

# **Journey of the Heart: Creating Openings Through Vulnerability**

**by  
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## **Abstract**

This thesis explores the pedagogy of vulnerability. To experience vulnerabilities in my learning, I explored art by taking risks and going outside my comfort zone to engage in art practices. Using the methodology of self-study, I examined myself as a learner and a practitioner through various art forms and changes in my practice as a result of my art engagement. Through my art practices, I embraced the creative process which opened up possibilities for reimagining how I could teach math. Looking within my own learning experiences helped me become more appreciative of the vulnerabilities in learning. I created openings in my math classroom by being improvisational and embracing moments of possibility. Experiencing vulnerabilities in my art exploration and sharing my learning process with students helped to build a more supportive learning environment for risk-taking in my classroom.

**Keywords:** Vulnerability; Self-study; Reflective practice; Arts-based methods; Mathematics teaching; Improvisation

# Table of Contents

Declaration of Committee .....	ii
Abstract .....	iii
Table of Contents .....	iv
List of Figures .....	vi
<b>Chapter 1. Introduction .....</b>	<b>1</b>
1.1. Background .....	2
1.2. Context .....	3
1.3. Why Art? .....	4
1.4. Why math? .....	8
1.5. Art as an Opening to Math Teaching .....	10
<b>Chapter 2. Vulnerability as a Site for Learning.....</b>	<b>13</b>
2.1. Sharing My Vulnerabilities .....	14
2.2. Vulnerability in Learning .....	15
2.3. Art as My Site of Vulnerability .....	16
2.4. Inquiry Question .....	18
2.5. Goals of Inquiry .....	19
2.5.1. Engage Students .....	19
2.5.2. Create Openings .....	20
2.5.3. Build Community .....	21
2.6. Uncovering My Learning Process .....	21
<b>Chapter 3. Looking Within Myself .....</b>	<b>23</b>
3.1. Methodology .....	23
3.2. Methods of Data Collection .....	25
3.2.1. Reflective Writing .....	26
3.2.2. Dialogue .....	28
3.2.3. Narratives .....	29
3.2.4. Arts-based Methods .....	29
3.3. Methods of Data Analysis .....	31
3.4. Ethical Considerations .....	33
<b>Chapter 4. My Journey in Art Exploration .....</b>	<b>34</b>
4.1. The Beginning of Painting .....	34
4.2. My Exploration of Drawing and Painting .....	35
4.3. Connecting with My Creative Process .....	41
4.4. Finding My Rhythm Through Dance .....	46
4.5. Taking Risks Through Improvisation .....	47
4.6. Sharing My Learning .....	52
<b>Chapter 5. Reflections on My Journey.....</b>	<b>57</b>
5.1. Appreciation for Vulnerability .....	57

5.2. Building a Supportive Community .....	61
5.3. Learning Takes Time .....	65
5.4. Opening Through Reciprocity .....	69
<b>Chapter 6. Conclusion .....</b>	<b>71</b>
6.1. Opening Through Vulnerability .....	72
6.2. Embracing the Process.....	73
6.3. Exploring Through Improvisation .....	75
6.4. Continuing My Journey .....	76
6.4.1. Student Perspectives.....	76
6.4.2. Teacher Vulnerability .....	78
6.5. Final Thoughts.....	78
<b>References.....</b>	<b>79</b>

## List of Figures

Figure 1.1.	Painting at Art Studio .....	6
Figure 1.2.	Exploring the Process of Painting.....	7
Figure 4.1.	My Drawing Practice .....	36
Figure 4.2.	a) Painting Exploration in Class b) Painting Exploration at Home .....	38
Figure 4.3.	Landscape Painting.....	39

# Chapter 1.

## Introduction

As an elementary learner support teacher, I became fascinated in the area of mathematics teaching. I found that many of my students often expressed their discomfort in math. This led me to explore students' stories of learning math. I started my journey wondering about how I might help students become more engaged, create openings in students' mathematical mindset and build a community within my math classroom. As my journey unfolded, I began to examine myself as a learner and a practitioner. I rediscovered my interest in art which allowed me to see new windows for connecting to students' experiences and sharing vulnerabilities in learning. Brown (2012) defines vulnerability as uncertainty, risk and emotional exposure (p. 34). In my inquiry, I explored my vulnerabilities by engaging in art practices to take risks and embrace uncertainty as a learner and a practitioner.

As I engaged in the process of art exploration through different art forms, I realized that the artistic part of me had been left behind. I started to open up and embrace the learning process, which helped me become more vulnerable with my students as a learner by sharing my experiences with them. I took classes in the visual arts and dance to engage in the creative process which brought me to possibilities for reimagining how I could teach math in my classroom. I realized the importance of looking into my own experiences of learning. I began to see learning as a process and to step outside my comfort zone to take more risks in my teaching. My experiences of engaging in the arts have helped me learn to embrace the beauty of uncertainty. Opening up myself in this way through the arts created new possibilities for me as a teacher and for the students in my classroom. I became more spontaneous in my teaching, more vulnerable with students by sharing my learning experiences, and more open to opportunities to be creative in the moment. Examples of how I created openings in my classroom will be discussed.

My journey inspired me to continue taking risks to explore my curiosities as a learner which led to a greater appreciation for my students and the learning process. It helped me appreciate that learning takes time, risk-taking and stepping outside one's

comfort zone. I realized that creating openings in my classroom involved being vulnerable with my students and opening up myself to engage in new practices. One purpose of my inquiry has been to examine the changes in myself as a learner and my teaching practice as a result from my artistic engagement. I have focused on the journey of how my art exploration opened up creative space in my math teaching.

## **1.1. Background**

In the MEd in Educational Practice Program, my inquiry involved using open-ended math journals for students to reflect on their understanding of math concepts. Even though students showed some conceptual understanding, they expressed feeling discouraged due to lack of success. Facilitating students through the writing process created an opportunity for me to connect with them which has helped me become more aware of students' interests and strengths. My interest in math has inspired me to continue to explore students' perceptions of math and how to help them become more open in their math learning. This was what initially brought me to the EdD in Educational Practice Program.

During my journey in the doctorate program, I realized the importance of continuing to discover who I am in order to better understand my teaching practice. Palmer (1998) suggests that teaching emerges from one's inwardness and that the inner self is projected through one's teaching (p.2). "Teaching holds a mirror to the soul. If I am willing to look in that mirror and not run from what I see, I have a chance to gain self-knowledge – and knowing myself is as crucial to good teaching as knowing my students and my subject" (Palmer, 1998, p. 2). As soon as the program started, I began to explore my identities as a learner and a teacher in order to better understand who I am as a researcher and my inquiry. This involved recalling and exploring my educational experiences in Taiwan and Canada.

I was born in Taipei, Taiwan. My family immigrated to Canada when I was eleven years old. I have spent most of my life in Canada, which I call home. As I recalled my stories as a learner, I started to appreciate my experiences of having attended schools in both Taiwan and Canada. Growing up in two countries has given me different perspectives on learning. Since I became a teacher, I have been working on sharing aspects of myself with students. As I recalled my early learning experiences in Taiwan, I



remembered that most of my teachers did not typically share any aspects of themselves outside of teaching with students. At the time, teachers were generally seen as the experts in their subject areas.

When I came to Canada in grade six, I noticed that teachers seemed to share more aspects of themselves outside of teaching with students. For example, they would often tell students about their families or what they did on the weekends, which helped me make more connections with them. Looking back, I realized that what they shared made them more real and more relatable to students. I wondered why my teachers in Taiwan did not share aspects of themselves outside of teaching with students.

After I became a teacher, I started to see that teaching is vulnerable. I also found it difficult to share aspects of myself with students when I first started teaching. “As we try to connect ourselves and our subjects with our students, we make ourselves, as well as our subjects, vulnerable to indifference, judgement, ridicule” (Palmer, 1998, p. 17). Palmer (1998) suggests that to reduce vulnerability, teachers may disconnect from students, subjects, and even themselves (p. 17). As I recognized and learned from my past experiences as a student, I became more aware of what my own experiences of learning bring to my practice. This helped me look within myself to begin to explore who I am as a teacher. Palmer (1998) emphasizes the importance of looking into oneself to give insight to one’s work (p. 5). “As important as methods may be, the most practical thing we can achieve in any kind of work is insight into what is happening inside us as we do it. The more familiar we are with our inner terrain, the more surefooted our teaching – and living – becomes” (Palmer, 1998, p. 5). Exploring my identities as a learner and a teacher has reminded me of the beliefs and values that are important to me such as being a life-long learner and connecting with students. These insights have helped me see the importance of continuously being reflective to align my beliefs and values with my practice

## **1.2. Context**

The context of my inquiry is important as the needs of my learners have helped to inform my practice. Denzin & Lincoln (2006) define qualitative research as a situated activity in which the observer is located in the world and making it more visible (p. 43). “This means that qualitative researchers study things in their natural settings, attempting

to make sense of, or interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2006, p. 43). My inquiry took place at an inner-city elementary school of over 500 students in a suburban city in western Canada. As a learner support teacher at the school, I teach students who could benefit from additional support in reading, writing and math at various grade levels. Many of my students are English Language Learners. I provide both small group instruction and in-class support through collaborative teaching with classroom teachers.

Going into students' classrooms to teach collaboratively with the classroom teachers has helped me better understand students' learning contexts in their classrooms. It has also opened up learning support as being part of the class and working with classroom teachers, and not just outside of the class. Teaching students at various grade and interest levels in math has helped me develop a greater appreciation for my students and deepened my own understanding of math. Since I generally teach small groups of around six students, I often have the opportunity to talk to students about their learning experiences. Getting to know my students and making connections with them by sharing aspects of myself as a teacher and a learner have become important aspects of my teaching.

### **1.3. Why Art?**

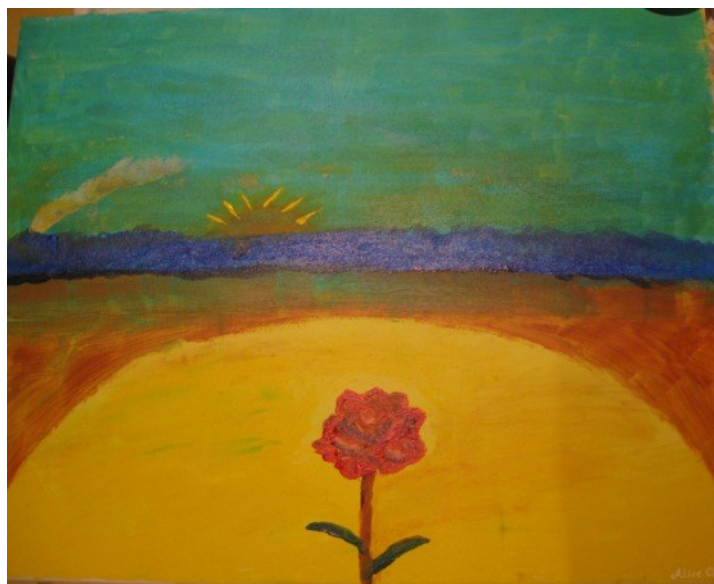
Art is my creative outlet. I have many fond memories of spending time at home on various art projects in my early childhood. I enjoyed drawing and creating art by using materials that I could find in my house. When I looked back on my early educational experiences in Taiwan until grade five, I immediately remembered that school was very structured. The focus each day was primarily on academic work. The one area where I recalled getting a variety of choices was art. I remembered being able to choose art classes that I really enjoyed such as drawing and calligraphy as electives. These classes offered opportunities for me to be creative.

After coming to Canada, I continued to enjoy art in elementary school and chose visual arts as my electives in secondary school. I remembered that I had thought about becoming an art teacher at one point. During my undergraduate studies, I did not get many opportunities to create art. It was during the Graduate Diploma in Second Language Education and the MEd in Educational Practice programs that I started to

explore using art in creative ways to express my learning. Even though I have always enjoyed creating art, this was a part of me that I somehow left behind after starting university. I have always thought about getting back into exploring and engaging in the arts someday. At the time, I was not sure why I did not continue to create art. It was not until this inquiry that opportunities for engaging with art arrived again.

Early in the EdD in Educational Practice Program, I had some opportunities to use art as a way to express my thinking and the process of my journey. This reminded me of my interest in art. I began to think about how I would like to spend more time exploring it again. One event in particular that led to art exploration in my journey was going to an art studio at the end of the first semester of the program. I tried acrylic painting on canvas for the very first time. I was not sure what was going to emerge or even where to start. I knew the theme of the event was *The Little Prince*, but I did not know what I was going to paint until I painted. Not knowing how the painting would turn out was a vulnerable experience for me. I was hesitant with each brushstroke. Though the uncertainty of not knowing how it would turn out was uncomfortable for me, I had a rejuvenating experience of just letting my painting guide me as I went along. I was surprised and inspired by how my creative process emerged.

As I witnessed how my painting unfolded in front of me, I was beginning to reconnect and see the artistic side of myself again. Brookfield (1995) discusses a transformative moment when one looks at oneself as a learner in a completely different way and becomes aware of new and alternative possibilities for oneself (p.64). My experience at the art studio was a transformative moment for me as it helped me open up to new possibilities of seeing myself as an artist again. I was surprised by what emerged from my painting since I was unsure of what to do initially or even where to begin. The experience of letting go and just letting the painting emerge as I painted was fascinating to me. When I look at my painting, I am reminded of this powerful and transformative experience. This art event was the beginning of reconnecting with the artistic part of me that had been left behind.



**Figure 1.1. Painting at Art Studio**

After my first painting experience, I was inspired to rediscover my interest in art. I talked to my students, colleagues and friends about how much I enjoyed painting. I started to consider taking art courses and looked at classes at the community centre. This idea had already been on the back of my mind for a while, since before the event at the art studio. Even though I wanted to try painting again, I did not paint until almost a year later, when I was inspired to paint during a course I was taking at the time. As I reflected on why I did not continue doing something that I enjoyed so much, I realized that I did not paint because I was focusing on what my painting would look like. I wondered about what I should paint and how my painting would turn out. As I reflected on these questions, I realized that students might feel the same way when doing math. Even though they might be encouraged to focus on the process and explain their thinking, I started to see why they might be fixated on the answer, which might make them hesitant when doing math. I realized that I was also focusing on the product rather than the process of painting, which made me hesitant to paint.

As I mentioned, I created my second painting almost a year later. I decided to go with the flow by just painting and letting it unfold as I did for my first painting. It was a vulnerable experience for me. At the time, I had been thinking about how I could help students open up their mindsets in math. I connected this to my own experience of being hesitant to paint, which was what inspired my second painting. Through my painting

process, I realized that even though my heart was telling me to paint again, it was my mind that was keeping me back from painting. This reminded me of how students' perceptions of and prior experiences in math might potentially make them hesitant to try in math. I learned from the process of painting that I needed to open up myself in order to create openings in my classroom. I needed to listen to my heart and follow my intuition in order to be open to possibilities.



**Figure 1.2. Exploring the Process of Painting**

Reconnecting with my interest in art through these initial painting experiences opened up new possibilities of learning for me. I enjoyed the process of expressing myself through art as it provided the space for me to just be in the moment and trust the process. These experiences of exploring art through painting have helped me begin to see myself as a learner. As I reflected on experiences from the first to the second painting, I realized that I needed to overcome the fear of making mistakes and judging my own work in order to let my painting process unfold. This would involve not having a product in mind of what I was going to paint. The uncertainty I experienced while painting has made me feel vulnerable which has allowed me to better relate to the vulnerability of learning something new. I began to connect with the uncertainty students might feel when learning in math. Art became an important part of my inquiry as it gave me a different perspective of teaching and learning math. I became curious in exploring

the vulnerabilities of learning through my own art engagement. Art became an important part of my inquiry and gave me the opportunity to reconnect with myself.

