture of the guitar amp:** I liked the whole vibe and energy, and I like how she implemented a grain on the picture and it showed it was rustic, and I really like the colours.
>
> **Heatherb_18:** I love (the teacher's) pictures. They're so clean and bright, and like really liked those pictures. They inspired me to post.

In the cases above, images posted online are teaching and influencing students' engagement and learning. Castro (2012, 2019) illustrated the importance of looking at peer's images in peer-learning networks in Art Education. In these cases, images circulated within a learning network teach. Within the SVH learning network, the teacher also played a critical

pedagogical role by actively posting photographs that, in some instances, inspired students' engagement with the project. Learning by looking is not only valuable for improving one's photography skills or visual style. It can also teach us something about the photographer. As Heatherb_18 put it eloquently,

> Sometimes we take for granted people's 'eye' until we see actually their pictures. I check Instagram everyday, and I see people's pictures, and they're amazing. They're like really good pictures, really high quality. They have the potential to be photographers one day.

At SVH, I also observed many different attitudes and dispositions towards photography during the post-interviews. In the case of Guns_are_great, photography was about having a "better eye for seeing things you can take pictures of." This eye is a skill that can be trained through teaching, practice, and peer-learning networks. However, this particular student was simply not interested and engaged in the project or art class in general. As he put it, "art isn't my thing." In such instances, having a "better eye for seeing things," as he put it, is of no interest to the student. Photography is for others.

Supremeleaderkimmjongoink and Theoverthinker134, on the other hand, were experienced photographers, who expressed varying views on what counts as an authentic photograph. Throughout the project, Supremeleaderkimmjongoink used his DLSR camera instead of using smartphones or other mobile devices to take and share photographs. He expressed to me his resistance to mobile photography on two occasions. During the interview, he said he did not want to use his phone because,

> I feel more genuine using my actual camera. And I just trust my camera all the time. I feel like an amateur using my phone. I don't feel I have the certain quality that I have when I use the better camera.

For Supremeleaderkimmjongoink, mobile photography had a negative connotation, although he conceded that the phone could be convenient since he does not always carry his large DSLR camera. Theoverthinker134 presented a contrasting view on this matter. He felt that images taken with a smartphone, if well taken, could get the same reaction online as images taken with a professional camera. For theoverthinker134, this was a positive point about mobile photography.

> Some people use huge cameras to take nice pictures, and you just have a phone. You can take good enough pictures and post them, and people are like that's a good picture. You can get the same reaction with a regular camera.

For this student, posting a good image online depended more on "the way you position your phone," and less on having an expensive professional camera. Theoverthinker134, however, expressed resistance to the notions of editing his photographs.

> You showed us some App for editing, and I felt like that helped but like I kind of don't want to use that because I feel it's better to go all natural. That's where you get the real feeling. It's like Photoshop.

It should be pointed out that this student had a video editing practice, where he mixed clips of movies and posted them online. He was, nevertheless, resistant to the inauthenticity of edited photographs. The various attitudes and dispositions of Guns_are_great, Supremeleaderkimmjongoink and Theoverthinker134 towards photography affected these students' engagement with the project in various ways. In the case of Supremeleaderkimmjongoink and Theoverthinker134, addressing photographic skills and techniques in a similar manner as phase 2 would have encouraged a greater appreciation of the kinds of photography that are possible with mobile devices and editing Applications.

Phase 2 at RMA – The Grid and Editing

For most students I interviewed at RMA, the grid, editing and applying photographic techniques were their most valued learning outcomes from the project. In a particular, several students identified the grid as a helpful tool for photography. During the first photography mini-workshop, I demonstrated to the class how to turn on the grid in their smartphone settings, and how to compose pictures with this tool using the rule of thirds. For Mysticalxunicorn, this became part of her regular photography practice:

> I think I learned how to take better pictures. And now I have the grid on my camera, so when I take pictures I could see and use two grids over and one under so I use that much more now.

Several students also mentioned editing as a key learning outcome. Ivan_ivanovich _ivanosky, Pink_sparkles_cream_pie_1620, and Mysticalxunicorn all talked about integrating editing with Snapsneed in their mobile photography practice.

> **Ivan_ivanovich_ivanosky:** When I take pictures, I'll probably edit them now, rather than going straight to posting them.
>
> **Pink_sparkles_cream_pie1602**:I learned how to edit. I learned how editing can really change a picture, make it nicer in some way. Well, I like that when I a take picture ofthe sky and clouds, how the contrast can really change. You showed us the editing app, so now I can use it for future pictures.
>
> **Mysticalxunicorn:**I really like the Snapseed now, I use it a lot. I use the light, contrast, warmth, focal point, and you could tilt the perspective. I really like that.

At RMA, many students used the grid to compose their photographs, and they edited their photographs. In addition to the grid and editing, there is evidence that students at RMA applied some of the compositional techniques covered in the second photography mini-workshop. This

workshop covered lighting, patterns, close-ups, framing and leading lines. The strategy of finding and using leading lines was used by a number of students. Particularly during the neighbourhood walk, a number of students used leading lines. Constellation.xx provided a good example of this with a picture of flower petals on the ground she took during the neighbourhood walk (Figure 46). She explained this was her favourite picture because "I saw (the petals) on the ground and I tried to get a good angle to see the leading line, and focus."

Figure 46

Photograph Taken during Neighbourhood Walk by Constellation.xx

Students also commonly mentioned colour, angles and lighting as important compositional elements for doing photography and also as elements they appreciated in their peers' pictures. Constellation.xx astutely observed the various compositional strategies used by

her peers to capture simple and literal subject matter, and she appreciated the photographers' various styles and choices. For the mission "Paths I take," for example, Constellation.xx noticed that her classmates "would think of the ground and path, and they would take different angles, and try to make it their own." For Sandycheeks, learning about these important elements of photography was a valuable outcome of participating in the project:

> I learned there's actually a lot more that goes into taking a picture than I thought, like things like lighting and where you're placing the thing in the photo, the centre, top, left corner, and also, there are a lot of colours that are coming out. There are a lot of things to think about, and I didn't think there was that much stuff that goes into taking a picture.

From these accounts, it is evident that the inclusion of the mini-workshops had an observable impact on the students' photography, which, in turn, positively influenced their engagement and learning in the project. The RMA students generally did not dispute the authenticity of an edited photograph or one taken with a smartphone, as did some students at SVH. Instead, they focused on the practical ways smartphones with cameras and editing applications can be empowering and helpful for photography. I speculate that a major reason for this is the teaching of photography skills. Using classroom time to provide instructions on mobile photography basics and editing with Snapseed played a role in convincing students at RMA of the value such tools have for photographers.

The attitudes and dispositions of students towards art and photography will always be a factor when teaching this subject. However, it can also be said that the instruction on the basics of mobile photography and editing played a positive role in students' engagement and learning by demonstrating to them how applying such tools can lead to compelling and meaningful photography. What is more, there is evidence that is instruction had a positive impact on students' engagement with the theme of the senses.

Sense Missions

The Sense Missions were visual prompts that required students to identify and photography sights, sounds, tastes, smells and touch in their surroundings. Missions included the main themes of "Sight," "Sound," "Taste/Smell," and "Touch;" as well as sub-themes such as "Soft," "Dark," and "Sweet." The sub-themes aimed to promote sensory engagement with adjectives that invoke more multiple senses. From post-interviews, I learned that the theme of the senses was well received by the teachers and some students. There were, however, quite a few students who found it difficult to capture senses through photography. The common reason among students who disliked the Sense Missions was that some senses, particularly sound, smell, and taste, were difficult to capture visually. I will discuss the challenge of translating these senses into photography later. The common reason for students and teachers liking these missions was that they viewed thought-provoking and creative challenges.

To gauge student engagement with the Sense Missions, I looked at the numbers of images posted in response to each prompt, and students' feedback during post-interviews. During phase 1 at SVH, there were a total of 43 posts versus 57 responses to the My City missions. The teacher and two students identified the Senses as their favourite missions, while two other students said it was their least favourite. During phase 2 at RMA, there were 69 total posts for sense missions vs. 68 for My City missions. The teacher and four students identified the senses as their favourite, while 2 students disliked the missions. The evidence suggests that during phase 1, there were more mixed feelings about these missions, while, during phase 2, the consensus was more positive. One determining factor in the difference between these preferences at SVH and RMA was my teaching of photography, which was more in-depth and systemic in phase 2.

During phase 1 at SVH, those who expressed a preference towards the Sense Missions tended included Supremeleaderkimmjongoink, Theoverthinker134, Heatherb_18, and the teacher

Rosegram. Heatherb_18 liked these missions because they encouraged her to think more like a "professional" photographer. She explained,

> For the senses, you need a good picture. You need to think about it. You need to think to something you can hear, and how you can project that in a picture or something that is soft. You have to take a good picture, like good quality, focus the camera properly so you can see text. So yah I love those things. It makes me feel professional when I'm taking the picture.

For Heatherb_18, the Sense Missions presented a challenge to think more deliberately about how to capture the subject matter in a photograph. That is, it got her to think like a professional photographer. The teacher Rosegram also saw the value in prompting students to represent their senses visually. She also modelled how to represent other senses through the visual medium by posting online. For the mission "Soft," for example, she posted a video of a fan blowing on a rug. During the post-interview, she explained to me that she had tried to capture the soft sound of the fan, soft textures of the rug and the pale colour of the fan in order to model to students "different ways of representing (softness) visually and sonically." Heatherb_18 also mentioned this post to be a favourite of hers, particularly because "you can see the soft texture." The intention of the artist is clear to Heatherb_18, which, in her mind, made this a successful image.

On the one hand, Rosegram thought "thought it was cool to get [her students] to think about representing the senses visually." On the other hand, she expressed some reservations about some students who interpreted this theme literally. Rosegram felt that covering photographic techniques would have helped for encourage students to engage with this theme more deeply. Overall, the students' and teacher's reactions to these missions during phase 1 showed that there was great potential in using these prompts to encourage students to notice their

surroundings and to do photography. It also became clear that students needed more technical tools for photography first in order to be better equipped to deal with the challenge of photographing the senses. After all, those who responded most to these missions were students who either already had a photography practice or were interested in photography.

During phase 2, the Senses missions were slightly more popular and received more favourable reviews. There were a variety of reasons students and the teacher liked these missions. For the teacher, these missions provided a unique approach to landscape photography. Cardinal said of the Sense Missions,

> They were cool because how do you capture that? How do you capture like a sound 'Loud.' These weren't your typical themes. It just made (students) think in a different way, and also myself. I was kind of, that's kind of different. How would I take a picture of that?

Cardinal's response to these missions is similar to Rosegram and Heatherb_18 above. For all of them, the Sense missions presented a challenge to approach photography in thoughtful, visually interesting, and creative ways. Several students at RMA also talked about why they felt positively challenged by the Sense Missions:

> **Mysticalxunicorn**: You have to think about what you can (photograph). Let's say if it was at a park maybe it could be touch because let's say the wind is blowing on you and it touches your skin. It just takes some thinking.
>
> **Constellation.xx:** I liked the senses because it was more vague so it allowed people to be more creative with it.
>
> **Ivan_ivanovich_ivanosky:**(The Sense Missions) were fun because you're trying to express other senses with one sense. It's like you need to translate everything into sight,

which is difficult but fun. You get to be creative.