## **1.4. Why math?**

I have always enjoyed math as a student and in my daily life. As an adult, I have continued to engage in math in non-academic settings for enjoyment. However, it was not until after I started teaching over fifteen years ago that math became even more fascinating to me. Whenever I teach and explore math, I constantly find different ways of looking at it. This is very intriguing to me. I find it interesting when students talk about their mathematical thinking as they often share ideas that I might not have encountered before. Teaching math has deepened my own understanding of it and furthered my own exploration in the area.

As a learner support teacher, I really appreciate the opportunity to work with and get to know students in small groups. Since I teach different grade levels, I often work with students for multiple years which has helped me get to know them better. At the intermediate level, some students would sometimes express negative feelings towards their learning in math. They would often voice that they are not good in math or that it is too difficult for them. What stood out to me was that students did not usually talk about their feelings toward another subject area in the same way. This made me curious about why students felt this way about math and their previous learning experiences in math. I wanted to find ways to help students become more open to new experiences in their math learning.

To understand students' perceptions of math, I began by asking them what math is to them. I noticed that students see math as steps and rules to follow rather than exploration. They talked about math as doing worksheets and finding the right answers. Lockhart (2009) compares the present system of mathematics education to paint-by-numbers (p. 20). This idea really resonated with me as it seemed that students have experienced math as paint-by-numbers rather than a blank canvas as Lockhart (2009) suggests. I have observed that students could know how to follow steps in math without fully understanding the concept behind it. For example, when finding ten percent of a number, students have been taught to move the decimal one place to the left without understanding what this really means in terms of place value.

Reflecting on my own experiences in art helped me see the differences between paint-by-numbers and painting on a blank canvas. I realized that most of my previous art experiences were different from my painting experiences. Many of the art projects I have completed in the past had steps to follow or had an end product to emulate, which might not have necessarily allowed my creativity to emerge. When I related these experiences to math, I saw that following steps in math might limit the creativity and imagination, which in turn might place the emphasis on the product. If a student perceives that there is only one way to approach a concept or a problem, their focus might be on finding the answer since they might already know or have been given the steps. Even though there might not be a single way to approach a concept, students might have been taught to do it a certain way. I wondered if students have had the opportunity to use their creativity and curiosity in math. In order to help students focus on the process and use their creativity, I needed to focus on the process in my own learning to experience uncertainty of what might emerge from my creativity.

As I continued having conversations with students, I began to unfold more of their views on math. Boaler (2016) suggests some misconceptions about math, “that math is a subject of rules and procedures, that being good at math means being fast at math, that math is all about certainty and right and wrong answers, and that math is all about numbers” (p. 31). These misconceptions remind me of the ways in which my students described math. I started to wonder about students’ perceptions of what it meant to be good in math. As I began to ask students about their feelings toward math, they shared similar thoughts as suggested by Boaler (2016). I noticed that students often focused on speed and accuracy as traits of being good in math, rather than their understanding of the concepts. They often associated math with a right answer and are often eager to just find it. When asked to describe different math concepts, most of my students talked about numbers and operations. These perceptions of math could lead to expectations of what a math class should be and what being competent in math meant.

To explore ways to understand students’ perceptions of math and help them engage in math, I asked my students about their past experiences. Belbase (2013) suggests that the instructional methods and resources used in the classroom largely depend on images of mathematics as perceived by the teacher and the students (p. 235). “Effective teaching depends on one’s image of mathematics” (Belbase, p. 235, 2013). This makes me think about how teachers’ views of math affect how they teach

and how students view math. I noticed that the perception of what it meant to be good in a subject area and the feedback received both have an important impact on how students view their abilities. For example, if students are asked to remember math facts, this might give them the perception that they might need to be able to recall facts in order to be good in math. However, the more I talked to my students about math, the more I saw that the reasons behind their feelings toward math were more complex than simply being caused by their perceived competence in math. There are also other factors such as their experiences of math outside of the classroom. Perhaps students' perceptions of math could be influenced by not just their own experiences of learning math, but also other people's stories of learning math around them.

From conversations with students, I have also learned that students might have expectations about math classes based on their previous experiences. For example, during a discussion about how they might use math concepts, they asked when they would be doing math and referred to doing worksheets. Perhaps this had been part of their experiences of how math had been taught previously. Lockhart (2006) suggests that there is a lack of understanding and appreciation for math that repeats itself as students learn math from their teachers, and teachers learn about it from their teachers (p. 30). As I observed that students' perceptions of math seemed to be passed down from their teachers, I became curious about how I could open up students' view on math. This would involve teaching math in new ways rather than simply following directions. "Math is not about following directions, it's about making new directions" (Lockhart, 2009, p. 31). This quote resonates with me as I wondered how I could help students experience math from different perspectives and become more open to exploring math through their curiosities.

## **1.5. Art as an Opening to Math Teaching**

As I began my art exploration through my initial painting experiences, I started to see the vulnerabilities in the learning process and develop a greater appreciation for my students. My hesitation to paint again after my first painting experience helped me relate to how students might be focusing on the product rather than the process in math. Over the years, I have noticed that students' understanding in math sometimes seemed difficult to determine. On the one hand, I discovered that students who were able to apply the concepts did not necessarily have the conceptual understanding. On the other



hand, some students who expressed having difficulty with recalling math facts sometimes had a good understanding of the concepts.

I started to wonder if students' perceived competence in math might not necessarily reflect their actual conceptual understanding. Skemp (2006) distinguishes between relational and instrumental understanding, and describes relational understanding as “knowing both what to do and why” and instrumental understanding as “rules without reasons” (p. 89). I connected this distinction to students seeing math as rules which relates to what Skemp (2006) refers as instrumental understanding, and noticed that they might not have the relational understanding. I found that some of my students who saw themselves as not good in math were able to explain the concepts orally and demonstrate their understanding. This was intriguing to me as it suggested that knowing math facts and procedures does not necessarily equate to understanding or competency. Skemp (2006) suggests that it is difficult to assess whether a student understands relationally or instrumentally, and that talking with students is the best way to find out (p. 93). From my experience, I found that conversations with students have helped me get a better sense of their relational understanding. Although this would be time consuming in the classroom, working with small groups of students as a learner support teacher gave me opportunities for these conversations. It seemed that some students might be focused on finding the right answers rather than on the process of developing their conceptual understanding. This made me curious about how I might help students focus on their learning process and conceptual understanding.

I wondered how art exploration might change the way I teach math. As I reconnected with art, I started to become more open to sharing aspects of myself with students through my art engagement. Perhaps continuing to go outside my comfort zone by taking art classes might help me become more vulnerable with students by sharing my learning experiences with them. Brookfield (1995) suggests making sure not to ask students to give something of themselves before having given something to them (p. 57). This reminded me of the importance of sharing my learning process with students before asking them to share theirs. My first experiences of reconnecting with art through painting helped me begin to experience the vulnerability involved in learning something new and unfamiliar. I started to explore my vulnerabilities as learning opportunities to get to know myself better. Brown (2012) suggests the myth of vulnerability as weakness and emphasizes that it is the core of all emotions (p. 33). In order to share my own

experiences with students to help them see the vulnerabilities in the learning process, I realized the importance of continuing to take risks and feel vulnerable in my own learning. As Brown (2012) suggests, "To feel is to be vulnerable. To believe vulnerability is weakness is to believe that feeling is weakness" (Brown, 2012, p. 33). This helped me see that to understand and appreciate the vulnerabilities in learning, I needed to embrace my own feelings of being vulnerable. In my inquiry, I reflected on and analyzed my own stories of encountering vulnerabilities from art exploration, and examined how my learning experiences impacted my teaching practice in math.

## Chapter 2.

### Vulnerability as a Site for Learning

I started my inquiry by exploring students' perceptions of math. I wondered if how math is taught might influence students' mindsets in math. I started by looking at the idea of growth mindset. Dweck (2006) defines the fixed mindset as "believing that your qualities are carved in stone" (p. 6), and the growth mindset as "the belief that your basic qualities are things you can cultivate through your efforts" (p. 7). Since some students have expressed that they are not good in math, I became interested in exploring mathematical mindsets. As students talked about not being a math person, I started to wonder about math abilities in terms of nature versus nurture. I wondered how I might foster a growth mindset by opening up students' experiences in math. I realized that I needed to share my own vulnerabilities in learning in order to create the space for students to take risks to explore in math. I also needed to better understand students' mindsets in math. Boaler (2016) discusses evidence from brain research in support of growth mindset and the importance for students to receive positive messages about their potential and ability (p. 4). "The new evidence from brain research tells us that everyone, with the right teaching and messages, can be successful in math, and everyone can achieve at the highest levels in school" (Boaler, 2016, p. 4). This quote reminded me of the importance for helping students see that they can be successful in math.

I noticed that some students have expressed that they like math because it is easy. This might create the perception for themselves and for other students that math should come easily to them if they are good at it. "Clearly, people with the growth mindset thrive when they're stretching themselves. When do people with the fixed mindset thrive? When things are safely within their grasp. If things get too challenging - when they're not feeling smart or talented - they lose interest" (Dweck, 2006, p. 22). The idea of thriving while stretching oneself lingered in my mind. I wondered how I could help students see that experiencing difficulty in math gives them the opportunity to grow. In order to foster the idea of growth mindset in my classroom, I needed to explore how students' previous experiences and approaches to math have impacted their perceptions of what it meant to be successful in math. Since my students have expressed being

good in math as being fast and accurate, I began to think about how to reframe the idea of being successful in math.

As I reflected on my own feelings toward math, I found that what I enjoy about math is that it makes me think in different ways. The more I engage in math, the more my understanding deepens. I realized that this is an on-going process that is still continuing to unfold as I teach math and explore it for myself. To help students relate to the process of learning something new, I asked them to think about their favourite activities such as playing a sport or an instrument and why they found these activities enjoyable. Typically, students did not express that they liked the activity because it was easy. I asked students if they learned the activity right away. Most students said no and shared how they have improved in what they were able to do gradually. For example, when learning a new instrument, students shared that they started with learning how to hold the instrument and gradually learned how to play a song. Through our discussions, they realized that it took time for them to get comfortable with the instrument and that it was challenging at times.

I began to think about how to reframe challenges in learning and how I might help students see that challenges help them grow. Boaler (2016) suggests that when the mind is challenged, this is when one grows the most (p. 12). This idea is important in helping students reframe challenges they experience in their learning. In order to help students see that challenges are part of learning, I needed to be vulnerable and engage with challenges in my own learning process.

## **2.1. Sharing My Vulnerabilities**

As a learner support teacher, I noticed that students often expressed what they found difficult in their learning when they felt discouraged. To help students see that different areas are challenging for different people, I made a list of what I found difficult and shared it with them. This was the beginning of allowing myself to be seen as a learner by students. Brown (2010) suggests that authenticity is a practice of making a collection of conscious choices to let our true selves be seen (p. 49). As I mentioned earlier, sharing aspects of myself as a teacher had been difficult for me. I realized that I needed to make conscious choices to share more aspects of myself with students. These choices involved sharing some of my vulnerabilities with my students. Since I

have been connecting with myself as a learner, I decided to share some areas that I was uncomfortable with in my learning such as dancing and creating movements to show myself as a learner. Many students were surprised and gave me some helpful advice on how I could become more comfortable with dancing such as moving only one part of the body at a time or practicing at home with someone I trust. This discussion created the opportunity for students to begin to see me as a learner and offer their advice since they had more experience in the area. I also shared with students about my first painting experience at the art studio. I expressed that I had been thinking about painting and even taking art classes, but it had been difficult to paint again. I was not exactly sure why at the time. Looking back, I could see that it was a vulnerable experience to try something new and unfamiliar to me. Even though I enjoyed the experience of painting, the uncertainty and unfamiliarity might have caused hesitations toward painting again. Sharing my experiences as a learner with students was an opening to seeing vulnerability as a site for learning.

By sharing my vulnerabilities with students, I began to see the parallels between rediscovering the artist within myself and students' experiences of learning math. I realized that learning something new might be a vulnerable experience for students and that their past experiences might make them hesitant to explore. Although my experiences and students' experiences were vulnerabilities in different learning contexts, I became interested in exploring my own vulnerabilities to see how this might inform my teaching practice. Through more conversations with students about different challenges, I started to see the importance of being vulnerable and sharing my own learning process with them.

## **2.2. Vulnerability in Learning**

Connecting with students through my own learning experiences was the beginning to creating openings in my classroom. Palmer (1998) suggests that a strong sense of identity infuses oneself, the subject and the students together (p. 11). By sharing aspects of my learning with students, I was getting to know myself and connecting who I am as a learner to who I am as a teacher. "My ability to connect with my students, and to connect them with the subjects, depends less on the methods I use than on the degree to which I know and trust my selfhood – and am willing to make it available and vulnerable in the service of learning" (Palmer, 1998, p. 10). The ideas of

knowing myself and being vulnerable resonated with me as I began to see the risk-taking involved in learning and how focusing on the product might be a barrier to exploring something new. In my experience, I found that being concerned with what to paint and what my painting would look like made me hesitant to paint. I wondered if the focus on finding the right answers might make students hesitant to explore in math.

I started to wonder if perhaps what I considered as making mistakes in my painting was part of the process of learning how to paint. The uncertainty I experienced inspired me to explore the vulnerability in learning. I realized the importance of helping students focus on the process, which might involve being uncertain and making mistakes. In math, reframing the idea of making mistakes might help them shift their focus on finding answers to gaining a better understanding of concepts. Boaler (2016) suggests that people think mistakes mean that they are not a math person because mistakes are not valued (p. 12). This made me wonder how I might help students see the value of mistakes and persevere when working on math, since they often expressed that their mistakes made them not good in math. Reframing how students viewed mistakes might involve giving students positive encouragement and guiding them through the learning process by asking them questions to help them better understand their learning.

As I found myself looking into my own vulnerabilities in learning through my art exploration, my inquiry question emerged. I realized that a way that I might show the learning process was to share my own learning experiences with students. How could I tell students that it is okay to make mistakes if I was afraid to make mistakes myself? I started to see that I needed to be vulnerable by taking risks in my own learning. I was curious about how facing my own vulnerabilities might inform my teaching.

### **2.3. Art as My Site of Vulnerability**

Art has been a way of knowing for me. Since I started exploring painting, I became curious about how the creative process unfolded and interested in learning more about my own learning process. I wondered how taking art classes for my inquiry might open up new ways of knowing and help me explore my curiosities. To be vulnerable and step outside my comfort zone, I engaged in art practices in drawing, painting and dancing to experience learning from different perspectives. All of these

practices helped me slow down and be in the moment. I was curious about what I might learn about myself and my practice through engaging in different art forms.

Throughout my inquiry, I enrolled in about 10 various visual arts courses through continuing studies at Emily Carr University of Art & Design and through community centres. I took courses on drawing, painting, illustration and 3-D mixed media to explore my interest in art and push myself out my comfort zone as a learner. I was curious about how my learning experiences might help me engage students, create openings, and build a community within my math classroom. Since some of my students had voiced their frustration with learning math, my goal was to explore possibilities in math with them by opening myself to learning something new and engaging in the creative process. I needed to be open in order to create new openings in my classroom. An important part of this for me was to experience vulnerabilities in my own learning to better support my students in their math learning.