These students felt positively creative challenged to think carefully and creatively about how to translate sensory experiences to photography. These missions proved to be effective *constraints that enable* (Castro, 2007; Davis, 2009). Constraints that enable, as discussed in chapter 2, aim to "create balance between structure and openness providing enough boundaries to guide students but also enough space for new patterns, relations, and solutions to emerge" (Akbari, et al., 2016, p. 21). The Sense Missions gave the limit of what they could photograph in their surroundings. They also limited students to think separately about specific senses. This provoked multiple ways of noticing, interpreting, and translating the sensorium of their surroundings to photographs. This theme limited students, thereby creating opportunities for noticing and creative problem-solving.

My experiences at SVH and RMA have convinced me of two things about the Sense Mission. Firstly, there were effective and creative tools for prompting students to notice their surroundings and to develop their photography skills and styles. Those who enjoyed these missions did so partly because they were challenging and thought-provoking. Those who did not like these missions found the challenge of translating other senses into an image too difficult. It became clear at the end of phase 1 that providing more thorough instruction on mobile photography, editing and composition would be necessary, and covering these topics had a positive effect on engagement with the theme of the Senses in phase 2. Building a basic set of photographic skills better equipped those students who were not already familiar with photography to deal with a more complex theme. During phase 2, I also include more examples of photographs that visualize other senses. I modelled this process with my Missions and Verdun Sense Map. Providing artistic models was a helpful contributor to students' engagement with this theme.

Another important element for engaging students with the theme of the sense was the in-classroom activities. In chapter 5, I discussed the essential role that being together in physical spaces and walking together in and around the school played in students' engagement and learning throughout the project. In the following section, I focus on the Sense Walk.

Sense Walks

Sense Walks involve going on walks to pay attention and notice different sounds, sights, smells, tastes and textures in spaces. As discussed in chapter 3, I developed this approach to photography based partly on my previous work as an artist, educator and researcher on soundscapes composition (2016) and soundwalks (2020), and partly on methods and approaches in sensory ethnography. Pink (2007, 2008, 2009) used visual and multimodal methods of collecting, analyzing and presenting sensory data to explore the embodied emplacement of the researcher(s) and participant(s). Powell and Uhlig (2019) described various "sensory fieldwork exercises" which aimed to disrupt "taken-for-granted everyday practices" of sensing the world (p. 161). These exercises divided the senses and invited learners to engage with the sensorium of their everyday surroundings through activities such as walking. In these various cases, walking in a space while paying attention to the senses is an essential and valuable activity for learning about oneself and others in relation to everyday environments. In this research, the activity of walking and noticing the senses was applied for the purpose of doing photography. In this context, the sense walks involved noticing the senses in one's environment first and then translating the senses into a photograph. At SVH and RMA, I did variations of the Sense Walks. In my analysis, I found the similarities and the differences between how the Sense Walks unfolded at each site to be illuminating.

During phase 1 at SVH, we did the Sense Walk by walking through the spaces of the school and focusing on one sense at a time. The teacher and I decided it would be best that she

designed and led the Sense Walk since she knew the school best. She drew a map prior to class, and during the class led the group of students out of the classroom, down a nearby stairwell to the cafeteria. We stopped and gathered as a group at the cafeteria to observe tastes and smells. The teacher and I asked the students "What do you smell?" "What are the smells in your school generally?" and "How can you photograph these smells?" After this, we moved to the old gym and used similar questions to observe the sights of the school. Finally, we moved through narrow, subterranean hallways toward the school auditorium and concert stage. We sat down for a few minutes to quietly and attentively listened to the sounds of the space. After this, we made our way back to the classroom. In the class, I introduced the students to the sense missions, and then gave them the remainder of the class time—about 20 minutes—to take pictures around their school and post them.

After the workshop, the teacher reflected on the activity, and we agreed that smell and sound were the senses that stood out during the walk. For instance, she had chosen the gymnasium as a site for capturing sight. However, while we were there, we both heard students talk about the smells of basketballs, the gym and teenagers.

During the sense walk at SVH, sound was also a theme that was discussed by several students, particularly in the listening activity in the school's music auditorium. The teacher recognized the value of using the space of the auditorium for a focused listening activity. Acoustics are an important factor in designing such space, which, according to Rosegram, gave the space "a different atmosphere" more suited for listening. During post-interviews, several students also discussed the sense of sound, as our visit to the school's music auditorium left an impression on them. In this space, the teacher and I asked students to sit down and silently listen to the space. As listened new sounds began to emerge. Mint_shiba and Theoverthinker describe their listening experience

Mint_shiba2: The music area, we were just sitting there, and then it got really quiet, and then we started to hear sounds that we didn't hear before, because usually there are other sounds that distract us. There's like air vents and stuff.

Theoverthinker134: We heard the quiet noises in our school (auditorium), which you never hear when there are people around, but I didn't get any pictures or ideas. Just sitting and listening I was like wow. I didn't know that sound came out from there, and then just where the sound came from, these mini sounds that are in the school that you don't hear because many voices in the school cover them.

These two students' accounts are consistent with my previous experiences with listening activities in educational contexts. When one listens attentively, one notices new things about familiar spaces (Akbari 2014; 2016b). At SVH, the particular space in which the listening activity was done also played a significant role. The music auditorium was designed to enhance acoustic qualities. The teacher's recognition of this fact, and the decision to connect sound to this space in the school had a positive impact on students' engagement and learning. The above quote from Theoverthink134 also illustrated another important point about the Sense Walk. He confessed that he "didn't get any pictures or ideas," which suggests that the connection between the senses and photography was not made explicitly clear to him. The teachers later reflected onhow we could further develop this connection. During the Sense Walk, we stopped at each site and talked about how we could represent a particular sense visually. The teacher suggested that we could spend more time and ask students to photograph something on the spot and push them to develop answers to these questions through trial-and-error.

The Sense Walk provides yet another argument for the importance of physical one-on-one interactions for learning, as discussed in chapter 5. One key way to address the challenge of translating one sense into a photograph is to spend time together taking pictures and figuring

things out through trial-and-error. I have applied these lessons to variations of the Sense Walks that I have done since the completion of the fieldwork. One vital amendment I have made for future iterations was to gave one mobile device to a small group of participants, and ask them to discuss and negotiate what and how to photograph their senses. Under such circumstances, participants were forced to discuss what they noticed and sensed in their environment, and then work together to photograph these things. Such an approach strengthened the connection between the senses and photography, and it also encouraged participants to learn from and about their peers.

For the Sense Walk during phase 2 at RMA, I introduced the theme of the senses by doing a presentation rather than going for an actual walk with the class. There were a number of context-specific factors that led to this decision. Firstly, since other classes were taking place at the same time, the teacher and I worried that walking around the school with a group of 30 students might be disruptive to other classes. On the day of the walk, the teacher also informed me that older kids were hanging around and causing issues outside the school, and the principal was thinking about calling the police. This serendipitous circumstance also made us concerned about stepping onto exterior parts of the school. Furthermore, I assumed that since some students in the class had expressed an interest in science and neurology, a more cerebral discussion about the senses might be appropriate in this context.

It turned out that I was wrong. It quickly became apparent to me that the Sense Walk I had done in the previous iteration at SVH was a far better approach to getting students to notice through senses than lecturing about it. As a general principle, I have found that students learned and observed more by doing than by listening to me lecture. During my presentation, I talked about the relationship of the brain to how we perceive and sense our surroundings, and how the senses are integrated. To illustrate this latter point, I showed a picture of delicious food and asked

students “which senses are engaged when eating?” Students astutely responded that eating involves both smell and taste, and some pointed out eating also involves sight and touch in a significant way. I also talked about the sense of smell and sense maps of dogs. After, we did a listening exercise, for which I asked students to be quiet for a minute and focus on the sounds of the room. I then introduced each Sense Missions and asked how we could photograph each sense. After the presentation, I sent students in groups of their choice to freely walk and photograph their senses in specific areas of the school where they would not disrupt other classes.

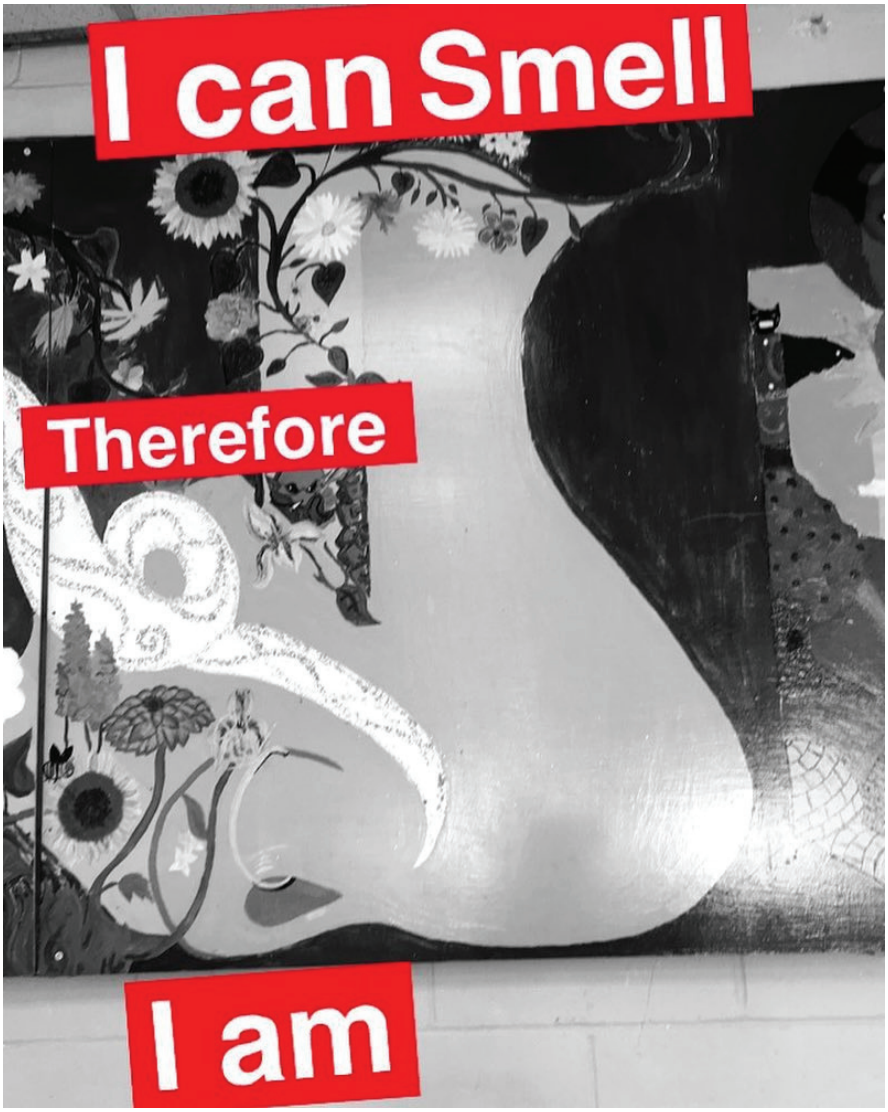
During interviews, students did not talk about the presentation or learning about their senses. In contrast to phase 1, students at RMA generally did not report noticing different sensory stimuli in their school. Sending students out to photograph their school, however, did lead to some interesting photographs and discussions of the senses. Similar to phase 1, smell was also a big deal at RMA with students posting a number of provocative photographs to represent smells in their schools. This will be explored in the next section.

My experiences with introducing the theme of the senses in these schools have highlighted for me the importance of doing practical sensory activities. Also, it is important to make explicit connections between sensing and photography. Being together in the spaces of classrooms and schools provides excellent opportunities for making the connection between the senses and photography.

Smells like teenagers

Figure 47

Response to Mission "Smell" by Blue_coons Taken during School Sense Walk at SVH



During the Sense Walks at both SVH and RMA, smell was predominantly discussed among students. At SVH, we started the walk in the hallways of the school and moved down the stairs towards the school cafeteria. While walking, I kept overhearing a group of students saying, "it smells like shit here." When we arrived at the cafeteria, the teacher and I gathered the students

and asked them to diplomatically say what they smelled. I heard several students muttering, "shit." They also replied

Student 1: I don't even smell.

Student 2: Smells like Chicken

Student 3: Do we have to write that it smells like crap?

Student 4: It smells like no one's cleaned.

This last response sums up the attitude of several students towards the smells of their school. This perception was likely influenced by these students' attitudes towards their school. These responses illustrate a general point about discussing the smells of a school: It can lead to uncomfortable conversations. This is one factor educators should consider when introducing this theme.

Although uncomfortable to discuss, I also observed instances in which students engaged in insightful conversations about smell. During the sense walk at SVH, we left the cafeteria to go upstairs to the school's gymnasium in order to focus on and observe sight. At the gym, students were still focused on smell. When I asked them about what they see, one responded, "it smells like basketballs," and another said, "it smells like teenagers." It appeared that the act of listing what they smelled at the cafeteria made them attuned to a number of prominent smells that were part of their daily lives.

At RMA, Sandycheeks024 discussed a variation on the theme of the "smell of teenagers." Before going on the walk around the school to take sensory photographs, Sandycheeks024 identified the girls' change room as the place with the most distinctive and representative smells in her school. She later photographed and posted an image of the change room, which elicited amusing responses from her peers such as "the best scent I know," and "the cheese factory" (Figure 48).

Figure 48

Response to Mission "Smell" by Sandycheeks024 Taken during School Sense Walk at RMA

These accounts illustrate that the smellscapes of schools are an important but rarely discussed part of students' daily life. The teacher at RMA expressed some reservations about using the theme of "smells" and the "senses," in general, to explore the space of the school. Cardinal pointed out that these themes highlighted some of the negative aspects of the school. Examples of this include pictures of an overflowing toilet in the girl's washroom posted by

Mysticalxunicorn (Figure 49) and clogged sinks in the boy's washroom posted by Ginothejanitor (Figure 50).

Figure 49

Response to Mission "Smells" by Mysticalxunicorn Taken during School Sense Walk at RMA

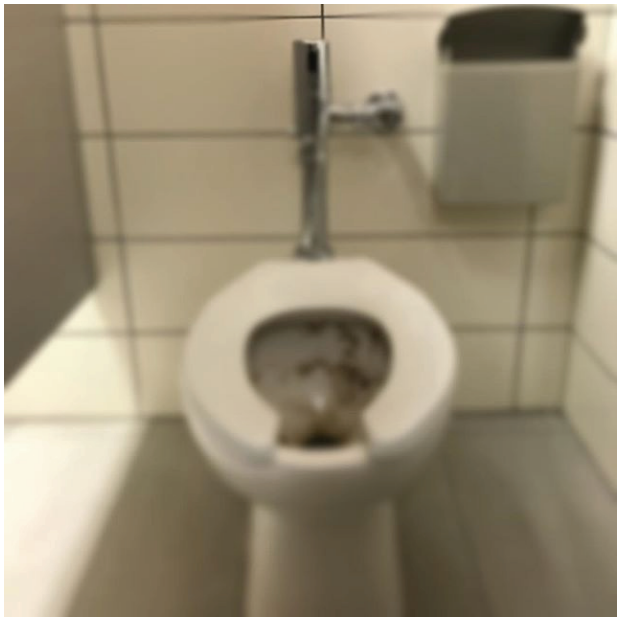


Figure 50

Response to Mission "Sight" by Ginothejanitor Taken during School Sense Walk at RMA

Although RMA is a reputable school and students expressed positive feelings towards their school, the Sense Missions gave them the chance to express their critical views of their school. There are striking similarities between these responses and student responses to the MonCoin missions "Change" and "Change My School" (See Akbari, 2019b). These MonCoin missions aimed to promote a critical and participatory perspective on students' everyday civic spaces. Although I had not intended to provoke such responses, the Sense Missions in some instances led students to critique their school's space. Such critical perspectives can be an opening for dialogue about civic responsibility. After the photographs were posted, I engaged in such discussions with Ginothejanitor to ask for his thoughts on what can be done to improve this situation. Ginothejanitor recognized the role of and responsibility of students in taking care of their school.

These students' responses to the mission "Smell" at their highlighted a number of key points for me. For one, I was surprised by the students' enthusiastic and critical responses to smells. Using this prompt in the context of the schools required an openness to having uncomfortable, but worthwhile conversations about the spaces within the school. The profound role of odours in social life, culture and power is understood in Sensory Anthropology. Classen, Howes, and Synnott (1994), for example, showed that in Western societies smells, and smell neutrality, often serve to divide humans along ethnic, gender, and class lines. Smell is fundamental to social life, and therefore, spatiality. It is, however, an uncomfortable topic because sometimes because odours can be unpleasant, and also sometimes because talking about smell requires addressing issues of ethnicity, gender, and socio-economic status.

What if the school curriculum attended to the senses of the youth in their schools? The cases above show that attending to the senses, in general, and smells, in particular, can reveal a great deal about students' attitudes and relationship to the environment of their schools. In some

cases, students pointed out issues within their school environment that they felt should be addressed. In other cases, students pointed out sensory experiences that define their daily experiences at school, some of which are not for polite company, and certainly not addressed in the usual curriculum. “It smells like teenagers here,” which students at both schools uttered during the Sense Walk, is one good example of this. In my view, these findings validate many of the points raised by Gershon (2011, 2019) about what he called the sensual curriculum. This approach to curriculum studies is partly rooted in aesthetic education, and partly in critical studies. Gershon insisted that the sensory cannot be separated from the political, and emphasized the value of explicitly attending to the senses in schools for dealing with critical issues related to class, race, gender, and sexuality.

Translating Senses into Photographs

Figure 51

Response to Mission “Senses” by Supremeleaderkimmjongoink

Supremeleaderkimmjongoink referring to Figure 51: I guess when I took the time to think about it, it really was about the senses, because of the colour and vibrancy, and how the flower smells. You have such a vibrant colour that you can distinguish it from anybody else, so that uses your sense of vision, and I can think back to and really remember how the flower smelled, so that uses your sense of smell.

In the above case, the mission "Senses" made Supremeleaderkimmjongoink aware of the smells and colours in a photograph he had previously taken. The phrase "senses" prompted him to notice, and later talk about, the smells present in an image in his camera roll. In his image, Supremeleaderkimmjongoink used vibrant red to emphasize the colours and smell of the flower. This student's reflection on his post highlights a number of key points about the translation of the senses into photography.

First, photographs can evoke multiple senses. This is known in the literature (Howes, 2003, 2005, 2011; Pink, 2007, 2008, 2009), and also a number of students described perceiving non-visual senses in their photographs after viewing the Sense Missions. In such instances, the prompts, which consisted of a word and an image, affected students' sensory perceptions. It follows that multiple senses can be conveyed through photography. In the case of Supremeleaderkimmjongoink, conveying the strength of colours and odours required applying effective compositional and editing techniques. This reaffirms the central theme of this chapter that there is a symbiotic relationship between photography and sensory perception.

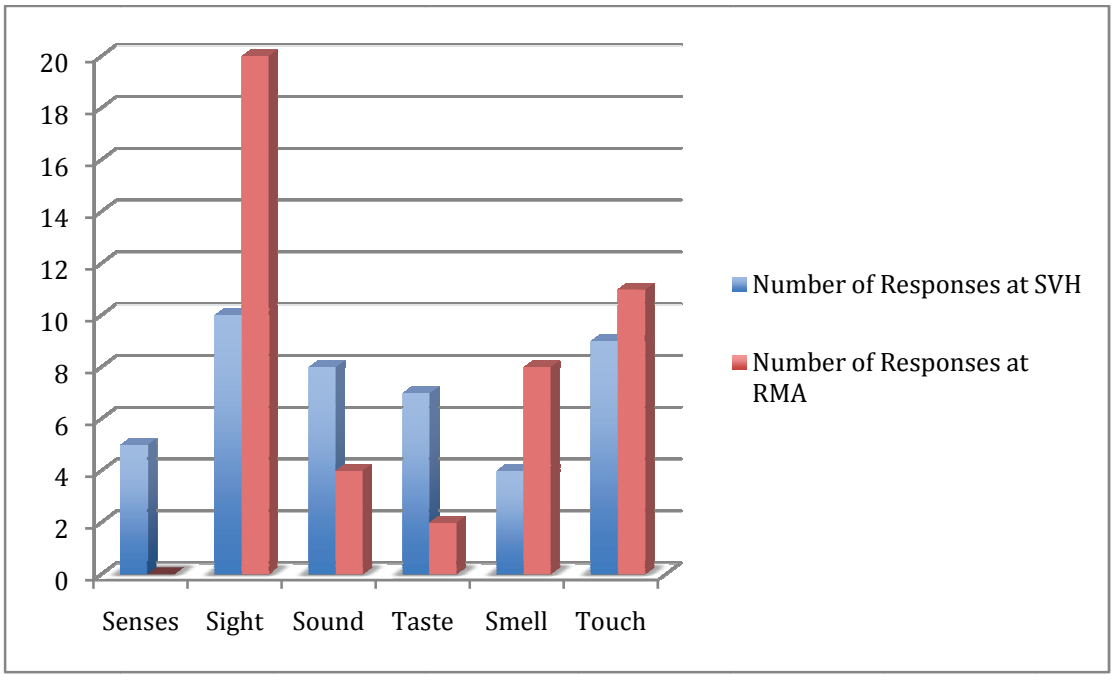
The central question addressed in this section is how one effectively translates the various senses into photographs. First, I focus on the diversity of reactions of students at SVH and RMA and provide various examples of how students dealt with the challenge of translating different senses into photographs. In my analysis, two key factors stood out that helped students deal with the challenge of translation: the choices of words and images for creating Sense Missions, and the

sensorium of the environment of learning and photography. In terms of the missions, using sensually evocative language, and providing visual models were helpful. An important factor for students' engagement with the sense was the sensorium of the places and time of the project. The students' critical reflections on their schools during the Sense Walks described above are one illustration of this point. In the following sections, I describe some of the students' challenges with translating each of the five senses, starting with the most difficult senses to translate — smell, taste and sound—and move to the easiest—touch and sight.