Since I shared with students about being uncomfortable with dance, I decided to take dance classes at community centres to explore my discomfort with movement. Even though I did not have any experience in dance, I had always wished that I had taken dance classes during my childhood. Why not now? I kept thinking about my students' advice about dancing by moving only one part of the body and trying movements at home. As I began to take courses in the visual arts, I was slowly opening up to taking more risks in my learning which gave me the courage to take dance classes. This exploration helped me step outside my comfort zone to explore embodiment and think about how math might be embodied. It was an opportunity for me to see another perspective of learning and help me open up in different ways from visual arts.

In addition to the art courses, I also took about 20 university courses outside of the EdD in Educational Practice Program on math education, arts education, writing, children's literature, and educational psychology. Most of the courses I took were at Simon Fraser University, and a few of the courses were at University of British Columbia through the Western Deans' Agreement. Each of the courses contributed to my journey in helping me engage in my inquiry from different perspectives. The math education courses gave me opportunities to engage with concepts in new ways through working collaboratively with others. This helped me further explore math concepts on my own and in my teaching. The arts education and writing courses helped me create and

engage in my own drawing and writing practices, as well as other embodied practices to slow down and be more present. In the children's literature course, I examined how math is portrayed in children's picture books to explore different narratives of math learning which helped me explore the complexity of students' perceptions of math. In the educational psychology courses, I explored different learning processes and connected them to my practice to better understand students' learning needs. All of the courses I took helped to further my thinking as I explored connections between different aspects of learning and related what I learned to my inquiry. It was very invigorating to engage in dialogue with others about my work in different areas of study.

I wondered how my inquiry might open up the ways in which I teach math to help students explore and be curious in math. Perhaps focusing on students' understanding and providing opportunities for them to experience math in different ways might create openings in their learning. "When we look at mathematics in the world and the mathematics used by mathematicians, we see a creative, visual, connected, and living subject" (Boaler, 2016, p. 31). This quote resonated with me as students sometimes questioned why they were learning math and how these concepts would help them in life. I wondered how I might help students connect to the math concepts and experience the math around them. In order to find new ways of teaching math, I needed to open myself to possibilities and reconnect with my own curiosity and creativity to reimagine how I might teach math.

## **2.4. Inquiry Question**

How will taking art classes to reconnect with my interest in art inform my teaching practice in math? One focus of my inquiry was to look at myself as a learner through rediscovering art and how this experience might inform my practice in teaching math. Brookfield (1995) suggests finding a way of revisiting the terror most people associate with learning something new and difficult in order to help students with problems in learning something he enjoys teaching, and points out that the best way is to be a learner in an area of skill or knowledge that is new and intimidating (p. 63). This reminded me that I needed to continue to experience the uncertainties of learning something new and unfamiliar. Throughout my inquiry journey, I examined the parallel between the process of finding the artistic part of myself and how this might relate to students' experiences of learning math.



My initial painting experiences opened the door for me to share aspects of myself as a learner with students. Engaging in the arts again was an opportunity for me to take risks in my own learning and reignite my creativity and curiosity. Brown (2012) suggests that engaging with our vulnerability could be new learning or relearning, and that the best place to start is to define, recognize and understand vulnerability (p. 35). I reflected back on my painting experiences, I recognized that my fear of uncertainty and risk-taking made me feel vulnerable. I felt the tension in my body and my heart was racing. To continue to experience the vulnerabilities of learning and further my art exploration, I decided to put myself outside my comfort zone as a learner by taking art courses. I thought about this possibility for a couple of years before finally taking the risk to be a learner through my art exploration.

## **2.5. Goals of Inquiry**

One goal of my inquiry was to use my own learning experiences in the arts to inform my teaching practice. I wondered what changes I might see in myself and my teaching practice. In particular, I focused on how my art exploration might help me engage students, create openings and build a community in my math classroom. Another goal was to contribute to scholarship on teaching and learning. Throughout my inquiry, I recalled my personal history of learning. I began to see that my experiences helped me better understand myself as a learner and a teacher. By being a learner in the arts and engaging in the learning process, I wondered how my experiences might impact how I support my students' learning. By sharing my inquiry journey in my thesis, I hoped to inspire teachers to unfold their own learning with students by exploring their own autobiographies as learners and continue to pursue new learning opportunities to inform their practice.

### **2.5.1. Engage Students**

I wondered how focusing on students' interests and unfolding learning with them might engage them in math. How might I help students focus on the learning process rather than finding an answer? Perhaps being creative through my art exploration might spark new ideas in my math teaching. I was curious if slowing down and paying attention to moments of wonder that students bring might help the co-creation of learning in my

classroom to invite a window of new possibilities. In order to be attentive to these unfolding moments with students, I needed to work on focusing on the process rather than the product in my own learning. The art courses might help me engage in more exploration, become more comfortable with uncertainty and learn about my own creative process. I needed to learn to trust my own process to let my creativity emerge in order to open up to innovative ways of teaching math to engage students.

### **2.5.2. Create Openings**

I wondered how I might create openings by exploring math with students through activities inspired by my art exploration. How could I create opportunities for students to see math from different perspectives? Perhaps using different art forms from my practices might inspire new approaches in my math teaching. How could I use embodied ways to teach math concepts to help students see math in a more playful way?

I wondered if my own experiences of math learning might also help to guide my teaching. Even though I learned math from mostly pencil and paper activities, I found my math learning experiences through games and hands-on activities more memorable. I wondered what made these activities stand out to me. Whenever I recalled an experience, the feelings and sensations would usually bring me back to the moment as if I were experiencing it again. This made me curious about exploring learning as a whole-body experience.

Perhaps taking art classes might help me work on embodying and being in the moment as I open up my own curiosity and imagination. "To tap into imagination is to break what is supposedly fixed and finished, to see beyond what the imaginer has called normal" (Greene, 2000, p. 19). Turning to art was my way of opening myself up to possibilities to inspire changes in my practice. I wondered how this opening might impact the ways I teach math. How could I help students see math beyond rules and procedures through exploring our curiosities together?

I was curious about how I could teach math in a way that invited students to see its possibilities rather than focusing on finding the answer. How might I help students appreciate the beauty in math by using their creativity and imagination? "That's what math is – wondering, playing, amusing yourself with your imagination" (Lockhart, 2009,

p. 24). In order to open myself up to possibilities to create openings for students, I needed to reconnect with my own creativity and imagination. This involved wondering and playing with different art forms.

### **2.5.3. Build Community**

I wondered how I might build a supportive learning community within my classroom. How could I help students take more risks when exploring math and focus on their learning process? Some of my students have expressed that being able to recall math facts might be a difficult task. They also shared concerns toward their abilities in math such as feeling discouraged when presented with math tasks. Perhaps helping students unfold their conceptual understanding through exploration and informal discussions might encourage students to focus on their learning process. In order to encourage students to go outside their comfort zones to explore math, I needed to build a supportive learning community in my classroom where students feel comfortable with taking more risks in their learning. In my art exploration, I have found that it took courage to go outside my comfort zone to try new ideas. Along the way, I have found that being part of a supportive community helped me take more risks in my learning.

My journey of rediscovering art might be a way for me to connect with how my students might be feeling when learning something new and unfamiliar. By being vulnerable through taking art courses and exploring new art forms, I might be able to better relate to students' experiences of learning new concepts in math. Perhaps sharing my own learning journey with them might help to build a supportive community within my classroom.

## **2.6. Uncovering My Learning Process**

I wondered if taking art classes might help me open up the space for exploration and change the way I teach math. "Of all the methods available for changing how we teach, putting ourselves regularly in the role of learner has the greatest long-term effects" (Brookfield, 1995, p. 50). This quote resonated with me as my first painting experiences helped me see that putting myself in the role of a learner to engage in something unfamiliar was not easy. Even though I enjoyed the process of letting my

paintings emerge, I was still hesitant to paint again. It took putting myself outside my comfort zone to take art classes to help me engage in learning something new again.

I felt nervous about taking on new art practices, which showed me that it was important to me and worth taking the risk. I realized that the times that I have stepped outside my comfort zone to take risks have been some of the key learning experiences in my life. Exploring acrylic painting for the first time at an art studio was one of these moments for me. Although it was something that I had always wanted to do, I was hesitant at first as I was not sure what the experience might bring or how it would turn out. Perhaps the uncertainty of not knowing what would happen made me feel hesitant.

By opening up myself to rediscovering art and reconnecting with my interests, I hoped to learn about myself as a learner and as a practitioner through new art forms. I embraced the opportunities and possibilities that my inquiry journey might bring to my practice in teaching math. How could I inspire students to look at math differently and invite them to explore their curiosities? Being a learner through engaging in the arts was a way for me to go outside my comfort zone and be vulnerable. My inquiry examined the vulnerability from my experiences as a learner and its impact on my teaching practice.

## **Chapter 3.**

### **Looking Within Myself**

My inquiry explored my art engagement and its impact on my teaching practice. I examined the process of myself as a learner in the arts and myself as a practitioner in math teaching. As my inquiry unfolded, I looked within myself to explore how my identities as a learner and as a practitioner informed each other. Aluli-Meyer (2008) suggests the importance of slowing down what it means to see, hear, or experience something, and recognizing one's uniqueness in how it shapes the research process (p. 220). The process of exploring my identities as a learner and a practitioner helped my inquiry gradually emerge as I began to slow down to be more attentive the learning process. My experiences as a learner and as a learner support teacher have created an opportunity for me to explore a context of research that is unique to me. "Your relationship to your research topic is your own. It springs from a lifetime of distinctness and uniqueness only you have history with" (Aluli-Meyer, 2008, p. 220). I reconnected with myself through exploring various forms of art and tried new art practices that were unfamiliar to me to engage in my creative process. I examined my art engagement in relation to my position as a learner support teacher to unfold the impact of what I experienced as a learner. Going outside my comfort zone as a researcher by using my own learning experiences to examine changes in my practice was a way for me to get to know myself better and open up to new possibilities.

#### **3.1. Methodology**

In my inquiry, I used self-study through examining myself as a learner through different forms of art as new lenses to help me gain a deeper understanding and greater appreciation for the learning process. The field of self-study research for teachers includes the Self-Study in Teacher Education Practices (S-STEP) community. I have not drawn from this literature since I am not a teacher educator, and I have not worked in the context of teacher education. The methods I have drawn from in my inquiry are found in the creative processes of art making. My methodology in my inquiry has emerged alongside my engagement in the visual arts and dance. I wondered how engaging in my learning process might help me see math differently. My inquiry involved examining how

I might create openings in my math teaching by opening up myself through my art exploration. I began my inquiry focusing on students' understanding and perceptions of math. I wanted to better understand how my students learn math so that I could create openings in my classroom. I soon realized that in order to create new opportunities for learning for my students, I needed to open up myself to new possibilities in my own learning.

I started my inquiry by looking into my own learning experiences as a way to better understand students' experiences. As Brookfield (1995) suggests, "Consulting our autobiographies as learners puts us in the role of the "other." We see our practice from the other side of the mirror, and we become viscerally connected to what our own students are experiencing" (p. 29). As I listened to students' stories of learning math, I began to uncover my own stories as a learner which helped me connect with students' experiences. I realized that my past learning experiences have helped me gain a better understanding of the challenges that students might encounter. For example, when teaching estimation and discussing how it is used in our daily lives, I noticed that some students would write down an estimate and go back to change it as soon as they find the actual result. Others would find the answer first and then go back to make their estimate. When I talked to students about why they find estimation difficult, I started to realize that students might feel uncertain when estimating if focusing on being right.

My own stories of learning math have helped me relate to how students might feel when experiencing uncertainty. I began to look at my own stories of learning how to estimate. I soon realized that my experience of learning math in Taiwan until grade five involved mostly finding the exact answer. I started to use estimation more when I came to Canada in grade six. I recalled thinking that I could just find the right answer rather than estimate at first. Reflecting on this experience helped me realize that estimation could be risk-taking for students as being uncertain was outside my comfort zone. This realization helped me approach the concept differently by working with students to help them see how math is used in everyday life, which often involves estimating rather than finding exact answers. My own learning experiences started to inform my practice by making me think about the vulnerabilities in learning something new and unfamiliar. At the same time, I also began to engage in rediscovering art and trying new art practices. I became curious about how my experiences of engaging in art practices might inform my

teaching. The autobiographical experience of looking within myself inspired me to explore my inquiry through engaging in a self-study methodology.

In my inquiry, I looked at how being a learner through rediscovering art informed my practice of teaching math using Schon's (1987) *Hall of mirrors*. I examined the parallel between my learning from taking art courses and my students' learning in math. I used my own experiences as a learner from taking art classes and my art practices to reflect on students' experiences in learning math to better understand the vulnerabilities of the learning process. From my first steps of reconnecting with art, I noticed that I needed to focus on the process for my learning. This realization began to help me become more attentive to and more appreciative of students' learning process when teaching. Students' experiences in learning math have also informed how I might act as a learner. In my classroom, I saw that students were sometimes hesitant to take risks in their learning which helped me realize that I also needed to continue to take risks as a learner.

Taking art courses was a way for me to put myself outside my comfort zone and experience vulnerability in my learning. I was curious to reflect on my teaching practice through the lens of being a learner to see how this might inform me of the learning process. By taking art courses, I hoped to gain a better understanding of students' learning processes by using my own learning experiences to create openings in my teaching practice. By reconnecting with my own creativity and curiosity through art, I hoped to open up myself to new possibilities and reimagine new ways to teach math. As I explored, I learned to trust my intuition. I had to let go of my own worries of imperfection and the product in order to immerse myself in my own creative process. I allowed my intuition and curiosity to guide me. In order to attune to students' learning processes and enter conversations with them, I needed to be attuned to my own learning. Continuously being a learner in different ways was integral to my inquiry process. I embraced the opportunities to connect my learning experiences with my students and examine how my learning changed my teaching practice.

### **3.2. Methods of Data Collection**

To better understand myself as a learner and a practitioner in my self-study, I used my reflective writing, dialogue with students, narratives of my learning and teaching

experiences and arts-based methods for data collection. In my inquiry, I explored these methods to examine what I learned and the impact of my art engagement on my math teaching. To explore creating space in my classroom for dialogue about learning, I needed to go outside of my comfort zone by sharing my own learning process with students. Throughout my inquiry, I documented my experiences through journal entries, having dialogues with students, sharing narratives of myself as a learner with students, and using inspirations from my art practices to create new ways of teaching math. These methods of data collection gave me new perspectives to better understand the learning process through different art forms and explore the vulnerabilities of learning something new and unfamiliar.

### **3.2.1. Reflective Writing**

Since I started the EdD in Educational Practice Program, I have been keeping a daily reflective journal of my experiences as a learner and a practitioner. Brookfield (1995) suggests using one's own learning experiences to analyze one's teaching (p. 53). I have enjoyed journal writing as a way to process my learning. It became a powerful tool for me to reflect on what I experienced and learned in my journey. "Keeping a regular learning journal of your experiences of graduate study can provide you with some provocative information rich in insights and implications for your own teaching" (Brookfield, 1995, p. 53). Throughout my inquiry, I documented my observations, wonderings and experiences as a learner from all the courses in my reflective journal and as a practitioner from my classroom. I connected my learning experiences to how students might feel in their learning which gave me insights in my journey.

To help with the reflective writing process, I used the five stages of *Through-the-mirror* writing suggested by Bolton (2001) to write stories of my learning and teaching experiences. My goal for my reflective writing was to better understand my experiences. I started a daily ritual of writing about my encounters each day for myself using the first stage of writing, and went through the subsequent stages if I came across experiences that I wanted to further explore for myself. "*Through-the-mirror* writing, the heart of reflection and reflectivity, is written primarily for the self. The process matters, not the product" (Bolton, 2001, p. 105). My writing ritual connected with my art exploration as I focused on the process of writing. I was not thinking about how I would use the writing, I



was exploring through writing to uncover my experiences as a practitioner and a learner in my inquiry.

The first stage of *Through-the-mirror* writing is a six-minute write. Bolton (2001) suggests writing whatever comes to mind, without stopping or being critical (p. 108). In my daily writing ritual, I typically had a six-minute write in the evening on a particular experience from the day to get whatever was on my mind down. I found that knowing that this writing was for myself helped to get my ideas flowing. Having a timer set for six minutes allowed me to get started right away without overthinking or over analyzing my ideas. I was present and focused on writing whatever came to my mind.

The second stage is to write a story immediately followed by the six-minute write. Bolton (2001) suggests focusing on an experience and not questioning why an experience was chosen (p. 110). If my six-minute write brought up a particular experience that I wanted to explore, I would write a story with as many details as possible about the experience that came to mind for about 30 minutes. I found it freeing to write as much as I could about an experience.

The third stage is reading and responding to the writing. I would reread my story and respond to it by noting interpretive thoughts to add insights. "Rereading is then like a dialogue with the self, hearing what the hand had to say" (Bolton, 2001, p. 112). I found that this stage was useful for seeing connections between different elements of my story, which helped me better understand the experience. I often had more questions that would come up which allowed me to add more to the story.

The fourth stage involves sharing the writing with peers. I usually shared my stories with teachers I work with and classmates from courses that I took. "Peers' responses can open up fresh avenues. They can support towards deeper levels of reflection" (Bolton, 2001, p. 114). Even though sharing my writing with others was a vulnerable experience because I did not know what response I would receive, I found this stage important as it allowed me to get different perspectives of my story. People would often ask me questions which helped me explore the story further by adding more details.

The fifth stage is developing writing by exploring the story from another person's point of view or different endings. During this stage, I would further develop my story by

exploring it from students' point of view, and make connections between my experiences in art exploration to my teaching context or students' experiences. "Writing developmental pieces can deepen and widen understanding" (Bolton, 2001, p. 116). I found that the more I developed my story, the more I learned from it.

These five stages of *Through-the-mirror* writing from Bolton (2001) helped me explore my own process of writing. I adapted the stages by following where my writing guided me. My reflective writing was an important part of understanding myself as a learner and a practitioner in my inquiry. My writing ritual helped me focus on the process of recalling my experiences and unfolding the significant moments of learning from my journey. The reflective writing from my experiences will be shared in the next two chapters.

### **3.2.2. Dialogue**

Over the years, I have found that dialogue with students and colleagues have helped to inform my practice. My dialogues with students have been important in helping me better understand their learning process. Since I typically work with students in small groups, I sometimes have the opportunity to talk with students through informal conversations about their learning. Dialogue became an important part of my inquiry as it provided opportunities to reflect on both students' and my own experiences and challenge my thinking. Whenever I shared my inquiry experiences with others, I learned to examine my encounters from a different perspective. This allowed me to explore using dialogue as a method of sharing my narratives with students throughout my inquiry. I shared my own learning process with students and also provided opportunities for students to engage in dialogue about their learning processes. These conversations became an important part of my inquiry journey.

I have experienced dialogue as a way to not only communicate, but to unfold new understanding together with students. Himley (2000) discusses the human capacity of meaning-making to make sense of the world and suggests that this capacity is enhanced by the differences among people and the recognition of multiple perspectives (p. 199). "The thing is, something significant happens when people commit to a sustained conversation around a shared topic of inquiry. That 'something' exceeds the actual words spoken, and it can't readily be replicated or summarized later for those who

weren't there" (Himley, 2000, p. 199). Dialogue with students helped me be vulnerable with them by sharing my own experiences as a learner which opened up the space for sharing learning experiences with one another in my classroom. My recollection of dialogues with students will be shared throughout my stories.

### **3.2.3. Narratives**

As my students shared their experiences of learning math with me, their narratives helped me see math from different perspectives based on their past and current experiences. Through dialogues with students about their views on math, we unfolded each other's stories of learning. As I recalled my past experiences of learning in elementary and secondary schools, I examined their significance in my current art exploration and teaching practice. Through reflective writing mentioned above, I explored writing narratives of my own experiences of learning math and art. The stories that I wrote included my learning experiences from my inquiry as well as my past experiences as a student.

I documented my art exploration by writing narratives from my experiences in my art classes as they unfolded. I reflected on what I have learned from these experiences about myself as a learner and a practitioner. Through writing narratives, I explored my lived experiences through my senses and how I felt in the moments of learning to uncover complexity. "To inquire narratively is to focus on experience as stories lived and told with an understanding that uncertainty lives in and between the situations or lived and told stories" (Downey & Clandinin, 2010, p. 390). As I examined my stories of learning and being in uncertainty, I connected my experiences to my students' learning and shared my stories with them. My narratives from art exploration and teaching will be shared in the next two chapters.

### **3.2.4. Arts-based Methods**

Art has become a mirror to my heart. It provided a way for me to reflect and be in tune with myself. It has become a form of self-exploration in my journey. My creative process makes me step outside of my comfort zone and into the unknown. In the process, I become more aware of how I feel and how my body responds to my experience in the moment. Weber & Mitchell (2007) suggest that art is a heightened

experience that engages our senses, our emotions, and our intellect (p. 984). Thinking back to my first painting experience at the art studio, I felt nervous, but also excited. I had butterflies in my stomach and my hand was shaking as I was painting. After all these years, I could still recall vividly these emotions and responses to my vulnerability of facing the unknown. "The reason we need and create art has to do with its ability to make us feel alive and to discover what we didn't know we knew, or to see what we never noticed before, even when it was right in front of our noses" (Weber & Mitchell, 2007, p. 984). Whenever I create, I feel alive as I uncover new possibilities. I find myself taking more risks as I step into uncertainty and embracing what emerges. My creative process has allowed me to learn more about myself such as what is important to me and what I find vulnerable. For example, my initial painting experiences have helped me see that facing uncertainty is vulnerable for me and that focusing on the process is an important part of reigniting my creativity.

Through my experiences of art exploration, I became inspired by using arts-based methods to open up possibilities to create openings in my classroom. My art engagement has opened me up to embracing the process as it unfolds. In my reflections, I have documented spontaneous moments in which I used artistic ways in my math teaching and how these moments have impacted my teaching practice.

As I explored different forms of art, I found myself embracing the process which has created openings in my learning. I began to see that students often focused on the product rather than the process in math. I wondered how I could help students focus on the process through exploration and unfolding learning together. As Brookfield (1995) suggests, "The more we teach something, and the farther we travel from our first experiences of learning it, the easier it is to forget the fears and terrors new learning can provoke" (p. 50). This quote helped me realize that I needed to experience vulnerabilities in my own learning, such as not knowing what the outcome might be, in order to empathize with the uncertainty that students might experience in their learning. Since it took some time before I started taking the art courses, I realized that I had to push myself to step outside my comfort zone in order to continue to explore the arts.

Similarly, I see the importance of continuing to explore math in my own learning. The math education courses I took helped me to continue to engage and appreciate the beauty of math. Lockhart (2009) suggests that math is a slow and contemplative process

(p. 44), and that it is important for teachers to share their excitement and love of learning (p. 47). This resonated with me as I have shared my love of math through my own exploration with students over the years. I found that students were generally curious to hear about my appreciation for math and my engagement in math. "Mathematics is an *art*, and art should be taught by working artists, or if not, at least by people who appreciate the art form and can recognize it when they see it" (Lockhart, 2009, p. 45). Through my art and math courses, I recognized the importance of continuing to engage in areas I teach to gain new appreciation and perspectives to reflect on my teaching practice. My engagement in the visual arts and dance brought new ideas to my practice. The impact of my art practices on my math teaching will be discussed later.

Brookfield (1995) suggests that we need to struggle as learners ourselves so that the empathy it engenders helps us adjust what we are doing to take account of students' blockages and anxieties. Being a learner in the arts and sharing my learning experiences with students created openings for me to be vulnerable with my students. As I was reconnecting with my own creativity, I was inspired to use arts-based methods in my teaching to help students make connections with the math concepts explored to help them gain a deeper understanding.

### **3.3. Methods of Data Analysis**

To help with data analysis, I used the eight steps from Hatch's (2002) interpretive analysis as a way to make sense and give meaning to my data. The first step involves reading the data for a sense of the whole. Hatch (2002) suggests being immersed in the data so that any impressions formed are considered within the context of the overall data set (p. 181). I started by carefully looking at the stories from my teaching and learning, the dialogues with students, and my artwork to get a sense of what I was learning, encountering and experiencing in my inquiry. As I became immersed in my data, I wrote what I noticed in my reflective journal.

The second step is to review the impressions that were recorded. Hatch (2002) explains that the object of the review is to determine which impressions might lead to more careful examination (p. 182). I reviewed my reflective journal entries to see my impressions of the learning moments and wrote notes about the ones that resonated the most and their significance as a way to begin articulating my interpretations.

The third step involves reading the data again to identify and record impressions in memos. Hatch (2002) suggests using general questions for reading the data to attach meaning to behaviours and events (p. 184). As I looked over my reflective journal, stories and dialogues with students, I asked questions such as how students' previous experiences in math affect how they feel about math and how my experiences as a learner relate to students' learning experiences. I identified and recorded my observations using my guiding questions while also focusing on discovering new impressions.

The fourth step is to study memos for salient interpretations. Hatch (2002) recommends going through the entire set of memos to get a sense of the big picture (p. 185). I examined my notes on my learning from different art practices as a whole to see how they connected to my inquiry question of how being a learner through taking art courses has informed my teaching in math.

The fifth step involves rereading data to find where interpretations are supported or challenged. Hatch (2002) suggests having a system to search for places in the data that relate directly to the interpretations (p. 186). To analyze my learning experiences, I revisited my reflections and notes to search for places where interpretations of my learning were supported or challenged .

The sixth step is to write a draft summary. Hatch (2002) explains that the goal of writing a draft summary is to put the interpretations into a story that others can understand (p. 187). I wrote about the emerging themes from my interpretations to help begin to articulate the themes from my stories.

The seventh step is to review interpretations with participants. Hatch (2002) suggests inviting participants to give feedback on the interpretations (p. 188). I explored the themes by sharing my interpretations with students and colleagues to get their feedback, and writing more reflections based on the feedback.

The eighth step is to write a revised summary and identify excerpts that support interpretations. Hatch (2002) suggests refining and clarifying interpretations to communicate the understandings constructed (p. 189). I revised and made connections between the themes which included my stories to support the interpretations.

By using these interpretive analysis steps from Hatch (2002), I made sense of my reflections, dialogues with students, stories from my teaching and learning, and my process of creating artwork. My analysis focused on the impact of my art engagement on my teaching practice. The data analysis process helped me gain a better understanding of myself as a learner and as a teacher.

### **3.4. Ethical Considerations**

Since my methodology was self-study, the data that I collected were from my own observations, reflections and stories. Through sharing my learning from my journey with my students, I have made more connections with my students and allowed them to see me as a learner and my learning process. I have documented these encounters anecdotally through my own experiences and recollections without using students' work. Therefore, I received ethics exemption from the Office of Research Ethics from Simon Fraser University.

## Chapter 4.

### My Journey in Art Exploration

Throughout my experiences of art exploration, I wrote stories of my learning from the art classes and my process of engaging in my art practices. Reflective writing through stories helped me see my learning process and relate to the vulnerabilities in learning that students might experience. In this chapter, I share my stories from my journey of art exploration. In my writing, I connected my experiences to my teaching practice and asked questions about how my encounters in learning might relate to my practice. In the next chapter, I will reflect on the questions from my stories, analyze how they informed my practice and discuss the themes that emerged from my inquiry.

#### 4.1. The Beginning of Painting

In the fall of 2017, almost two years after my first painting experience at the art studio, I finally started exploring art by taking a painting class at the community centre. Since I realized that I was hesitant to paint on my own, taking a class was a way for me to begin to go outside my comfort zone in my art exploration. It gave me the time and space to explore with the guidance from an instructor. The following story was my recount of my very first painting class.

*I walked into my first painting class. Although I was nervous, I was excited by the possibilities of this new adventure. Since my painting experience at the art studio, I had been wanting to take a painting class for over two years. While setting up the materials, I wondered what I would be painting. My mind wandered with possibilities.*

*The class began with introductions of what brought us there. Everyone had varying degrees of experiences in painting. Since I didn't have much experience, I became a bit more nervous even though this was an introductory class.*

*To my surprise, we didn't start painting right away. We started by exploring how to mix colours and learning to use the paintbrushes. Which paintbrush should I use? How much of each colour should I add? I quickly realized that I needed to experiment. There was no right amount of paint to use. I just needed to play with the paint and create my palette.*



*I made my colour swatches very slowly and carefully, painting each square as neatly as possible and all lined up. As I looked around, most people were almost done. I still had more combinations to try. I rushed and accidentally mixed two colours that were already done. Although I experimented with mixing colours, I was still worried about making mistakes. How I could focus on the process, not on the product?*

*I wondered if students felt this way when doing math. When I saw that I was slow with the colour mixing in comparison to the others in the class, I felt that I needed to rush to get my work done. Did students feel this way when seeing others finished with their work?*

My first painting class at the community centre made me think about how I needed to explore the medium of painting before starting to paint. It helped me begin to see the importance for students to explore math concepts without focusing on the product of finding an answer. At the time, I was not sure exactly what this would entail in my practice as I was just beginning to engage in my own process of art making.

## **4.2. My Exploration of Drawing and Painting**

Following my first painting class, my instructor had suggested that I explore drawing. I recalled that I had enjoyed drawing as a child and always wanted to draw again. I became curious about how engaging with drawing again might inform my painting exploration. To further explore visual arts, I began to take art classes at Emily Carr University of Art & Design. I noticed that I really enjoyed drawing and making my own designs. A few months later in 2018, I took a course on art-based methods in research. During the course, I had the opportunity to start a daily art practice which I have continued to this day.

*Through an arts-based methods course, I started a daily art practice of drawing. It didn't take me long to decide which practice to try. I have always enjoyed drawing as a child and wanted to draw again. Therefore, drawing became my daily art practice. I finally opened my sketchbook that I've had for years. I was waiting for the right moment to arrive to start drawing. This was my moment. It was the beginning of rediscovering my love of drawing.*

*Opening to the first page of my sketchbook, I looked around the living room. I was inspired by the beauty of the flowers right in front of me. I started sketching the flowers by paying close attention to details of the intricate lines as my pencil danced on the page. I really enjoyed the*

*process of being attentive to my surroundings while drawing since it allowed me to be in the moment.*

*At first, I was concerned with making the drawing look exactly like what I saw. This made me do a lot of erasing when the lines didn't match up or when I saw that the scale was off. I continued the drawing for a few days. As the flowers started to wilt each day, I had to reimagine my drawing since it was different each time that I worked on it. This imagination helped me shift away from trying to make the drawing look exactly like the flowers in the vase. I began to use what I saw as an inspiration and followed my intuition.*



**Figure 4.1. My Drawing Practice**

*After drawing the bouquet of flowers, I continued with more drawings inspired by my surroundings which included plants and furniture in the room. I also worked on my drawing practice outside when I went on nature walks. As I continued to explore drawing through my daily practice, I started to make my own drawings from my imagination. I became more comfortable with exploring different ways of drawing.*

*To experiment with the medium and allow my creative process to emerge, I decided to improvise by not knowing and planning what I was going to draw. This was difficult for me at first since I would usually have an idea for what I wanted to draw.*

*To improvise, I started drawing in my sketchbook without knowing what I was going to draw. I would draw different types of lines and turn the*

*sketchbook to look at the lines from different perspectives. Then I followed what my drawing inspired me to create and let the process emerge. Through my improvised drawings, I created different compositions that I might not have envisioned before. For example, I drew a butterfly from one of the improvised drawings in a different way than how I would usually draw a butterfly.*

*Since I have found that erasing what I have drawn sometimes interrupted the flow, I also tried drawing without using an eraser. This helped me let go of what I saw as mistakes. What I noticed was that all the markings that I created became part of my drawing.*

*I realized when anything was erased, the trace of what was left behind still informed my drawing in some way and remained as part of my process. This helped me see the importance of exploration and risk-taking in learning something new. How could I create the space for risk-taking in my classroom?*

As I continued my daily practice of drawing, I started to take painting classes again. I began to see that I was more comfortable with drawing since I have had more time to explore this medium. I realized that learning something new and unfamiliar takes time and practice. During one of my painting classes, I saw that I still needed more exploration to get comfortable with the medium of painting. My realization helped me see that learning takes time and practice, and that students might need time to become more comfortable with a math concept.