One clear observation in my analysis is that some senses were more easily translatable into photographs than others. To get an impression of how easily translatable students found each of the senses, I looked at the number of visual responses to each of the sense missions at both schools (Figure 52).

Figure 52

Numbers of Response to each of the Sense Missions



Students most readily responded to "Sight" given that photography is a visual medium and less translation is required. Touch could be more easily captured visually by finding examples of various textures and surfaces. Sound, Taste and Smell, on the other hand, received fewer responses because they are more difficult to capture visually. During interviews, the students generally did not respond positively to smell, taste, and, to some extend, sound. Students at both schools found smell and taste particularly difficult to photograph:

Constellation.xx: Smell and taste were hard. I don't think I did them either, but I did sight.

Cassie_jones23: (I didn't like the) Sense missions. It's really hard to post about what you taste and smell. I participated in Sound. But the sense one was really hard to find something interesting to post, so it wasn't motivating me.

Chriscrossmillhill: (I didn't like) Senses. Specifically, Taste and Smell. Those were challenging. It's hard to take a picture of smelling something or tasting something. It was quite a challenge for me.

Bbblkodnnd: I didn't like Smell. I don't know how to take photos for smell.

Jxexa: Taste and Smell, really hard! Didn't know how to take a picture of taste or smell.

These statements make it clear that students found taste and smell quite challenging.

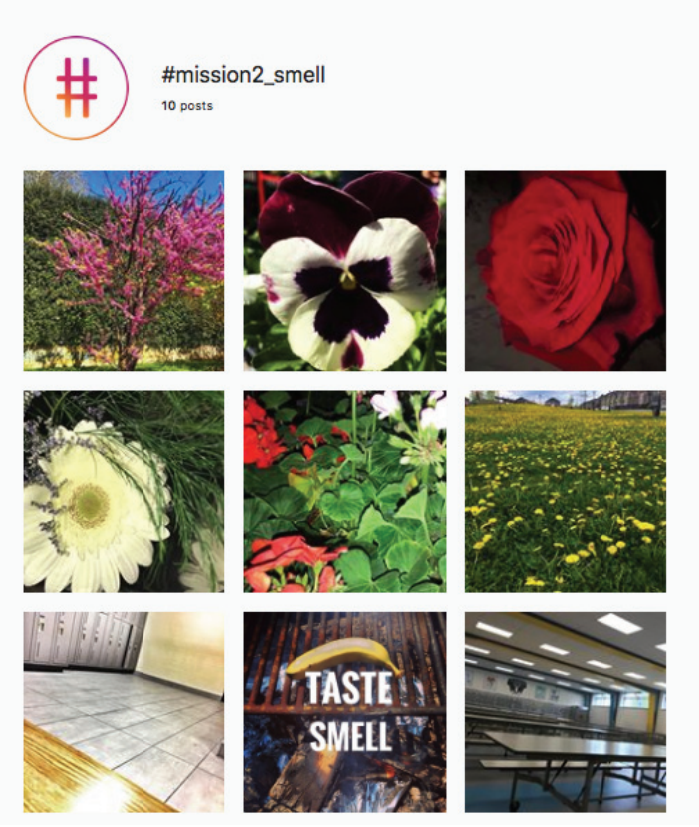
This evidence suggests that "Smell" and "Taste" were clearly unpopular. In my analysis, I found the comparisons of the students' accounts of photographing smells and tastes, to their visual responses to these and other similar missions to reveal important aspects of doing photography about the senses in everyday environments.

Smell

While the sense of smell received a great deal of attention during the school Sense Walks at both schools, this prompt received only four responses at SVH and eight at RMA. A higher number of responses at RMA is largely due to the fact the project took place in May when flowers were blooming in Montreal (Figure 53). The time during which the project occurred had a significant impact on the students' response. This highlights the importance of taking into consideration the sensorium, the spatiality, and the temporality of the environment of learning. In many instances, soundscapes and smellscapes change with the seasons. Developing effective sensory prompts requires careful consideration of the sensorium of the environment in which one is doing photography.

Figure 53

RMA Responses to Mission "Smell"



In the case of the flowers, students used the common strategy of identifying and photographing the object that emitted the sense. The challenge many students had with this sense was that smells could not be seen. One can identify the source of a smell, but visually capturing smells is much more challenging. When I asked the class at RMA the question of how one can photograph smell, I received the suggestions of photographing "steam coming out of food" from one student and "garbage bags" from another. Supremeleaderkimmjongoink offered a literal and somewhat metaphoric visual response to "Smell" by posting an image of a cloud of smoke leaving from an indistinguishable face (Figure 54). Steam and smoke were two specific subjects that students suggested could be photographed to visually capture the sense of smell.

Figure 54

Response to Mission "Smell" by Supremeleaderkimmjongoink

Taste

Although the mission "Taste" received very few responses, the related missions of "Food," "Savoury," and "Sweet" were well received. A key difference in my approach to this theme between the two phases was the inclusions of the theme of food at SVH, which was omitted at RMA and replaced by the missions "Savoury" and "Sweet" (Figures55 & 56). These photographs gave students the chance to express part of their identity by showing what they liked to eat, and also, in some cases, show where they like to hang out.

Figure 55

Responses to Mission "Taste" at SVH

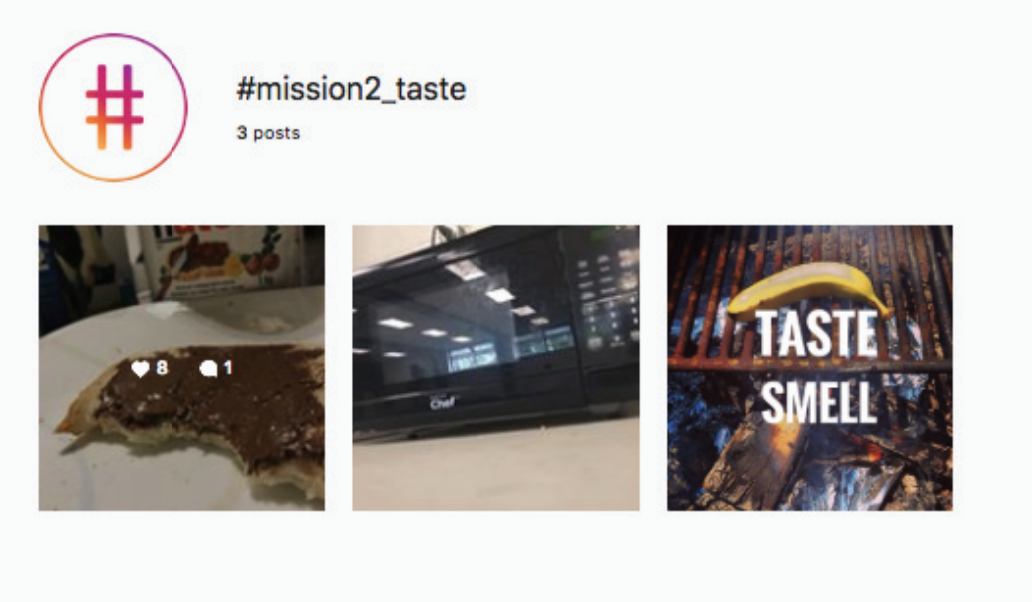
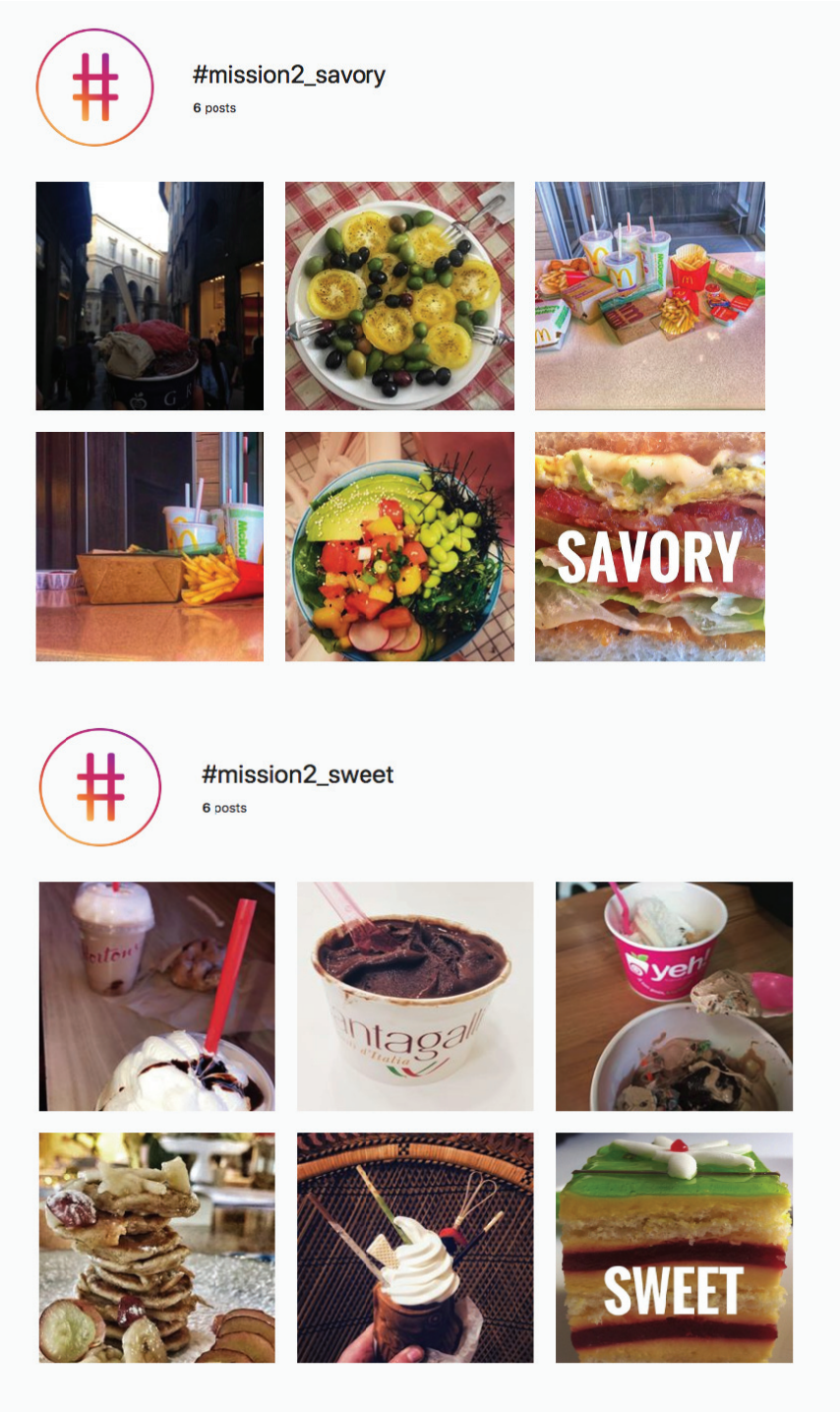


Figure 56

Responses to Missions "Savoury" and "Sweet" at RMA



I found students' responses to "Taste" to be somewhat surprising given that the mission "Food" was one of the most popular during phase 1. I expected these two missions to generate

similar responses. While many students posted photographs of food, few identified the specific mission of "Tastes" to be creatively productive. The replacement of the mission "Food" with missions "Savoury," and "Sweet" turned out to be an effective strategy. These two missions explored the common Instagram trope of taking food pictures but asked students to think about how to convey the sense of taste using photographic techniques and editing. The mission yielded visually and thematically interesting responses. This underscores the importance of language in developing prompts. Students posted more readily in response to the familiar sounding theme of food. However, more nuanced and specific language that vividly evoked one or more senses was an important factor in students' engagement with the theme of the senses.