*I have been doing my daily practice of drawing for over two years. I started with drawing what inspired me from my surroundings and then explored with improvised drawings. I experimented with improvised drawings probably about a year later. I also started with exploring drawing with my left hand which helped me be more present in my drawing practice. I found myself not overthinking as much when drawing with my left hand, and just embracing what arrived. It took a lot of time for me to become comfortable with exploring different ways of drawing.*

*At around the same time that I started exploring improvisation in my drawing, I was taking my third painting class and still exploring with painting. I was experimenting with using different parts of the paintbrush, painting at different speeds, and painting with moving only my wrist, my forearm, my whole arm and my whole body. It was an embodied experience of using different parts of the body. I was fascinated by the different qualities of the brushstrokes created through different movements of the body. These were my painting explorations in class and home. I didn't have any end products in mind. I was embracing the process of getting to know the medium of painting.*

a)



b)



**Figure 4.2. a) Painting Exploration in Class b) Painting Exploration at Home**

*Even after three painting classes in the last few years, I still felt hesitant to paint. During my exploration with painting in that class, I realized that I was still getting comfortable with the medium. I still had so much to explore. One of the assignments was painting a still life. We did pencil drawings of it first. It was at that moment, while doing the pencil drawings, that I realized the difference in my comfort level between drawing and painting.*

*I was still hesitant to paint at the time, but I wasn't hesitant to draw. When I was sketching the still life, I jumped right in. We did a series of different sketches including contour drawings using one continuous line and without looking at the paper. I felt comfortable and at ease. When I did the painting of the same still life after the drawings, I definitely did not feel the same level of comfort. I realized that it takes time and exploration to be comfortable with in an area. I wondered how I might create the space in my math teaching for students to explore.*

As I pondered how to create opportunities for exploration, I started to think about the risk-taking involved in trying something new and sharing one's work. During my art classes, I experienced vulnerabilities in my learning which helped me realize the importance of continuing to push myself outside my comfort zone to take more risks to further my learning. Vulnerabilities in my learning included embracing imperfection and

mistakes, getting comfortable with uncertainty and changes, as well as putting my work out there for critique. Getting feedback on my work from instructors and classmates was vulnerable for me as a learner. The following story was my recollection of one of my experiences of putting my painting up for critique which helped me realize how difficult it was to not compare my work.

*Walking into my painting class with my canvas in my hands, I felt very nervous. I knew that I would be sharing my painting, but I was worried about seeing it on the wall with all the other paintings. Even though it was an introductory class, I felt that I had little experience as I had just started painting. This was my landscape painting on the wall.*



**Figure 4.3. Landscape Painting**

*When I looked at my painting on the wall, I couldn't help comparing it to the other paintings. I felt that the other paintings were much better than my painting. This experience made me think of my students. I often tell them to focus on their own work and not to compare with the work of others. At this moment, I realized just how difficult this was to do. I felt very self-conscious about my painting.*

*As I reflected on my experience, I thought about how students are often asked to share their learning by putting their work on the wall or write their ideas on the board. Perhaps this might not be comfortable for students to do either, even though they are frequently asked to put their work out there.*

*Putting my own work up for critique in my art classes helped me experience another vulnerability in my learning. As hard as it might be,*

*I'm learning that putting my work out there is part of the learning process in order to further my work. Whenever I share my learning, I get new ideas and perspectives on how to explore further.*

*I've been sharing experiences from my art courses with students and bringing my artwork to show them. When I show students my artwork, they would often suggest what else I could include in my painting or drawing, and point out what they notice. Their comments and suggestions have inspired me to try new ideas in my art practice. For example, when I showed students my left-hand and right-hand drawings of trees, they said the lines in my left-hand drawings were more realistic since the branches are not straight lines like my right-hand drawings. However, they also commented on how my right-hand drawings were more detailed. While listening to their feedback on my nature drawings, I came up with the idea of using both hands in the same drawing. I could use my left hand to draw the lines for the tree trunk and branches, and use my right hand to add more details. I realized that sharing my work has helped me take more risks in my creative process.*

*Although it has been vulnerable for me to share my art, I began to see the importance of getting feedback to further my work. Sharing my work has helped me reflect on how I give students feedback. How could I help students further their work in an encouraging and supportive way?*

Recognizing that it is risk-taking for me to share my work helped me gain a greater appreciation for the work that students shared with me. "To put our art, our writing, our photography, our ideas out into the world with no assurance of acceptance or appreciation – that's also vulnerability" (Brown, 2012 p. 34). Whenever I put my work up for critique, I felt vulnerable as I immersed myself into the uncertainty of not knowing how my work would be received. The experiences of sharing my work helped me embrace moments when students shared their work with me. It became important to me to let them know how much I appreciate their work. I also made opportunities for sharing in my classroom more invitational by giving students the choice of how they share their work. For example, when I invited students to share their writing, some students shared the whole piece of writing, and others shared parts of the writing. Some students also came to the front of the room to share, and others shared from their seats. I invited students to share in way that is comfortable for them. I also talked to them about how difficult it was for me to not compare my work. I shared that what made me have the courage to put my work out there is focus on how the feedback I have received has



helped me grow as a learner. Experiencing my vulnerabilities as a learner helped me better support my students with their vulnerabilities in learning.

### **4.3. Connecting with My Creative Process**

During my art exploration, I reflected on my previous learning experiences to connect with my creative process. As I thought about sharing my work, I recalled that this had been difficult for me to do from my experiences of creating art in high school. I realized that I had also been focused on the product at that time. As I continued my daily drawing practice, I became more comfortable with trying different ways of drawing and seeing what emerges. I found myself embracing the creative process and letting my intuition guide me. I was learning to trust the process. This involved not worrying about the product and not comparing my work. As I tried to improvise in my drawings, I started to let go and trust the process which allowed me to be in the moment. This story connects an experience from high school to my current art practice of drawing.

*As I was thinking about sharing my paintings and not comparing my work with others, I recalled my experiences of taking art courses in high school. I was hesitant to share my work even back then. Whenever I saw my work put up on the wall, I would think that there was more that I could do, and that other people's work was better than mine. I wondered why I felt this way.*

*I remembered being very critical of my work. I thought that my work could always be better and that a piece of artwork could never be finished. One assignment from grade 12 stood out to me. I chose an image from a magazine, cut around a part to glue on a piece of paper and drew the rest of the image. This was a difficult task as I tried to make my drawing look exactly like the image from the magazine. When drawing something from a picture or a still life, I would always think that the original was better than my drawing.*

*Even though I worked hard, spent so much time on this drawing and received a great mark, I was still not happy with it. Then I showed my work to my English teacher at the time, who said that my drawing looked better than the original. I was so surprised by this comment. How could it possibly be better? I wondered.*

*Looking back, I had focused on the product of making my work like the image. Since it didn't look exactly like the picture, I probably thought that it couldn't possibly be better than the original.*

*Thinking about my current art exploration, I connected my high school art experiences to the beginning of my drawing practice. Since then, I have*

*learned to see my environment as an inspiration rather than trying to make my work look exactly like it. This was very hard to do at first. I was comparing my work to what I saw, which made it difficult for me to be in the moment during the creative process.*

*I needed to let go of envisioning the end product to make it my own and to be present in the process to see what emerged. Trusting the process has allowed my drawings to emerge. Sometimes the drawings turned out better than other times. It is what I learned from the experience that I'll take with me to try something new and spark more ideas. In my creative exploration, I'm learning to explore and follow my instincts.*

*Relating to students learning math, I wonder if having more open-ended activities might help them explore math without focusing on the answer or being right or wrong. Perhaps this might help students focus on their thinking and reasoning rather than simply finding the answer.*

As I was connecting with my creative process, I noticed that I was reframing what I saw as imperfection or mistakes. This helped me to shift the focus from product to process in my own learning. In my teaching practice, I also started to reframe the idea that students had about math as being right or wrong by using more open-ended questions where many responses are possible. More details on open-ended tasks will be shared later. Since shifting from product to process in my learning, I also began to think about the connections between writing and math while engaging in the process of writing my thesis. Writing is a continuous process for me of exploring my thoughts and ideas. I wondered how I could use the exploration in the writing process in my math teaching.

*When I think of the writing process, I think about being free and the possibilities. I wonder about what I can write, I can express my ideas in many possible ways.*

*When I think of math, though I'm finding more ways to play with the concepts, I wonder if it might be more constrained when an answer is involved. When there's a right or wrong, students could end up focusing on the product.*

*While students were working on writing in my classroom one day, I realized that the hesitancy in writing and math could be similar in some ways. I have noticed that some students would often ask for the spelling of words rather than sounding them out. There's uncertainty involved in sounding out words as one does not know if it's right or wrong. This might interrupt the flow of writing or even create a block for some students. For students who seemed to be hesitant when writing on paper, I wonder if*



*they might be more willing to sound out on white board or a different surface.*

*Similarly in math, if students were concerned with being right, this might prevent them from trying different ideas. I could recall students being hesitant to write things down until they know it's right and want to erase what might be wrong. This connects with my experience of feeling hesitant to start in my sketchbook, but feeling free to draw on scrap paper. I find that own my risk-taking involves knowing that it's okay to make mistakes.*

*Going back to the connections between math and writing, I think that the potential for what a person might discover and explore is present in both. The challenge is that taking risks and being willing to make mistakes are such key steps to the exploration.*

*In math, students might be stuck when they want to find the right answer and they don't know the basic facts. This might make the concept exploration seem more difficult. For example, my students have sometimes expressed feeling discouraged when working on division through the steps for long division. I found that helping students focus on their understanding of the concept of division helped to open up different ways to approach it.*

*Perhaps encouraging students to focus on the big idea might help them focus on the process. When teaching a concept, it could be helpful to know if students are spending the time on the concept or something procedural which might be overlooked. Through dialogue, I could help guide students through their learning process by uncovering where challenges might arise.*

Although I have found that it is helpful to create opportunities for students to explore the big idea of concepts to develop a stronger conceptual understanding, I recognized that the time for exploration might be limited since there is a lot of content in the curriculum to cover. From my experience, I found that having open-ended explorations or discussions with students when introducing a new math concept helped them to engage with the big idea and pique their curiosity. For example, to help students see the use of measurement and the importance of having standardized measurements, I shared my experience of using measurement while playing bocce with friends at the park with grade 5 and 6 classes. The way we played it involved first throwing a smaller ball on the grass to determine where we needed to aim. Then we each threw a ball to try to get as close to the target as possible. Since it was not always easy to tell the distance between each of our balls in relation to the target, I explained to students that we

needed to measure to see whose ball was closest to the target. We did not have a ruler or measuring tape so we used our feet. I asked students if it would be fair if we all measured with our own feet. They quickly said no because people would have different size feet and suggested that one person could measure all the distances. We discussed the importance of using a consistent unit when measuring for comparison. Then I asked them how the distances could be communicated to others if the foot size was not known. This was when we discussed the importance of having standardized units so that we would have a common understanding of measurement. I found that students were engaged in the discussion by asking questions and offering their ideas. Having a contextualized discussion focusing on the big idea of measurement helped them build their understanding and think about examples of how they have used the concept.

In addition to discussions about concepts, I also used open-ended tasks with students in groups to see how the problem-solving process unfolded when working collaboratively with others. I was curious to see if open-ended tasks might help students focus on the process rather than the product. To better understand my own process, I reflected on writing and problem-solving experiences and found similarities in how they unfolded.

*To help focus on the process in my teaching, I explored my own writing process and problem-solving process with students. Using my drawing and other learning experiences, I shared with students that learning is a continuous exploration and that our understanding could continue to grow. As I looked at my own creative process in drawing and writing, I noticed that exploration involves risk-taking and an openness to explore the unknown.*

*I compared teaching math to language arts by exploring their connections. As I examined the writing process and the math-solving process from my own experiences, I found that openness and improvisation have been important in creating openings, similar to my drawing practice.*

*When I write, I often discover what I didn't know before that was important to me. This has helped me embrace the creative process. Writing has been a way for me to explore my ideas. Different pieces of writing from my journey have helped me understand and make sense of my thinking. Writing allows me to explore these ideas to make connections, such as exploring the parallels between math and writing.*

*From my math problem-solving experiences, I embrace trying different ideas. What I discover along the way informs what I might try next. This is*

*not a planned process. It emerges as I go, similar to when I write. My understanding unfolds in the moment. I have been working on bringing this to my math classroom through open-ended tasks.*

*I used the numeracy tasks “Sharing Cookies” and “Going Canoeing” from Liljedahl (n.d.) to give students opportunities to work collaboratively in random groups using whiteboards. The tasks involved sharing something amongst people and organizing into groups.*

*As I walked around to talk to all the groups, it was interesting that each group often understood the problem slightly differently. The tasks were open to their interpretation. There was not a single way to approach the problems. Students also asked me different questions to clarify their interpretation. They were engaged in the tasks and communicated with each other on making sense of the situations.*

*What I found interesting was that the groups often came up with different ideas as they interpreted the tasks differently, such as organizing the number per group differently. It was fascinating to hear students’ reasoning of how they approached the tasks. I became more appreciative of the ambiguity in the questions and the ideas from each group. It reminded me of the openness in my creative process and the importance of embracing possibilities.*

*As each group shared their approach, I was surprised that students didn’t ask about the right answer. They seemed to have embraced different ideas from each group as well. When I asked students about what they enjoyed during the tasks, they expressed that they liked the opportunity to work in groups. They talked about appreciating the support from the group and sharing ideas, rather than doing math alone. This has been what I appreciated from my own experiences of group work in my math courses. It was fascinating to see how ideas unfolded during discussions. Having dialogues with others helped me make connections and furthered my thinking.*

*Seeing learning as a process is particularly important for students in math. In my experience, students would often express that they think they get it or don’t get it when looking a particular concept. My exploration of teaching math by connecting to the writing process was an opening in helping students focus on their learning process. Perhaps working collaboratively in groups could help them begin to see different ideas and unfold new possibilities.*

Reflecting on my own process of art making, writing and problem-solving in math helped me better understand how the learning process unfolds. From my experiences in all of these areas, I found that I often start with a curiosity or a question to explore. Then I would try out different possibilities by following my intuition and changing directions on

the way as the process unfolds. During the explorations, I gain new understanding as I discover new information. I find that conversations with others help to challenge and further my thinking. This is an on-going emergent process in which I continue to clarify and refine my understanding. Sharing my own process with my students throughout my inquiry gradually helped them reframe the idea of being right or wrong in math as a continuous learning process.

#### **4.4. Finding My Rhythm Through Dance**

At around the same time that I started taking visual art classes, I also started taking dance classes at different community centres. I have always wished that I could have tried dance classes as a child. Through my art exploration, I realized that it was not too late for me to try to explore movement. I became more open to taking risks which gave me the courage to explore dance. I enjoyed improvising through movement. When I improvised in dance, I focused on engaging my senses and became more in tune with my body. I found that the temporality of movement helped me focus on how I felt in the moment and follow my intuition.