Sound

Figure 57

Response to Mission "Hear" by Cassie_jones23

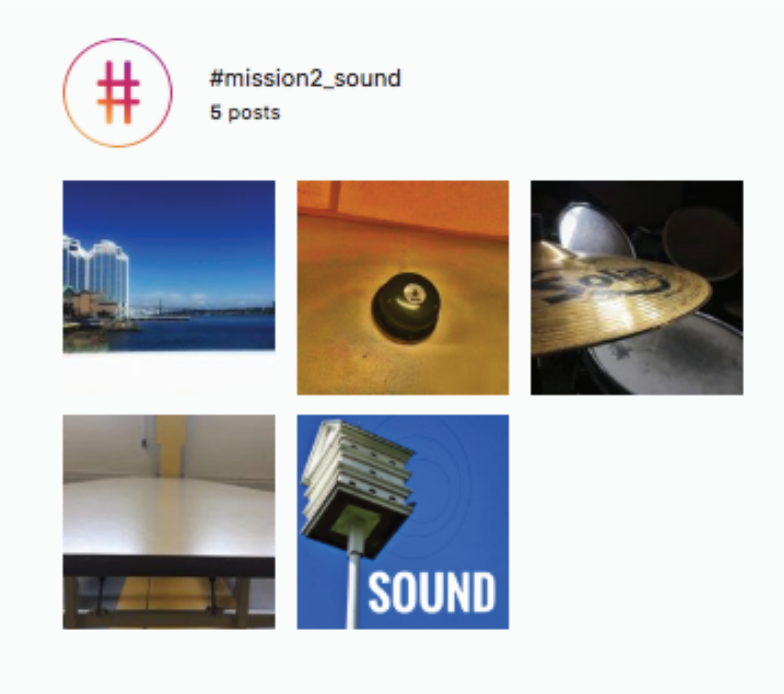
Photographing sounds proved quite challenging for many students. Sound received eight visual responses at SVH and four at RMA—the same as "Smell." The higher numbers at SVH was partially influenced by the listening activity we did at the auditorium as three students posted images from that space (Figure 57). Taking the time to go to this space during the Sense Walk positively impacted students' engagement.

During post-interviews, several students talked about the challenge of photographing sounds. Students had various suggestions on how one can capture something that is ethereal. At RMA, one student suggested to the class that one could draw sound waves to represent sound in a photograph, which is the strategy I had used in my photograph. The teacher suggested using Snapseed to create a wavering effect. Waves visually represent sounds. Photographing waves, or using editing to add waves, are one way of dealing with the challenge of translating sounds into visual images. Sound artist Rupert Cox deployed similar tactics to visually represent sound for the art-science collaboration called "Air Pressure." For this project, Cox and Carlyle (2013) measured and created multimedia representations of sound pollution near Narita Airport in Japan. He used photographs to document the sound that resonated in the exterior spaces of farms near the airport by capturing the effects of sound waves on water, grass, and trees. Capturing the effects of sound waves, and adding effects in editing are some methods of representing sound.

At SVH and RMA, the most common strategy used by students to capture sound was to photograph something that made a sound. To capture sounds, students photographed the schools' bell, school hallways, a city bus, and many musical instruments (Figure 58).

Figure 58

Responses to Mission "Sound" at RMA



Touch

Touch was the second most popular of the Sense Missions, after sight. We did not discuss touch in-depth at SVH or RMA besides the instructions to "find textures, surfaces and things that make you want to touch them." The frequency of responses can be in part explained by the relative ease of translating textures, surfaces and the act of touching into a visual image. Student photographs represented the textures of trees a soccer pitch, towels, animals and water, among other things (Figure 59).

One way of represent touch was to show hands. Bbblkodnnd, for example, talked about how this mission prompted her to post this image because her hand was in it. In addition to the hand, this image is provocative of the sensations of touching a prickly planet (Figure 60).

Figure 59

RMA Responses to Mission "Touch"

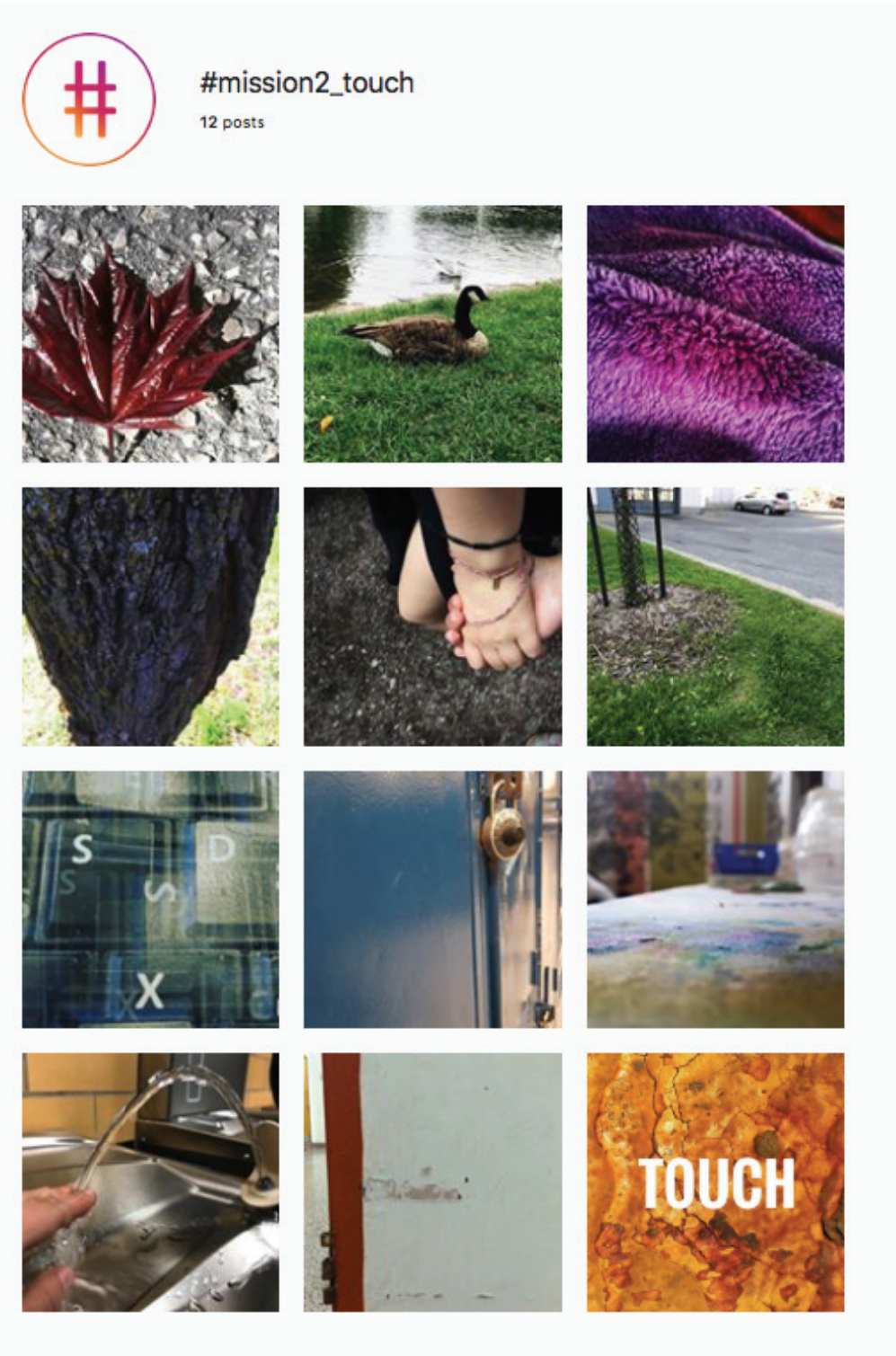


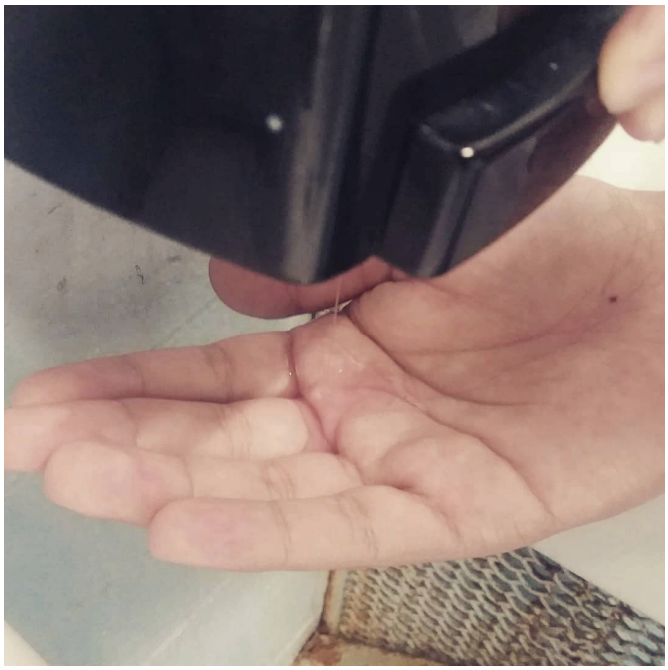
Figure 60

Response to Mission "Touch" by Bbblkodnnd

Several of the responses to this mission were taken during the school walks. During the photography time at SVH, Cloverfieldproject walked around the school and took several pictures that included his hands touching anything he could. This included hand-soap, a microwave door and a locker handle. Cloverfieldproject interpreted this theme literally to observe and photographically report things he could touch in his school (Figure 61).