In one of the dance classes I took, I ended up doing a dance performance with the class. I would never have imagined myself being part of a dance performance as an adult. It was another opening for me to step outside my comfort zone to experience sharing my work through a performance. This experience helped me see the importance of my intuition in my creative process and being attentive to the role of place in being present. The following story was my recount of the day of the performance.

*I never thought this day would come. It was my very first dance performance as an adult. I had talked to my students about this and asked for their advice on preparing for the event.*

*On my way to the venue, I could feel the butterflies in my stomach. In fact, I had been feeling the nervousness for weeks. I tried to take deep breaths, focusing on each inhale and exhale. Taking in what students had told me about just having fun and doing my best, I decided to focus on the final practice without thinking too much about the performance itself.*

*Interestingly, the final practice turned out to be a performance in itself. We were outside in the open space where people would enter before going into the theatre. My experiences of doing the performance in various places, the studio, the open space and on stage, were all different.*

*I learned that place also has a role in the performance. I was interacting with the space which became part of my improvisation. Since the open space outside the theatre was small, the timing for all the movements changed. I realized that each time I danced was unique just like the performance would be. I started to feel a bit calmer. I just needed to let go and let my movements emerge.*

*Finally, it was time to enter the stage. I was as ready as I would ever be. I entered the stage and just felt the energy of the moment, the music, the dance group and the audience. I was just feeling the rhythm and letting my movements guide me.*

*Surprisingly, I wasn't as nervous as I thought I would be in the moments leading up to the performance. I was no longer focusing on the fact that it was a performance. I was just moving and being free. The performance was over before I knew it. I was glad that I embraced the moment without the worries I had prior to entering the stage.*

*I've come to realize that all the nervousness I had was my body's way of preparing me for the performance. My body showed me that this was really important to me. I was taking a risk at something that I didn't feel comfortable with. I didn't know about the performance when I registered in the dance class, but I was so glad that I got the opportunity to perform. It created an opening for me to continue to put myself outside my comfort zone. The process of preparing for the performance was a learning experience of being in tune and getting into the rhythm of my body.*

My dance exploration was another way for me to experience vulnerability as a learner. I was glad that I took the risk to take dance classes as I found out that I really enjoy dancing. I would not have known this if I had not decided to explore my vulnerability with movement. This exploration helped me find my inner rhythm and trust how I feel. Whenever I explore movement, I feel so free. I am not seeing what the movements look like which allows me to fully focus on the process. This is different from drawing and painting since I can see my creation as it unfolds, unless my eyes are closed. Exploring dance helped to further engage in my creative process and connect with my inner self.

## **4.5. Taking Risks Through Improvisation**

As I engaged in the different art forms in my inquiry, I noticed that I became more connected with my intuition again. This has helped me embrace the uncertainty in my creative process, which was very vulnerable for me. Gradually, I learned to let go of

expecting the product to be a certain way in order to welcome the surprises that come along my way. For example, in my dance exploration, I could potentially plan a certain movement, but I would often end up letting my body guide me. This helped me to trust my intuition and not to overthink each movement. As I learned through the process of exploring dance, improvisation became an invitation for exploration that helped me take more risks in my other art practices.

When I improvised in dance, I let go of being right or wrong. I listened to my body. I became in tune with how I felt in the moment. I never knew exactly how a movement would turn out. Not knowing the outcome helped me embrace the creative process and become more open to the unknown. Through improvisation in my art exploration, I began to see new possibilities in my classroom such as using dance to teach patterns.

*It was a Friday afternoon. I had planned to work on patterns with a grade 5 math group. When I went to find my students in their classroom, they were doing dance. On the way to my class, students talked about how they had been enjoying dance and wished that they could continue. As we walked down the hall, the wheels in my head were turning.*

*When we got to my room, I told my students spontaneously that we could dance in my classroom too. Students looked at me with surprise and asked how. I didn't have a particular plan as I came up with this on the spot.*

*In math, students had been learning about patterns through input and output tables. They had been working on coming up with rules to continue the patterns. I had planned to review different types of patterns with them that afternoon. Instead, I suggested that we could each create a short dance pattern to share with the group. As each person shared, we mirrored back the dance and talked about the patterns we saw in the movements.*

*I wasn't sure how this would go. Though it was exciting to improvise by trying something new unexpectedly, my heart was pounding as I was still uncomfortable with dance. At this point, I was just beginning to engage in visual arts again.*

*As I came up with my movement pattern, I showed students and we all danced together. They described the pattern of the movements. I noticed that I wasn't thinking about the type of pattern as I was creating the dance, I was just following my intuition. This was different from how I learned patterns before. I realized that I had been figuring out existing patterns or making particular types of patterns.*

*This organic experience was the beginning of opening up the space in my classroom for math exploration. "Patterns have the power to engage students, to embody mathematics, and to activate imaginations" (Zazkis & Liljedahl, 2009, p. 20). As students shared their dances and discussed their patterns, they expressed enjoyment of the activity and said that they were surprised to dance in math class. It wasn't what they expected as being possible in math. This spontaneous exploration activated their imaginations to help them embody math in a new way.*

*Not only did the experience open up students' experiences in math, it also opened up what is possible for me as a teacher. I was surprised by this improvisation as I wouldn't have typically imagined myself doing something completely different from what was planned on the spot without prior preparation. "The teacher's art is to connect, in real time, the living bodies of the students with the living body of the knowledge" (Nachmanovitch, 1990, p. 20). In this situation, I was connecting how students were feeling at the time to what I was teaching. Since students wanted to dance, I used movement to engage them in learning about patterns.*

*Reflecting on this experience reminded me of the importance of focusing on the process and being open to surprises. When I created patterns before, I had an idea of what pattern I was making. That afternoon, I just allowed myself to embody the experience of creating movement to see which patterns emerged.*

*As I look back on my improvised lesson, I see that it is another example of the difference between focusing on the process rather than the product. The element of uncertainty of not knowing what would happen opened up possibilities for new understanding. I wondered if focusing on how patterns occur in life might help students see patterns in a different way.*

*After I began to take art and dance classes, I noticed more improvisation in my teaching. I started to slow down and pay more attention to what students were telling me. Nachmanovitch (1990) suggests that a teacher has to teach each person, each class group, and each moment as a particular case that calls out for a particular handling, and that this cannot be planned (p. 20). I realized that the ways in which I teach a concept was changing based on the inspiration in the moment. I became more open to taking risks when opportunities to be creative in the moment arrived. In doing so, I have been exploring math through embodiment and making more connections with my students.*

Improvisation became an opening for me to engage in my art practices and welcome new ways of teaching in my classroom. As I became more open in my art practice, I started to see more changes in my teaching by taking more risks. This was vulnerable for me since I did not know how my ideas would turn out. I found myself more

spontaneous when moments of new possibilities arrived such as creating stories with students to explore a math concept. Students were engaged in the collaborative creation of the story by offering their ideas. Zazkis & Liljedahl (2009) suggest that details of a story can be filled in by the story teller or the story listeners to make the story more interesting (p. 32). The following story is an example of a scenario that I created with students through improvisation.

*The idea of improvisation has helped me with my art exploration. I became more in tune with my creative process. When I improvise in my art practices, not knowing the end product helps me let go of making mistakes.*

*In my classroom, the inspiration from my art practices has helped me become more spontaneous in my teaching. One example was creating a scenario with a grade 6 class through a discussion of how students might use estimation in their lives.*

*To begin the exploration, I asked students to share their thoughts and experiences with estimation. During the discussion, we spontaneously created a scenario together where students imagined going to the store to buy snacks for their friends. This was not planned as it organically emerged in the moment.*

*It started with a student saying that we could use estimation when going to the store. Another student suggested buying snacks for their friends at the store. As students shared their ideas, I became curious and asked how much they might spend. Another student suggested an amount. I asked what kinds of snacks they could buy and how much they were typically.*

*Suddenly, we created a scenario together as a group through students' suggestions like improv. Young (2013) explains that improvisational comedy or improv is theater that is made up on the spot with no script or planning (p. 467). Similar to an improv show where the audience generates ideas, this story of estimation came from students' ideas without any planning. They seemed to be engaged as there was a lot of participation from the class. I wondered if creating a situation together through improvisation helped them feel more connected to the story since it came from their own experiences and ideas.*

*This experience helped me see that I need to encourage students to participate without worrying about making mistakes. Perhaps using improv in math could help with this. Young (2013) explains that the improv concept of "yes, and" is where improvisers agree with what has been previously established and add to it (p. 470). "There are no wrong answers. Rather, every participant's contribution is embraced and heightened" (p. 470). From the process of creating the estimation*



*scenario, I began to see the importance for students to support and add on to each other's ideas to encourage participation and risk-taking.*

*After the creation of the scenario, students worked in groups to figure out if they would have enough money to purchase their chosen snacks. Each group shared their ideas and showed their thinking of how they estimated in different ways. Then students came up with more questions such as if they had one more or one fewer friend. How would this affect how many items or what they could get?*

*I was fascinated by students' enthusiasm and their willingness to explore possibilities in the situation. Perhaps creating the scenario together helped them take more risks in their participation since their suggestions were welcomed. The scenario was based on all of their contributions and students were building on each other's ideas. This improvised experience inspired me to look more into the role of improvisation in my art exploration and in my teaching practice, and how they are related.*

When I improvised in drawing, painting or dancing, I worked with what emerges which opened up possibilities, rather than focusing on a single way. This was an important part of exploring something new for me. My art practices created openings in my classroom. I began to follow what emerges from my interactions with students to explore new ways of teaching. I became more attentive to students' comments and suggestions which helped me change what I had planned on the spot. "The secret is in feeling the audience, engaging the audience, and varying the script where necessary" (Zazkis & Liljedahl, 2009, p. 26). I found myself taking more risks by improvising when moments of new possibilities arrived. I began to unfold learning through curiosities with my students.

*In a grade 5 math exploration group, we were learning about large numbers to the millions through problem-solving. We started by discussing our wonderings. I was curious about how much water is used during a shower. As I shared this wondering with students, they shared their own wonderings sparked by this curiosity.*

*One student wondered how much water is used if the whole world was showering at the same time. This led to an interesting discussion about the access of water around the world. As we talked about the population of the world and water scarcity, students realized that only part of the population has access to showers.*

*Students were enthusiastic during the discussion. We talked about what information we would need to research to explore the amount of water used. We looked at how much water is used during one shower and*

*compared the amount to something we could relate to, such as a jug of milk. Students were surprised how much water was used.*

*Students brought up other factors such as the length of time people might shower. As we unfolded each other's curiosities through this exploration, students were excited and engaged in the conversation. They made sense of quantities by relating to what they knew. This was an important part of understanding large numbers.*

*Throughout the exploration, the questions came from all of our curiosities. It created an opening for students to focus on what they notice and share their wonderings. Students seemed engaged in the process through their enthusiasm and participation. This experience of uncovering curiosities with students helped me see the importance of being curious when exploring math with them.*

Unfolding each other's curiosities was another way that I improvised in my math teaching. Through my art engagement, I noticed that was becoming more curious and engaging in the math concepts I teach in new ways. Being improvisational in my art practices helped me embrace improvisation in my teaching practice.

## **4.6. Sharing My Learning**

As I shared experiences in my art exploration with students, I experienced the vulnerability in sharing my work with them as I did not know how they would respond. I noticed that they also started to share their own artwork with me. I began to see the reciprocity in vulnerability. The more I shared with students, the more they shared with me. I began to see that building a community with my learning support groups was a gradual process that took time. In my own course work, I saw that it also took time for me to feel comfortable sharing my work in the classes, especially my dance exploration.

*I have shared some of my drawings and paintings in my courses. Sharing movement has been something that I have thought about for a while. Then the opportunity came for us to offer something to the class in an arts education course. It was an invitation to share whatever we wanted.*

*This gave me the opportunity to work with a classmate to share movement with the class. It was a collaborative creative process of exploring improvised movement together using different parameters that we came across from our own dance experiences.*

*During the offering, though I was nervous, I felt alive and free as I moved. I was being in the moment and letting my intuition guide me. What stood out to me was the encouragement from my classmates afterwards. This made me feel very nourished and inspired to continue my dance exploration.*

*This experience made me think about the importance of building a supportive learning community for my students. How could I be more nourishing for them? I wondered if recognizing when students are being vulnerable and going outside their comfort zones might be a start.*

*Thinking back to the improvised movement, it took time for me to feel comfortable sharing this art form with the class. This reminded me that building a supportive community and making connections with students would take time. Since I work with many different groups and grade levels, I recognize that the process of connecting with each group would be unique. It takes time to get to know each student and connect with each group.*

As I saw myself taking more risks in my learning and sharing my work. I realized the importance of being part of a learning community in opening myself up to risk-taking. I thought about my own vulnerabilities in learning math as an elementary student and related to the risk-taking that my students might experience in their learning.

*I recalled my own experiences as a math student. This has helped me better relate to students' experiences of learning math. Though I really enjoyed math, I was always hard on myself if I made mistakes.*

*I wondered why. As I reflected further, I realized that I had thought that people around me, both teachers and classmates, didn't seem to make mistakes. Somehow, this stayed with me. I was afraid to make mistakes because it seemed to me that making mistakes meant that I wasn't good in something. What does it mean to be good in math or good at anything in general?*

*When teaching estimation, I have noticed that some students would write an estimate and go back to change it after finding the actual result. Others would find the answer first and then go back to make an estimate. When I talked to students about their experiences in math, I started to realize that students may feel uncertain when estimating.*

*As I thought more about estimation, I realized that estimating involves uncertainty which helped me relate to what students might be experiencing when learning something new. I realized that estimating could be risk-taking for some students.*

*Thinking back to my learning experiences, being uncertain was also outside my comfort zone. This probably made me hesitant to estimate as well. When I look at how I use math daily, I see that I use estimation a lot more than finding the exact amount. This generally involves estimating more than finding the exact answers.*

*I have been approaching concepts differently by emphasizing the process. I realized that I needed to work on helping students to explore by seeing how math is used in everyday life. By having students come up with how they might use estimation, they started to see its importance. It's the process of estimation that's important as it involves reasoning and sense making.*

*Embracing uncertainty has helped me focus on the learning process through my art exploration. I realized the importance of getting over the fear of making mistakes to engage in the process of learning something new. Using my own experiences of learning math, I could see that it is important to nurture risk-taking by helping students see that mistakes are part of the process of exploration.*

As I explored math with students through improvisation, I uncovered more complexity in their conceptual understanding. I became more attentive to moments when I had the opportunity to get to know students' learning process. Pausing in these moments to have dialogues with students about their understanding has helped me better support their learning.