Figure 61

Response to Mission "Touch" by Cloverfieldproject

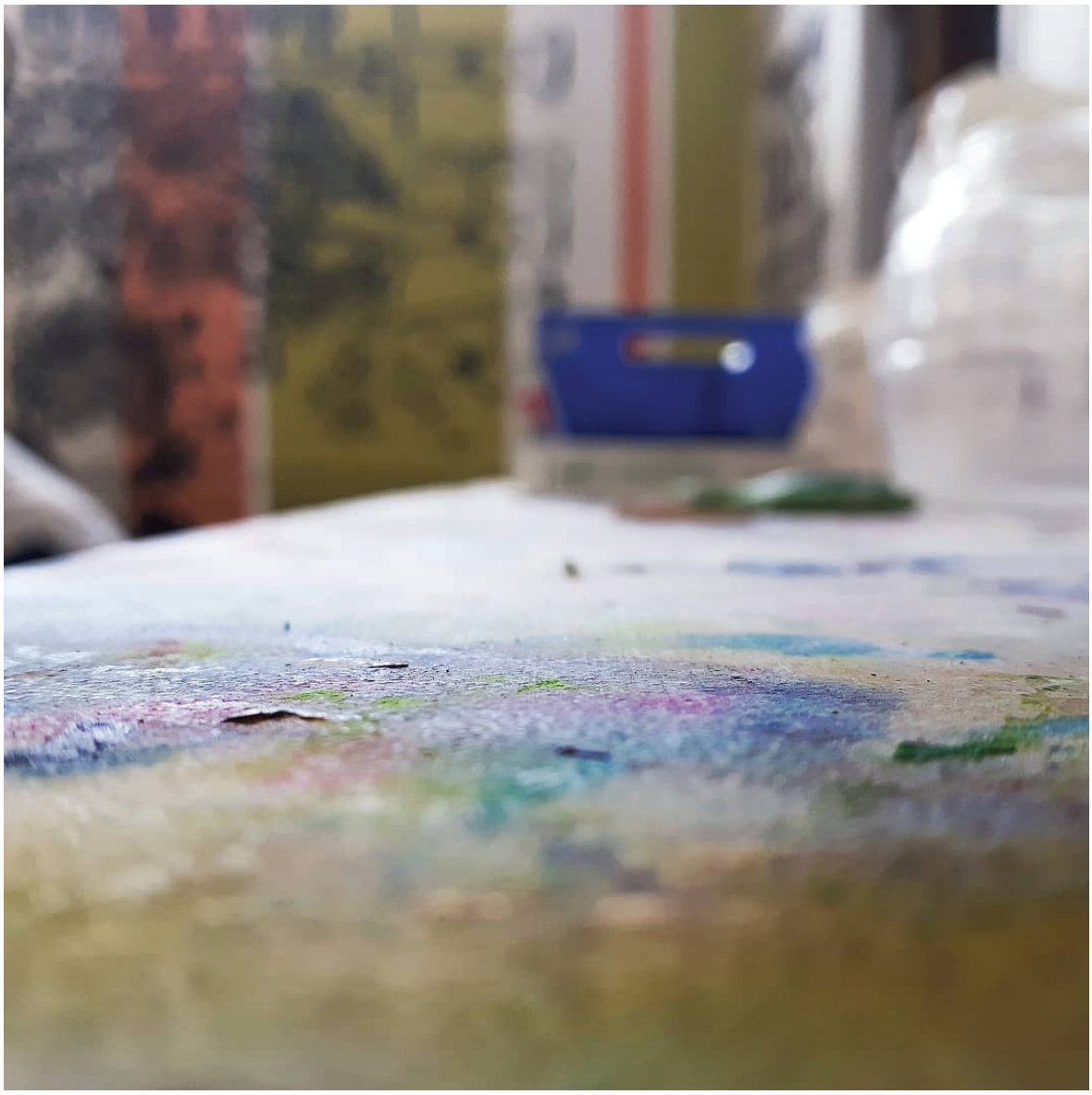


In phase 2, Barthalamue_velvatine came up with the idea for his photograph during the school walk. For him, taking the photograph for "Touch" involved a great deal of thinking and deliberate decision-making (Figure 62). He later explained,

> I spent a while thinking how can I show touch, texture, in such a way that I'd be different. Earlier that week, I was grabbing stuff off that table (in the art class), and that table's dirty. It has a bunch of paint from past projects, past years. It just felt really weird, so after awhile of walking around school (during the school walk) I decided why not this because you sort of see the paint, you see the little bumps on the table. I really liked the way (the photograph) came out.

Figure 62

Response to Mission "Touch" by Barthalamue_velvatine



Barthalamue_velvatine also spent some time editing the image. During one class, he approached me for feedback on how he had used the blurring tool to bring emphasis to the middleground of the image. This image is one example of a students' response to the theme of touch that attempted to visually convey the textures of a surface.

Sight

Figure 63

Response to Mission "Sight" by Jxexa

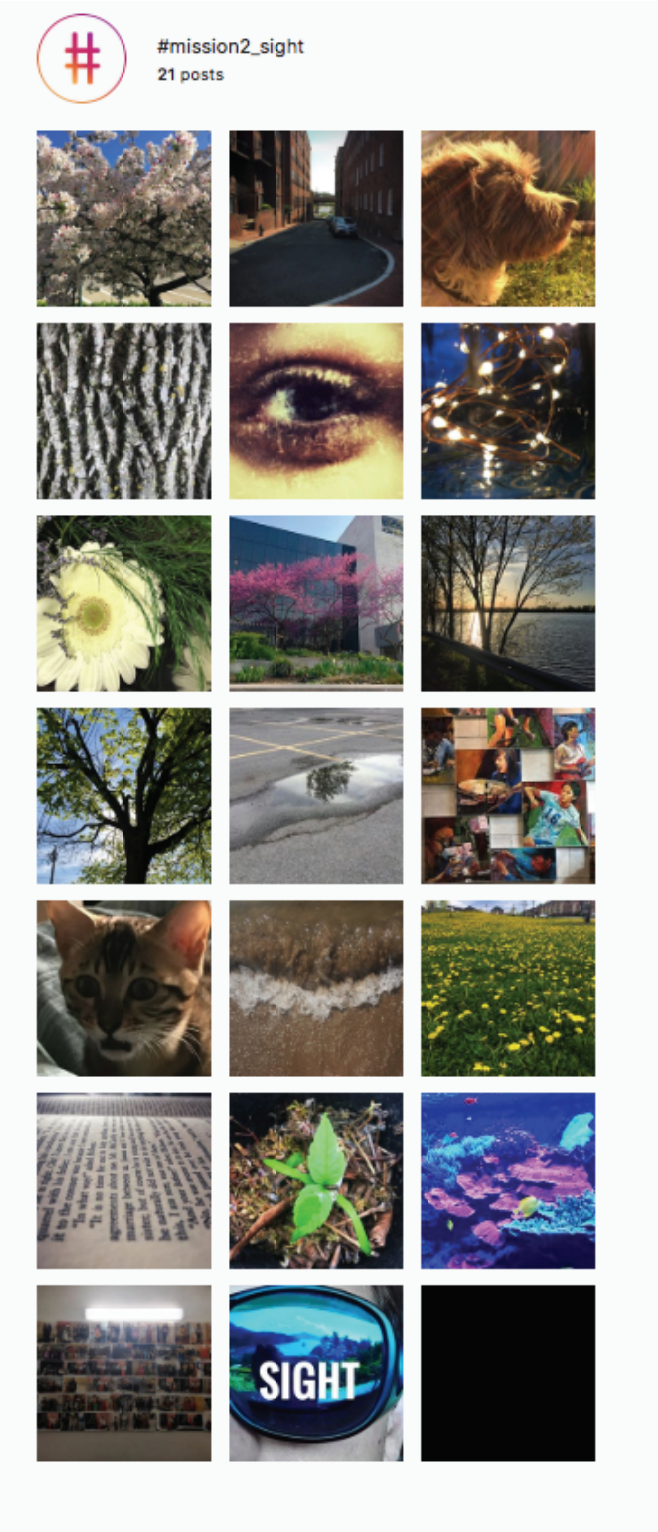
Figure 64

Response to Mission "Sight" by Cardinal

Sight was by far the most popular of the sense missions with 10 responses at SVH and 20 at RMA. Many students represented this sense by photographing things that they noticed around them. Lights and colours were among the most common visual elements that can be observed in these images. Jxexa captured the rays of the sun through flower leaves (Figure 63) and Cardinal used editing to emphasize sunrays bathing a dog (Figure 64). Other students posted images of a night cityscape, sunset on an airplane, and sunbeam coming through a sky ceiling at their school. A few posted images with vibrant colours and some included sight and smell together for images of flowers and trees (Figure 65).

Figure 65

Responses to Mission "Sight" at RMA



Conclusion

In this chapter, I have discussed the relation of the senses to photography. I began with a discussion of students' feedback and engagement with the Sense Mission and Sense Walks. Several students and the teachers talked about the Sense Missions as positive and productive creative challenges for doing photography. These missions also presented the challenge of translating different senses into the visual medium of photography. I described some ways students dealt with the challenge of translating the senses into photographs and suggested some factors to consider that can help with translation, including language, environment, and modelling.

A central theme of this chapter has been that teaching photographic techniques was critical to student engagement with the sensorium in their everyday environments. Moving together in physical space also played a positive role. The Sense Walks, particularly at SVH, were effective in enabling conversations among students about the spaces of their school. Smell was a big deal at both schools. Applying the theme of the senses to the spaces of the school, created opportunities for critical reflection on the students' everyday educational environments. This reveals the power of sensory education. Paying explicit attention to the senses can engage a group of learners in visual and verbal conversations about their attitudes, beliefs and personal responsibilities towards their school, or other everyday spaces.

My experiences at SVH and RMA have convinced me of the importance of explicitly attending to the sense. Explicitly attending to one specific sense at a time is valuable for learning in art. For one, this is an effective way of noticing, focusing on, and becoming aware of one's relation to their surroundings. Capturing and sharing aspects of the sensorium in everyday spaces through photography presents opportunities to express one's perspectives, preferences and attitude toward their spaces. Sensory engagement is enhanced by the development of

photographic skills. Simultaneously, photographing the senses presents opportunities to think creatively, and develop photographic techniques and approaches.

CHAPTER 8 — CONCLUSION

Summary of Findings

I used the methodology of Design-Based Research (DBR) to design educational interventions for the integration of mobile sensory photography and creative cartography in art classrooms. I examined these interventions by collaborating with two art teachers, Rosegram and Cardinal, and their art classes in two different Montreal high schools. The aim of this research was to use the educational tools of mobile sensory photography and creative cartography to connect youth to their everyday spaces.

A central question in this research was how youth's perceptions and engagement with their everyday surroundings shifted by engaging in a curriculum on mobile sensory photography and creative cartography. I found these activities made students notice their everyday environments and also become aware of their relationships to these spaces. There were a number of key contributing factors that lead to these transformations including the themes of the senses, teaching photography skills, being together in physical spaces, and collective online mapping.

This was one of the main affordances of this curriculum. Photography and mapping were effective tools for connecting youth to the everyday places of their schools and neighbourhoods. Engaging in these activities led to what I have described as spatial learning. There were two critical limitations. The use of technology in the classroom generally provides a number of challenges. Both collaborating teachers were aware of this and pointed out factors such as distraction, technical issues, and inconvenience as disincentives for using smartphones and computers in their art classes. I also found this to be true during the fieldwork. I experienced issues with monitoring the online social media space at SVH and numerous technical issues with using Google My Maps for collective online mapping at both schools. Despite these limitations, I found the activities of mobile sensory photography and collective online sensory mapping to

have great value in engaging youth with their surroundings and enabling a group of young people to learn about each other.

Another goal of the research was to identify the characteristics of the spatial and collective learning that occurred as a result of mobile sensory photography and creative cartography. In terms of the former, my findings are consistent with the MonCoin project (Castro, 2019). Images circulating within a peer-learning networked space acted as teachers that affected the learning of the collective. In this dissertation, the theme of the senses was added to use this approach to collective learning for the purpose of enabling spatial engagement and learning. It became apparent that the development of artistic photography skills was integral for spatial learning in this project. Taking on an artistic temperament enriched spatial engagement. Collective online sensory mapping was another factor for spatial and collective learning. These maps visualized the spatial relations within the classrooms. In these maps, individuals and collectives expressed themselves in relation to local and global spaces. This led some students to articulate particular things they noticed about their peers and their class as a collective.

Reflections, Implications and Recommendations

In the following sections, I expand on insights gained from this research in relation to three main themes: Spatiality, the senses in Art Education, and creative and collective mapping. I outline some of my reflections on what I have learned from the process of reading, doing fieldwork, analyzing data and writing this document, and how I have since applied these lessons to my professional life. The ideas discussed here have had profound implications for me as educator and researcher. I also believe many of these insights are valuable for teaching and learning in various other contexts in the contemporary era.

Spatiality of Learning

Spatiality is an essential part of all teaching. Experienced teachers implicitly understand the importance of structuring the spaces of their classrooms to enable various modes of interaction among learners. As has been argued throughout the dissertation, spatiality is also temporal. Teachers also understand the critically of structuring time. Cardinal, the teacher at RMA, pointed out to me on numerous occasions the difference between how her class behaved during the first versus the last period of the school day. Learning collectives have different qualities in the morning and the afternoon, and also at the beginning and end of a school or semester. Time of day, seasons, and the sequencing of learning events are all implicated in the learning process. This is understood implicitly; and, as a result, of my research experience, I am now convinced of the value of explicitly attending to the spatio-temporality of learning because this empowers educators to make effective decisions about how they run their classes and curricula.

For this research, the spatio-temporality of learning was all the more pertinent given the integration of mobile devices in the learning processes. Mobile devices enable different modes of asynchronous and synchronous connectivity, which can expand the space and time of learning beyond the confines of the classroom. This necessitated careful thought and consideration of how I structured physical and online spaces and interactivity to enrich learning. Thus, spatiality is a critical consideration for teaching in general, and for mobile, online and blended learning, specifically.

Generally speaking, I have found the notion of learning as spatio-temporal events to be invigorating for my teaching. Massey (2005), theorized places as spatio-temporal events in order to acknowledge the specificity and the multiplicity of trajectories that co-constitute places. I have applied this notion to learning because learning also involves negotiations among

multipletrajectories that coalesce in space and time. Viewing learning in this regard has allowed me to acknowledge the uniqueness of the individual and collective learners that I encounter in my professional life.

This became clear to me in the fall of 2019. During this time, I was thinking deeply about the role of collectivity and spatiality in my dissertation. At the same time, I was teaching a TESOL (Teaching English to Speakers of Other Languages) training course over September to a group of aspiring English teachers. I had taught this course many times and knew the curriculum inside and out. Under such circumstances, it is easy for me to go into autopilot mode, and deliver the curriculum based on what worked before. During these classes, I started thinking about my interactions with individuals and collectives as events unfolding in space and time. I began to notice how the individuals in the class shaped the learning of the collective, and the collective shaped the learning of the individuals. Learning was a process that evolved and transformed in time. These thoughts helped me as the teacher to acknowledge the uniqueness of that particular class as a learning collective, and each moment as an event that was full of possibilities for the emergence of the new.

In this experience, the curriculum that I had taught before was merely the map. Learning was the experience of using this map to navigate through the terrain, which were the existing and emerging relationships among a group of learners in space and time. Learning presented opportunities for encounters the multiple trajectories of a group of individuals who joined together for a brief moment in time, in a physical classroom environment. Learning was alive and full of possibilities. As a teacher, I was open to the unintended curricula, which can be as valuable as the intended ones. This meant allowing conversations to veer off the course content, discussing personal experiences, aversion, and welcoming negotiations when they lead to

productive conversations. These experiences have persuaded me that there is a tremendous value for all teachers to think about their classes as spatio-temporal events.

Spatiality is also a vital consideration for mobile, online, and blended learning. The curriculum of "Map My World" was largely designed to enable interactions in the online spaces of the closed social-media network, and collective online mapping platform. I was, however, cognizant of the importance of aligning in class and online activities, and developed the curriculum to incorporate interactions in physical spaces to enrich interactions online. The degree to which physical interactions motivated engagement online was greater than I had expected. Being together in physical spaces was essential for the students' learning and engagement in this project. Examples of this included walking together in the schools and surrounding areas, and one-on-one interactions between teachers and learners. As such, I am a strong advocate for the notion that face-to-face encounters are vital for effective teaching and learning.

It is all the more important to stress this point given the reality of education at this moment. At the time of writing, universities and schools have moved all of their educational activities online due to the COVID-19 global pandemic. During this historic moment, online teaching and learning have become the only option in many places. This reality has made more evident many of the benefits and limitations of online education. I have always believed online learning offers immense and wonderful potentials for education. This had been a core motive for my research. However, my experiences have also illustrated the limitations of online learning spaces. One key limitation is the lack of face-to-face interactions, which I found to be essential for students' engagement and learning in "Map My World." It is reasonable to speculate that in the future online learning will become more commonplace in many fields. Within this context, I am a strong advocate for the critical role of face-to-face interactions for teaching and learning, in general, and mobile, online and blended learning, specifically.

The Senses in Art Education

In chapter 2, I described how the film *Parasite* used the scents of the members of the poor family as a marker of their social class. This smell was a critical element during the climax of the movie. I can think of many instances in films where there is a cutaway to a delicious hot dish or dessert during a tense and important scene. In film, food can connote culture, comfort, luxury, comradery, culture, or deception. A good illustration of this is a restaurant scene in Tarantino's "Inglourious Basterds." In this scene, Landa, a character nicknamed "Nazi Hunter," is interrogating Shosanna, a young Jewish French woman. Shosanna knows Landa as the killer of her family when she was a child, but she does not know whether Landa knows her secret identity. At the beginning of their conversation, Landa insists on ordering a strudel for each of them. The two strudels arrive in the middle of their conversation. Landa realizes he had forgotten to order cream and insists they wait for the cream to arrive before touching the delicious treats. Once the cream arrives, they continue chatting and eating, and the conversation starts to take a more relaxed tone. Landa lights up a cigarette later, and, at the end of the conversation, puts it out on what is left of his strudel and walks away. Shosanna is relieved. In this scene, the contrast between the tense conversation and the decadence of strudel creates multiple layers of complex and conflicting emotions in the viewer. This is part of the affective and full-bodied experience of watching a film. Skilled filmmakers create rich sensory experiences to engross viewers and involve physiological reactions in the act of looking. In these cases, looking is a multi-sensory experience. This principle is not limited to film. It also applies to other visual media such as painting or sculpture.

In this research, I explored the senses in relation to photography, and found that there is a strong symbiotic relationship between artistic photography and sensory engagement with one's surroundings. The challenge of translating their sensory experiences into photographs gave

learners a chance to apply their creativity and skills, and, simultaneously, prompted them to notice, focus on and become aware of their daily environments. To engage students' in the theme of the senses, it was vital that I addressed technical photography skills, and provided models. Sharing images in educational peer-networks, and walking together in physical spaces were also essential for student engagement.

During the Sense Walks in the school, for example, talking about the smells of the school was a preoccupation of some students. In response to this theme, a few posted photographs that presented the school in a critical light. These observations made me attuned to the importance of the senses in the environments of schools. There are scents, tastes, sounds, and sights that are integral to one's experiences of places. Some of these shape daily life, yet they are rarely discussed in polite conversation. I believe there is value to attending to senses in relation to everyday spaces such as schools. Through sensory photography and mapping, one can express one's perspectives and attitudes towards these shared spaces. This can present openings for conversations about one's rights and responsibilities in relation to shared spaces.

After the completion of fieldwork in spring 2018, I applied the methods of the Sense Walks and Sense Maps in different educational contexts. In November 2019, I did a short-term residency at the Montreal Museum of Fine Arts. I was invited as an artist and researcher to run a workshop with Concordia graduate students to reinterpret and remix the museum's collection. To begin the workshop, I led participants on a Sense Walk through a section of the museum and asked them to focus on and write down what they sensed in their surroundings through each of the five senses. In the exhibition space, I observed participants slowing down to take in each artwork. They were reflecting on the visual art objects within the context of the museum space with the entire bodies.

The reaction of participants to this exercise included those who felt the sensory prompts enabled them to have rich full-bodied encounters with the artworks and exhibition spaces and some who felt the five senses were limiting. This sensory categorization can be useful, but sensory experiences often defy such categorization. After the groups reflected on the Sense Walk, participants were asked to work in groups to map and photograph what they sensed in the museum's various exhibition spaces. In their artworks and proceeding discussions, participants expressed their diverse perspectives on their experiences in the museum spaces, which were coloured by their cultural backgrounds, sexuality, abilities and disabilities, and other factors. Several discussed how the museum controlled and monitored their bodies, and their sensory experiences. Attending to the senses within the spaces of a Fine Arts museum impacted participants' engagement with the artworks by slowing them down, and also made them aware of how the space impacted their bodies and interactions with the artworks.

In art education, paying explicit attention to the senses can be valuable in a number of ways. The theme of the senses can be used for art appreciation and art-making. For viewing for artworks, this provides a different entry point to engage with visual art. Sensory photography in my research, and cinematic artworks such as Parasites, are two examples of how the senses can lead to the creation of engaging visual art. Moreover, the acts of observing, photographing and mapping the senses are always intertwined with the spaces in which these activities occur. This theme can be valuable for critical engagement with spaces, as suggested by some educational scholars (Gershon, 2011, 2019; Wozolek, 2019).

Creative and Collective Mapping

For me, one of the most valuable insights from this research is the understanding of maps as representations of the subjective, interpersonal, social and political realities of individuals and collectives. In my interviews with students and analysis of their collective maps, there was

evidence that the tool of collective online sensory mapping was valuable for spatial, collective, and peer-to-peer learning. Students learned about their everyday environments by designing, going on, and photographically documenting Sense Walks in their neighbourhoods. Students learned from and about each other by sharing geo-tagged images on collective online maps. In some cases, posting images of Google My Map revealed students' connections to different parts of the globe. Students posted images in other countries, which, in some cases, were their former homes, and, in other instances, places they had travelled.

During post-interviews at RMA, several students talked about gaining new insights about their peers from the locations they had identified on the collective online map. Where one hangs out reveals something about their personality, and the knowledge about others could potentially lead to students finding common connections among their peers. The act of collectively sharing images that are connected to places on a collective online map has the potential to create a sense of community among groups of learners.