*While exploring math with students, I have uncovered complexity in students' conceptual understanding and their learning process. While working with counters one day, I spontaneously asked students to each grab a handful of counters and estimate the number of counters they had.*

*We discussed the estimates they chose and how they could describe their numbers. Students talked about how many tens and how many ones. What came up for students was whether the number was odd or even as they expressed being uncertain. Students asked which number to look at to determine if it was even or odd. Is it the tens or the ones?*

*Students recalled being taught to look at one of the digits, but they weren't sure which digit. This made me curious about their understanding of odd and even. They suggested that even numbers could be put into groups without remainders, but did not specify two equal groups. I asked them how many equal groups and they weren't sure, but they suggested dividing into two groups. Then we went through examples of different numbers they chose to try to put the counters into two equal groups.*

*We explored each of their numbers by looking at the tens and ones. For example, the number 63 has 6 tens and 3 ones. Students observed that a number is odd when it has 1, 3, 5, 7 or 9 ones as a ten is even and concluded that 63 is odd. This exploration helped them understand that the ones digit determines whether a number is odd or even.*

*This experience created an opening for me as I saw the complexity in uncovering students' understanding. In this case, these students were in grade 5 and had learned about odd and even numbers. However, they might have learned a rule in a previous grade of looking at the last digit without understanding the reasoning behind what odd and even mean. The rule might have become something to memorize which led to not being sure about which digit to check.*

*I started to wonder what other concepts or ideas that students might not be sure of and perhaps might have memorized rules without full understanding. As students go up in grades, it might become more difficult to get clarifications on what they have learned without the understanding behind it, as more content is introduced each year.*

*I found that exploring math through dialogue with students helped them deepen connections and make sense of concepts. As I saw that many of my intermediate students would often know how to find the answer through procedures and not be able to explain their thinking, I realized that looking at students' written responses alone might not show students' understanding.*

To help students build a deeper conceptual understanding, I started exploring concepts through investigation and discussion with them. Having discussions with students helped them see the big ideas and the connections between concepts. An example was finding the circumference by making sense of the relationship between the diameter and the circumference.

*I asked my grade 7 students to draw their own circles of different diameters and explore how they could measure the circumference of the circles that they created. Students suggested using something flexible. One way that we used was covering the circles with strings to measure the circumference and finding the length of the strings on a ruler. The findings were shared and discussed with the whole group.*

*Students observed that the circumference was a bit over three times the diameter. They related this finding to the value of pi. They expressed that they had heard of pi before, but they didn't know what exactly it was. This exploration helped them gain a deeper understanding of the relationship between the diameter and the circumference.*

*My art exploration in the different forms of art has helped to revitalize my own curiosity. I became more open to exploring with students when opportunities have arrived by being improvisational in my teaching. This has helped me uncover the complexity in math learning and better understand students' mathematical thinking.*

In this chapter, I have shared some of my experiences from my art exploration and from my classroom. Throughout my journey, I encountered the vulnerability of being a learner in unfamiliar art forms. I experienced the difficulty of taking risks as a learner, and embracing mistakes and imperfections. It was vulnerable for me to share my work, to put my heart and soul out there and not to compare my work with others. Through experiencing vulnerabilities in my art practices, I connected my own learning process to what students might encounter in their learning. The stories I shared are some examples of how my art exploration has changed my teaching practice and created openings in my classroom. Through improvisation, I unfolded students' curiosities and the complexity in their mathematical understanding. In the next chapter, I will discuss the themes that emerged from my art exploration and their impact on my teaching practice.

## **Chapter 5.**

### **Reflections on My Journey**

Through writing about experiences from my art exploration, I have gained new insights on the learning process which have helped to guide my practice. Writing as a method of inquiry became an important part of my journey. The reflective writing from my art exploration and teaching practice became stories of my key learning moments emanating from my inquiry. My writing process helped to reflect on my experiences and create new understanding. This was an improvisational process of following my ideas as they come to me during writing. "I write because I want to find something out. I write in order to learn something that I didn't know before I wrote it" (Richardson, 1994, p. 517). Writing was a way for me to unfold my encounters and better understand my own learning process. As I wrote about my experiences, I made connections between what I was experiencing as a learner and what my students might encounter in their learning.

In the last chapter, I shared stories from my art exploration and asked questions about how my experiences might inform my practice. In this chapter, I share the themes that emerged from my inquiry. I reflect on the questions from my stories and discuss changes in my teaching practice. How have I been teaching differently? How have students responded in new ways? As I looked back on my art exploration, I developed a greater appreciation for the vulnerabilities in learning, the learning process and the importance of building a supportive learning environment. My journey in art exploration has helped me see that learning takes time. It took a lot of time and practice for me to begin to feel comfortable with drawing and exploring movement. I also saw that I still needed more exploration with painting. These experiences have helped me slow down in my teaching in order to listen to and connect with students' learning journeys. My inquiry has opened me up to embracing the uncertainty and the possibilities that arrived, which created openings in my classroom.

#### **5.1. Appreciation for Vulnerability**

Although I have always encouraged students to try and take risks, I needed to experience vulnerability for myself, especially being vulnerable in my own learning. It

gave me a greater appreciation for what students might encounter in their learning process. In my art exploration, I experienced vulnerabilities in different ways. When I reflected on how long it took me to finally engage in visual arts again, I realized that it had been a long time since I was exploring my artistic self. It took a lot of courage for me to finally step outside of my comfort zone to engage in my art practices again. This was only the beginning of being vulnerable through risk-taking for me. Looking back, I realized that it takes courage to be vulnerable. As an adult, there are things that I have always wanted to do that I did not do until I actively pushed myself outside my comfort zone during my inquiry. This included taking classes in visual arts and dance. I always thought one day I would draw again and perhaps try dance. The fact that it took so long for me to put myself outside my comfort zone to finally take risks gave me the opportunity to experience the vulnerability in learning for myself. Taking the first steps in my drawing exploration helped me begin to take risks and connect with my creative process.

*I reflected on how long it took me to open my sketchbook, I started to think about the different surfaces that I've worked with when drawing or painting. I found that this makes a difference in the risk-taking in my work. For example, I found myself taking more risks when I drew on a scrap paper compared to in a sketchbook at first, or when I painted on a paper compared to on a canvas.*

*My first steps in drawing made me wonder if having work on a surface that is not permanent or a surface that can be easily altered might encourage students to take more risks. I have used white boards with students for them to show their work and found that they seemed to prefer using white boards over paper.*

*Perhaps showing their thinking is part of the process of exploration, which could be difficult if students see recording their thinking as part of the product. I could see why they might be hesitant to write down their thoughts as they might not want to make mistakes.*

As I reflected on my journey of art exploration, I learned to let go of imperfections in order to be present and focus on my process of art making. "What we have to express is already with us, *is* us, so the work of creativity is not a matter of making the material come, but of unblocking the obstacles to its natural flow" (Nachmanovitch, 1990, p. 10). I realized that the idea of imperfection was blocking my flow of creativity. I needed to reframe what I saw as imperfections as my guides in the process. Gradually, I gained



the courage to let go of the worry of how something would turn out and allow my creative process to guide my exploration. Improvisation helped me to explore new ways of drawing and creating movement as I learned to follow my intuition and trust the process. The more vulnerable I allowed myself to be, the more I found myself immersed in my own creative process. It was fascinating to experience how it unfolded in the moment. Being vulnerable in my art engagement allowed me to open up to uncertainty, embrace the unknown and see new possibilities.

My learning process of diving into vulnerability slowly emerged over time with continuous practice and support from others. This was important in my journey as I have become more empathetic in my teaching and more attentive to what students shared with me. In the past, if students were hesitant to try new things, I would encourage them to take risks and let them know that it was okay to make mistakes. This was more easily said than done. It was when I experienced the uncertainty and discomfort in my inquiry through my art engagement that I learned to better support how students might feel. I realized the importance of sharing my own vulnerabilities with them. This started with telling them what I found difficult to help them see that we all find different things challenging, as I mentioned previously. It was surprising that students were not sure what would be shared. Although I felt vulnerable while sharing, I noticed that students were engaged in the discussion. They were surprised that I did not feel comfortable with movement and offered ways that I could practice. Through further discussions, they recognized that what might be challenging could be different for each of us. Students would sometimes say that something was easy, but understanding that it might not be easy for another person was an important part of building a more supportive learning environment. Having the courage to share what was difficult for me started this conversation and helped me to begin to be seen by students.

During my inquiry, I created the space for students to explore their own learning process in my classroom. As I talked about my own experiences as a learner from my art exploration, I began to open the conversation about vulnerabilities in learning with students. I realized that being vulnerable involved being open to changes and seeing them as new possibilities. As I experienced this for myself, I shared more of my learning stories with students. For example, I shared how I felt when entering my art classes after a long time of not creating artwork and putting my work out there to be critiqued. As I continued my art exploration, I noticed that I was gradually putting myself more and

more outside my comfort zone by sharing more of my artwork with others. As I shared the stories of my learning and my artwork with students, many of them were surprised that we shared some of the same feelings of being nervous about presenting our work. Showing my own vulnerabilities as a learner helped me better connect with my students and allowed them to see me as a learner.

It took courage to put my artwork out there to get critiqued in my art classes. I became more aware of being critical of my own work. I experienced the vulnerability of getting feedback as I was putting creations from my heart out there. Even though I have suggested to my students about not comparing their work to others' work, this was very difficult to do for myself when I tried not to compare my own work and focus on my own growth. I saw that students were also putting themselves out there when receiving comments which helped me rethink how I gave them feedback. I focused on students' strengths to help them move forward in their learning. I worked with students to recognize, build on their strengths and support what they would like to work on to further their growth. This was a collaborative process. For example, I would ask students to choose one or two things that they would like to work on. Then I would suggest ways to support their learning and allow more time for them to explore a concept if needed. Whenever I shared my own artwork, I often got new ideas of how I could continue to explore the medium. When students shared their work, I found it helpful to ask them what they would like gain from this experience since the purpose of this might not always be clear to the students. Having dialogue with my students about their work helped them become more self-aware in their learning process.

Bringing my artwork and writing to share with students helped me better understand when students might not feel comfortable sharing their work. As I experienced the vulnerabilities in my learning, I realized the importance of creating a supportive environment for students, fostering risk-taking in my classroom and inviting students to share their work. The more I put myself out there by sharing my journey of art exploration with them, the more students shared their own learning process and their own artwork with me. I experienced the reciprocity of vulnerability in my classroom. The idea of vulnerability as reciprocity lingered with me. Students showed vulnerability through bringing in their sketchbooks to show me, asking me about ideas for their art practices and suggesting that we do art activities together. These interactions have opened up the space for making more connections in my classroom. I also felt inspired

to continue taking risks in my own art practices and try new explorations. As I shared my artwork with students and embraced their suggestions, I experienced that learning something new and familiar could be uncertain and uncomfortable. Seeing this perspective has helped me become more empathetic and supportive of students' learning journeys.

Sharing my learning experiences with students has helped them open up to share their stories of learning. Through sharing my learning process with students, we found commonalities in our learning journeys. Our experiences sometimes mirrored each other which has helped me better support students' learning needs. Being vulnerable with students by sharing my learning journey opened up the space for exploration and risk-taking in my classroom. The reciprocity of sharing became an important part of my teaching as it helped to build a community within each of the learning groups of different grade levels in my classroom. Sharing my learning from my inquiry with students helped me better understand the parallels between my art exploration and their learning. This helped me see the importance of sharing vulnerabilities to create a more supportive environment for risk-taking in my classroom.

## **5.2. Building a Supportive Community**

Through my daily drawing practice, I reflected on how long it took for me to get started in my art exploration. It made me think about the importance of creating a supportive learning environment to nourish risk-taking. As I began to open up through my art exploration, I found myself becoming more improvisational in my teaching. I was more spontaneous and attentive to each moment as opportunities arose to try new ways of teaching. Even though taking risks in front of students took courage, I realized the importance of creating an environment that supported risk-taking. This involved taking risks in my teaching to show students that going beyond the familiar was a key part of my learning process. This was hard for me to do at first, but I began to see the importance of encouraging risk-taking in my classroom through taking risks myself.

From my own educational experiences, I did not recall many instances of seeing my teachers taking risks or talking about risk-taking in their learning. I wondered if this could have affected my openness to taking risks as a student at the time. As I experienced vulnerability and risk-taking in my art exploration, I started to think about the

importance of sharing my own learning journey and vulnerabilities with students. My experiences have helped me become more supportive of students' learning process. As I learned to appreciate the uncertainty of learning something new and unfamiliar, I began to experience the importance of having a supportive environment for exploration in my own learning. I saw that students were frequently asked to take risks and try new things. Experiencing risk-taking for myself helped me recognize when students were taking risks. I become more appreciative of when students show their vulnerabilities. As I began to improvise in my art practices, I found myself more improvisational in my teaching by being more open to students' suggestions of trying new ideas.

How could I create the space for students to explore and take risks in my classroom? As I pondered this question, I wondered if embracing the struggles in learning might be a start. This involved seeing mistakes as openings and the potential they offer to move learning forward. I realized that it is important for students to see that feeling challenged is part of learning. When something is challenging, it could be a learning opportunity rather than a feeling of being inadequate. I wondered how I could help students see challenges more positively. This involved revisiting when I had asked students to think about skills that they have learned and seen that they have improved overtime. Using examples of a skill in a sport or playing an instrument, students could see that they had to keep trying and practicing in order to improve a skill. When I related to this to my art exploration, I realized that I had to learn to embrace mistakes and uncertainty. Improvisation has helped me welcome the unknown and the potential for new possibilities. Perhaps supporting exploration by creating a nurturing environment for students to try different things and value mistakes as part of learning might be helpful. In order to do this, it would be important to build a community for students to collaborate to support each other's learning where they could share and give each other feedback on their work in an encouraging way.

Thinking back to my spontaneous use of dance to teach patterns, I saw that this experience helped my students see patterns from a different perspective. Students responded to this with engagement and enthusiasm. Perhaps this new way of approaching patterns created an opening in how students viewed the use patterns around them. As I began to improvise more in my teaching, I found myself feeling more alive with possibilities. I embraced opportunities that came up for students to experience math concepts in different ways rather than just following steps given. In my own

experience in math problem-solving, I see that my process is also improvisational. I would start with a strategy and based on what I discover, I would try something else. It is not a planned process for me. As I make choices when approaching a problem, I learn from my process which informs my next steps. When I work on problem-solving with a group, I find that the different ideas that come up guide the improvisational process. We build on each other's ideas which leads to new ideas. I find that the collaborative process of exploration provides opportunities to develop and refine understanding. Creating opportunities that support collaboration could be an important part of building a learning community and helping students see learning as a process.

Reflecting on my own writing process, I see connections between math and writing. When I write, it is an ongoing process of refining my ideas. I see this in math as well. The more I teach and explore math with students and on my own, the more I find new ways of connecting different concepts. My understanding is still continuously being refined. When students would share their learning experiences in math, they seemed to view their understanding as binary rather than an ongoing process. Perhaps emphasizing the process by using tasks with multiple possibilities could help students focus on their conceptual understanding rather than finding an answer. Students have also described math as an area in which they have worked mostly independently. Experiencing the unfolding of my own understanding through continuous dialogue with others has helped me see the value of working in groups collaboratively. In order for students to take risks while exploring concepts in groups, it is important to build a supportive learning environment where students appreciate and support each other's work.

From my own experiences of being in a learning community from taking courses in a cohort, and classes at the community center, I found that making connections with people helped me take more risks in my learning. It took time for me to get to know my classmates and feel comfortable exploring and sharing my work with them. In my experience of improvising with students to create the estimation scenario that I mentioned in the last chapter, I saw that supporting and adding on to each other's ideas could be an important part of community building. I noticed that students who might not have typically offered their ideas were contributing to building the improv scenario.