These findings have convinced me of the potential of collective online mapping to empower individuals to express their identities in relation to local places and global spaces, and to build communities across space and time. Thus, I believe collective online mapping to be a valuable educational tool. However, I am also aware of the technological limitations, which are an essential consideration for implementation in school settings. For future inquiry, I intend to use this tool to enable different learning communities to connect with each other and learn together about their various connections to local places and global spaces.

Future Directions of Inquiry

Two related questions that arose from that doctoral research, which I believe to be extremely pertinent in the contemporary context. Firstly, I would like to examine how mapping can be used in educational settings to connect individuals in different communities across

Canada. In my dissertation, Collective Online Sensory Mapping (COSM) proved to be an effective tool for encouraging youth to attend to their everyday surroundings and to learn about each other. This research has convinced me of the power of maps for exploring one's surroundings, expressing one's identity, and learning about others. It is these potentials of mapping that I aim to build on for future research.

Across Canada, there are significant similarities and differences in the environments that urban, suburban, rural and Indigenous youth experience in their daily lives. There is immense value in enabling learning interactions among the diverse communities in this country. This future research program shares the goal of *Place-based Education* (PBE) to connect teaching and learning to local communities (Ball & Lia, 2006; Gruenewald, 2003; Gruenewald& Smith, 2008; Sobel, 2004). It also builds on this dissertation, and the research of others (Caquard, 2019; McCoy, Tuck, & McKenzie, 2016; Taylor, 2014) to develop educational methods for using cartography as a tool to tell personal and communal stories about people and places.

The second question is a response to the current situation. During the COVID -19 pandemic, the phrase "being together while staying apart" has become a common refrain. Information Technologies and online networks have enabled citizens to connect with each other while following the mandate of social distancing. In this context, there is an urgent need for educational activities that allow individuals to build learning communities online, while they are separated in physical spaces. This is an important value of collective online mapping, which allows a group of individuals to learn together, and to build communities while staying in different geographic locations. For future inquiry, I aim to further investigate how this tool can be used to create meaningful connections online among people who are apart in physical spaces.

Orientations for Using Smartphones in Art Classrooms

I am an advocate for the use of smartphones in classrooms to enrich teaching and learning. I acknowledge this is a controversial position, and for good reasons. Smartphones are a major source of distraction in our modern world. For this and other reasons, some governments have gone so far as to ban the use of smartphones in schools. On the other hand, this technology is an essential part of the lives of youth today. I believe educators can have a significant positive impact on youth by embracing these technologies in thoughtful and creative ways in classrooms. In my dissertation, I found that the intentional integration of smartphones led youth to notice and pay attention to their everyday surroundings, expanded their learning spaces, encouraged them to go outside and explore, connected them to their peers, and enabled them to learn from and about each other. These are some of the valuable affordances of smartphones for Art Education. Smartphones are particularly well suited for Art Education. Creating art often involves aesthetic engagement with one's surroundings, and communicating personal experiences and narratives. My research has convinced me that smartphones are useful for both purposes because of their mobility and networking capabilities. I embolden Art Educators to continue thinking about ways of using these tools to enrich human connections to places and others.

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Appendix A

CERTIFICATION OF ETHICAL ACCEPTABILITY FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Dr. Juan Carlos Castro

Department: Faculty of Fine Arts \ Art Education

Agency: Social Sciences & Humanities Research Council
Concordia University

Title of Project: MonCoin: A Mobile Application for Fostering Civic and Educational Engagement

Certification Number: 10000635

Valid From: June 14, 2017 to: June 13, 2018

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

_____

Dr. James Pfaus, Chair, University Human Research Ethics Committee

Appendix B

Pre-Project Student Interview Questions

We are going to take 10-15 minutes for this interview. If there are any questions you don't want to answer, just say "pass." The interview is confidential, meaning we will not identify you when sharing the results. However, if you share something that tells us you might hurt yourself or someone else we will have to talk with the school councillor. I will now turn on the recorder. Please introduce yourself using the pseudonym you choose for the project [turn on the recorder]

Hello, today is _____. My name is _____. Please introduce yourself with your pseudonym. [wait. student says pseudonym]. Thank you.

Motivation in School

1. What motivates you to do well in school?
2. What can get in the way of you doing well in school?
3. What do you hope to learn in school?
4. What's your favourite class? Why?
5. Do your peers ever help you with your learning? Please give one example.
6. Do you ever help your peers with their learning? Please give one example.

My Surroundings

1. Where is a space you like to spend time in your school? (by yourself or with friends)
2. Where is a space you don't like to spend time in your school?
3. What do you like most about where you live? (neighbourhood/city)
4. What do you like least about where you live?
5. Where is a place that you feel like you can be yourself?
6. Where are some places where you feel like you're being watched?

Digital practices

1. Are there spaces online where you feel you can be yourself?
2. Are there spaces online where you feel like you're being watched?
3. How often do you access the Internet?
   a) All of the time (a few times an hour) b) Several times during the day (once every 2-3 hours) c) A few times a day (3 times a day) d) Rarely
   e) Almost never
4. How do you access the Internet? (desktop computer/laptop, tablet [ipad], smartphone)
   3. What do you access the Internet for? Information? Communication with friends? Social Media?

Mobile Media

5. How often do you use a mobile device (e.g.- smartphone, tablet)? a) All of the time (a few times an hour) b) Several times during the day (once every 2-3 hours) c) A few times a day (3 times a day) d) Rarely
   e) Almost never
6. What apps do you use most often on your mobile device?
7. Do you take many images and videos with your mobile device?
8. What kind of images and/or videos do you make? What is the content?
9. What do you post through your social media account(s) (e.g. - web links, photos, videos, written messages)?
10. Do you share your own images/video on social media? Why do you share them?

Social Media

11. How many Instagram accounts do you have? What do you use it for? Who follows you/you follow on those accounts?

Mobile mapping

12. Do you use any mapping applications on your mobile device?
13. What information do you access from a mobile map?

Mapping

14 What can you learn from a map?
15. How do you think you can use mapping to help with your learning in an art classroom?
16. How do you think you can use mapping to help with your learning in other school subjects?

Mobile devices and Mapping at School

1. Are you using mobile devices in any of your classes? Which classes? For what?
2. Do you think using mobile devices at school can be helpful for your learning?
3. Where do you think using mobile devices might NOT be helpful for your learning?
4. How do you feel about your school's rules about using mobile devices?
5. Do you have any suggestions for improving the use of mobile devices at school? In your classes?

Appendix C

Post-Project Student Interview Questions

We are going to take about 15 minutes for this interview. If there are any questions you don't want to answer, just say "pass." The interview is confidential, meaning we will not identify you when sharing the results. [turn on the recorder]

Hello, today is _____. My name is _____. Please introduce yourself with your pseudonym username. [wait. student says pseudonym]. Thank you.

Mobility

1. How often did you check our Instagram feed?
2. When did you check the feed?
3. Where were you usually when you checked the feed?

Motivation in the Project

1. Were you motivated to participate? Why?
2. What did you find that wasn't motivating about the project?
3. Did your motivation level change during the project? When? Why?
4. Because this is NOT marked were you more or less inclined to post images? Why?
5. Art you motivated in the art class?

Identity

1. Can you describe why you chose the pseudonym you did? Did you change it during the project? Why?
2. Estimate about how many of your classmates you knew online. How did you know who they were? Did you know who your TEACHER was?
3. Did being somewhat anonymous online influence your participation (motivation, sharing, posting, interacting)? Please elaborate.
4. How was posting in this account different from posting on your personal account?

The Project

1. What was your favourite mission? Why? (Mission 1, 2, Mission 3, 4)
2. What was your least favourite mission? Why? (Show me your response). What was your favourite classmate response?
3. Did you contribute to the online map with Google My Map? How was the process? Did you face challenges? What do you think you learned from doing that?
4. Was it helpful for you to do this project at the same time as your in-class studio project?

Teaching and Learning

1. What did you learn from this project?
2. Did you learn anything new about your classmates?
3. Did you learn anything about your surroundings?
4. Did you learn anything about your senses?
5. Did you learn anything about Instagram's copyright and terms of use? Does this affect how you use it?
6. Did you learn anything about making and/or sharing images?
7. Did you learn anything about maps?
8. Did you learn anything about the mapping functions of your phone?
9. Who and what helped you to learn?
10. What can you learn about your surroundings through photography?
11. What can you learn about your surroundings by mapping images?
12. How do you think Google Maps can be used as a tool for learning in the art class? In another subject?

Appendix D

Teacher Interview Questions

I will now turn on the recorder. Please think of your pseudonym and use it to introduce yourself when I tell you. [turn on the recorder]
Hello, today is _____. My name is _____. Please introduce yourself with your pseudonym. [Teacher says pseudonym]. Thank you.

Background

1. How long have you been teaching?
2. How long have you been teaching at _____?
3. What motivates you to work in education?
4. Do you use social media in your personal life? For what purposes?
5. Do you connect (friend, follow, etc…) with students through social media? Former students?
6. Do you use social, mobile and/or digital media in your art-making?
7. How comfortable are you using smartphones, social media in your teaching?

Project

1. Why did you decide to do this project?
2. Why did you choose this particular group to work with?
3. Do you think a project like this could work with another group? Why? Why not?
4. What are some factors involved in choosing the right group for this project?
5. Do you think it was helpful to do this project at the same time as an in-class studio project? What was the in-class project?

Online Participation

5. How often did you check our Instagram feed?
6. When did you check the feed?
7. Where were you usually when you checked the feed?
8. Can you describe why you chose the pseudonym you did?
9. Did being anonymous influence your participation in the project?
10. Did being anonymous influence how you approach teaching/learning online? (Did you see yourself as a teacher online, or only a participant?)

Feedback on the project

1. What was your favourite mission? Why?
2. What was your least favourite mission? Why?
3. What was your favourite post?
4. Did you have a favourite student artist? Any favourite pictures?

5. What do you think about the Google Mapping activities? Would you feel comfortable participating in that?
6. Workshops/presentations/activities I did. Which were effective and useful? Where could improvements be made?
    a. Setup and presentation on Instagram terms of use
    b. Presentation on Senses, Listening exercise, photography in school
    c. Presentation on Artist Mapping
    d. Neighbourhood Walk
    e. Google My Maps
7. Do you think your students were motivated to participate in this project? What motivated them?
8. Who was motivated? Who wasn't motivated? Why? Why not?
9. What was motivating about the project? What wasn't motivating?

Learning

13. What do you think your students learned from this project?
14. What did you learn from this project?
15. Did you and/or students learn about the following topics?
    a. their surroundings
    b. their school
    c. their senses
    d. making images
    e. sharing images
    f. maps and online mapping
16. What can you learn about your surroundings through photography?
17. What can you learn about your surroundings by mapping these images?

Future Teaching

1. How do you think Google My Map can be a tool that helps teaching and learning in an art classroom?
2. Are there any particular aspects of this project that you will use in future teaching? (sense walks, neighbourhood walks, missions, Instagram, maps)
3. Would you consider using social media in the art classroom again? Why? Why not? How?
4. Would you consider using mapping in the art classrooms again? Why? Why not? How?
5. Will you keep your Instagram account or delete it? Why?