*I began to see multiple layers of improvisation which included how I improvised to create the activity, how the scenario unfolded with students, and connections to my own art improvisation. I think the improvisation from my art practices helped me become more spontaneous in my teaching. The improvised activities came from the spontaneity of the moment and the inspiration came from my art exploration. Opening up to possibilities through improvisation has helped me become more curious and more spontaneous to explore with students.*

*Perhaps improvisation could give students the chance to connect and collaborate as a group. Young (2013) suggests that improv can help students learn to take risks in the classroom and emphasizes the importance of creating an environment where everyone feels comfortable participating (p.469). This reminded me of the importance of having opportunities for students to participate and not worry about making mistakes. Building on and sparking each other's ideas and curiosities through improv might help with creating a more supportive learning environment.*

Improvisation in my art exploration has helped me reignite my creativity and curiosity. It also became a way for me to explore, embrace the unknown, and discover new possibilities that I did not know of before in my teaching. This was risk-taking for me as I did not know how things would turn out, but I was curious to find new ways to explore concepts. "Teachers need the time and encouragement to feel curious themselves and the chance to see what it's like to follow the answer to a question, wherever it may lead them. Developing their own capacity to be curious and to act on that curiosity is one of the most substantive and useful skills teachers can acquire" (Engel, 2011, p. 643). My art practices helped me become curious again. The uncertainty in my creative process of not knowing how my artwork would turn out led to new ideas for new creation. This helped me see the beauty in uncertainty and become more open to trying new ways of teaching. In my art exploration, taking dance classes was particularly unfamiliar to me as I did not feel comfortable with movement. However, I found that I really enjoyed exploring movement. I would not have known this if I did not try it. This experience helped me see that perhaps providing opportunities for students to experience math in different ways could broaden their perspectives of math.

Becoming more open to explore my creativity and curiosity in my art practices has helped me embrace students' curiosities. I found myself being more open to trying students' suggestions to see what could happen. I saw their suggestions as invitations

for new learning opportunities for me. I tried new ways to teach math to create openings such as using art and movement for students to experience math in more embodied ways. Not knowing how the math activities would turn out was vulnerable for me, but it showed students that it was okay to explore new ideas. Engel (2011) suggests that the teacher's own behaviour has a powerful effect on a child's disposition to explore (p. 636). My curiosity in trying new ways of teaching created opportunities for students to share their wonderings. "Instilling curiosity and interest in children is best achieved when teachers themselves are curious and interested, such as when they are excited, involved, self-directed, and trying new things" (Shin et al., 2019, p. 457-458). In my journey, engaging in the creative process helped me reconnect with my own curiosity and interest. Opening up through my art exploration helped me become more curious when teaching. Sharing my own wonderings with students created the space for them to explore their curiosities. In the process, I made stronger connections with students and began to build a more supportive community for exploration.

### **5.3. Learning Takes Time**

In my journey, I experienced risk-taking in learning and realized that I needed to step outside my comfort zone to explore the different art practices. The learning process took time and continuous practice in a supportive environment. My art exploration helped me appreciate the learning process and the time that it took for me to become more comfortable with different art forms. My experience inspired me to help students see learning as a process and appreciate the time that it might take to learn something new. During my journey in art exploration, I examined my learning process in the various art forms. Although my comfort levels in drawing, painting and dancing are different, what I noticed was that getting more comfortable with a medium takes time. As I looked more into my experiences in different art practices, I saw that getting more comfortable in these areas depended on my continuous exploration and the support in my environment.

Thinking about drawing, I started exploring through my daily drawing practice of experimenting with lines and shapes. My comfort level with drawing has grown more than painting as a result of my continuous daily practice on my own. I explored different ways to create improvised drawings such as having my eyes closed and not using an eraser, as well as using both my left and right hand to draw. While exploring, there was no right or wrong way to draw for me. I embraced the freedom of trying things out and

seeing what emerged. As I reflected on this, I realized that practicing drawing on my own was a key factor. My daily drawing practice gave me the opportunity to explore out of my own interest and not for any assignments or classes. Perhaps this made a difference in my comfort level for risk-taking. All the drawings I created were for myself. I was not necessarily planning on showing my work to anyone. The drawings were for my own exploration and growth. I was engaged in the creative process for myself. Though I have shared my drawings with people, I was not doing it for an audience and my work was not meant for others. I wondered if students have a lot of space for learning through exploration for themselves and how I could enlarge this space for my students.

Just like drawing, my comfort level with movement increased with more exploration. It did not happen overnight. It was a continuous engagement in trying different movements in a supportive environment that helped with my exploration. This took time and courage. The more I felt connected in the community dance class, the more I felt comfortable with exploring movement. In painting, it started with learning about the medium as a way to communicate through experimenting with different brushstrokes. I realized that getting to know the medium was part of the learning process.

*I had thought that I was going to paint in the first class. I realized that learning about the colours and the paintbrushes are part of creating a painting. This was the beginning of my exploration to get to know the language of painting.*

*I wondered if this was what students might need, the space to explore and play with math. As I pondered, I thought about the ways in which students often describe math as finding answers on worksheets. Mixing colours for my painting class and trying different brushstrokes helped me see that students needed opportunities to explore and take risks in math.*

I connected how I felt during the first painting class to creating the space to explore in math. When I related my experiences in art exploration to teaching math, I saw that students needed more time to explore math concepts. When asking students about what they know about concepts, I noticed that they often begin to describe the procedures or steps involved. Perhaps they have experienced math as structured steps to follow rather than a space to explore and connect with ideas, which made them describe concepts this way. I noticed that learning through this structure did not



necessarily equate understanding. Perhaps students needed to explore and make sense of the concepts for themselves, since they would often be able to follow procedures without fully understanding the concepts. An example I shared from the last chapter was students not being sure about how to tell if a number is even or odd. From this encounter with students, I could see that if they were taught to look at the last digit without understanding what makes a number even, they might try to remember the rule instead of trying to make sense of the concept.

As I thought about giving students more time to explore, I was also reminded that students were often wanting to get the work done and saw doing math as following steps to find the answer. When given more time to explore concepts through discussion or hands-on activities, I noticed that students did not necessarily see this as doing math, and that they would ask where we were going to do math. I wondered if they needed to slow down to explore concepts. I found that my own understanding in math continued to deepen as I explored further with students. Working collaboratively with students helped me see how their learning processes unfolded which allowed me to better support their learning.

To help support students in their process, I reflected on what makes me persevere. When I am working on something, seeing that I am making progress helps me keep going. Recalling past experiences that were positive and successful can also be helpful. Perhaps helping students see their progress in their exploration could encourage them to keep exploring. It might also be helpful to remind students of their previous successes and positive experiences and build on them. Creating opportunities in class for students to build positive experiences would take time. It would be taking small steps at a time while approaching their encounters in math with openness and curiosity. What do they know that they did not know before? What are they still curious about? What do they still want to know? Believing that they can be successful could be an important part of students' willingness to persevere. Perhaps talking about how success might be different for each person could also help students see their own progress, which connects with not comparing to other people's work. In my painting class, I experienced that not comparing my work was difficult. I think focusing on my own learning process helped me to see progress which inspired me to continue to further my work.

Reflecting on my risk-taking in my art exploration, I realized it was it was a gradual process. This was a reminder to me that learning takes time. I needed to slow down myself through my own art practices in order to slow down my teaching. In order to explore, I found that not analyzing my work while trying to create helped me let go of the product and focus on the process. This allowed me to get into the flow of exploring drawing, painting and creating movement. In my exploration, I found that encouraging comments through descriptive feedback, and comments for areas of further exploration helped to guide my learning process more than marks did. This made me think about the importance of supporting students in their work by focusing on where they are in their learning process and providing positive encouragement. I found that when students were making discoveries in math in the intermediate grades, I could often see their excitement. However, they would sometimes express that it was something that everyone probably knew already. This reminded me of the importance of emphasizing that learning takes time, and that we are all working at our own pace. My encounters with students showed that it is important to recognize their learning process and celebrate individual learning milestones to encourage them to keep exploring and discovering. To help students see that learning is a process that takes time, I needed to experience it for myself and share my learning journey with them. This helped me build deeper connections with students and become more appreciative of their learning process. My learning journey has helped me better connect with their experiences.

I have also noticed that students' prior experiences could affect their openness to trying different ideas. Perhaps the key is to understand what they see as being good in something and challenge or broaden their perspective. For example, if they see being good in math as being fast and accurate, perhaps celebrating successes that are different such as risk-taking and persevering in problem-solving could be a start. In writing, students often see success as writing a lot. They often think that the more they write, the better their writing is. In this case, it might be important to focus on the quality rather than quantity. This could be opening up the length and the format of writing to students as they often ask how much they have to write. Perhaps having these new experiences over time might help students see connections between math and writing more positively and embrace their process along the way. It would most likely take time for students to shift their thinking in math and writing. Hopefully having opportunities for positive experiences could help open up their mindset on their own learning process.

Seeing progress in my work and getting positive feedback have supported me to keep exploring and sharing my work. This reminded me of sharing movement in one of the courses I took. It was vulnerable for me to put my work out there, but knowing that the class was supportive helped me take the risk of sharing my dance exploration. Perhaps it is important to know what risk-taking might look like for students. I recognized that it might be different for everyone. When building a supportive community, it is important to have the support from both the teacher and the classmates. From my own experiences, I recognized that this would take time to build as students would need to get to know each other as well as the teacher. More opportunities in the classroom for dialogue about learning experiences could help with community building.

#### **5.4. Opening Through Reciprocity**

My art exploration created a path for me to be vulnerable through taking risks and going outside my comfort zone to face uncertainty. By exploring improvisation in different forms of art, I became more open to possibilities and began to embrace the beauty in uncertainty. Appreciating vulnerability in the learning process changed my teaching practice. As I experienced vulnerability in my journey and started sharing my own experiences with students, I began to connect with them through our encounters of learning something new. As I shared more with students, they also began to share more of themselves with me which helped me see the reciprocity in sharing our vulnerabilities. This facilitated the process of building a more supportive learning community in my classroom. As I became more vulnerable with students, I created openings in my classroom by embracing what arrived from our discussions. I listened to what students shared with me and tried their suggestions spontaneously, which took me outside of my comfort zone. I noticed myself becoming more open to possibilities as I engaged in my creative process through my art practices.

Experiencing and sharing my vulnerabilities with students helped me build stronger connections with them which allowed me to take more risks in my teaching. Being vulnerable was an important part of following students' suggestions of trying something new. I saw their suggestions as invitations to explore. I delved into these moments of possibility and embraced the unknown. This allowed me to open up to students by taking more risks in my teaching practice. Being improvisational was a key

change in my teaching. Improvising in my art practices helped me become more open to taking risks by letting go and allowing the moment to guide me.

It took vulnerability for me to try teaching in new ways spontaneously. Opening up in the ways that I teach math was risk-taking for me. In the past, I might have said to students that I would consider the possibility of using dance in math another time rather than diving into the unknown in the moment. Now I find myself more likely to just say, “Why not? Let’s try it.” I am more appreciative of students’ ideas and suggestions. Being in the moment and improvising helped me to become more intuitive and more authentic by following my own creative process. By being open to trying new ideas, I saw that students were also opening up to exploring math in different ways. Sharing aspects of myself, my stories and my work led to students sharing more of themselves with me. The reciprocity of being vulnerable created an opening to building a more supportive learning community for risk-taking in my classroom.

## Chapter 6.

### Conclusion

As an elementary learner support teacher, I have experienced students expressing their challenges in math. When I started my journey, I had planned to focus on students' stories of learning math to better understand their experiences in order to create openings in the ways that students perceived math. To my surprise, it was looking within myself and rediscovering my interest in art that allowed me to create openings in my classroom and build stronger connections with my students. My inquiry became a journey of the heart. Through putting myself outside my comfort zone in my art exploration to experience vulnerability, I developed a greater and deeper appreciation for learners and the learning process. I learned the importance of continuing to put myself in the vulnerable position as a learner and reflecting on my experiences to inform my teaching. Brookfield (1995) suggests that if we find ourselves regularly in the situation of trying to learn something new and difficult, we can use this experience to gain an appreciation of the terrors and anxieties our own students are facing (p. 50). Through my art exploration, I experienced the uncertainty of learning something new and unfamiliar. This helped me embrace students' stories of learning and share my own vulnerabilities with them. I made deeper connections with my students by looking within myself and my own experiences. I learned the importance of sharing my learning journey and vulnerabilities with my students. Hearing about my learning experiences as they unfolded in new and unfamiliar areas helped students see that learning is a continuous process.

Reconnecting with myself through exploring my interest in art was the start to becoming more open to possibilities. Looking within my own learning process helped me see the risk-taking involved in learning. This was vulnerable for me as a learner. Sharing my art exploration with students helped me experience the reciprocity of vulnerability. Although my experiences as a learner are different from students' experiences since our learning contexts are very different, the process of sharing vulnerabilities in my learning with students still created the space and opportunity for dialogue about the learning process. Despite our learning contexts being different, students still expressed that my journey helped them see learning as a process that involves being vulnerable. When I

showed students that I was taking risks by welcoming their suggestions as invitations to explore new ways of teaching without knowing the outcome, we discussed the importance of risk-taking and embracing it as part of the learning process. These discussions with students helped to build a stronger and more supportive learning environment for risk-taking in my classroom.

My inquiry focused on my learning journey of opening up through my art exploration. I examined how my art practices have helped me take more risks in my teaching practice. By sharing my inquiry, I hope to show that being outside of one's comfort zone as a learner could help teachers experience vulnerabilities and inform their practice. When I thought about why I have not drawn or painted for so long, I realized that I had to put myself outside of my comfort zone to be vulnerable. I learned that I had to actively push myself to take risks in my learning. Enrolling in art courses helped me step outside of my comfort zone to face my vulnerabilities as a learner. It made me wonder how difficult this might be for students. I began to see the vulnerabilities in learning that students might experience. My inquiry helped me develop a greater appreciation for students' learning journeys and their process of engaging with their learning.

## **6.1. Opening Through Vulnerability**

My art exploration opened up my creative process and my teaching practice. I have always encouraged students to try and let them know that it was okay to take risks. I learned that this was difficult when I experienced uncertainty in my art engagement. Although I have always wanted to explore art again, it took a long time for me to put myself outside my comfort zone during my inquiry to take classes in visual arts and dance. My learning process helped me appreciate that becoming comfortable to explore something new and unfamiliar could take some time.

When I shared my vulnerabilities in my art exploration, students related to how I was feeling throughout my journey. I began to see an opening in my classroom. It allowed students to see me as a learner actively engaging in the process. This was different from sharing past learning experiences since students could see the time it took to make progress. My learning experiences enlarged my openness as a teacher. Experiencing vulnerability in my own learning process helped me better connect with

students' learning experiences. Through my inquiry, I found that being vulnerable was an important part of creating a supportive learning community. Appreciating the vulnerability in learning changed my teaching practice. I became more attentive to what students shared and more empathetic of their experiences.

By sharing my learning experiences, I made deeper connections with students. It took courage for me to be vulnerable with students which made me more appreciative when they opened up and shared their learning experiences with me. Brown (2010) suggests that there is risk involved in practicing authenticity and putting oneself out into the world (p. 53). As I put myself out there by sharing my learning process and my work, I was taking the risk of having aspects of myself as a learner seen by my students. "Staying vulnerable is a risk we have to take if we want to experience connection" (Brown, 2010, p. 53). This quote resonated with me as being vulnerable with students helped them be vulnerable with me which deepened our connections. The more I shared with students, the more they began to share with me. By sharing that what was difficult for me, they saw that we all have different challenges. This helped me see that sharing vulnerability is reciprocal and that building a supportive learning environment was a gradual process. Becoming more empathetic by listening to what students shared with me helped us explore new possibilities in the moment. Gradually, I became more vulnerable with students by taking risks through their invitations to be spontaneous and embracing what arrived. The reciprocity of vulnerability was an important part of building a learning community in my classroom.

## **6.2. Embracing the Process**

In my journey, I learned that an important part of shifting from product to process was trusting and allowing the process to guide my exploration. In order to do this, I needed to become more intuitive and in tune with myself. My art practices of drawing, painting, dancing and writing helped me to slow down and be in the moment. As I explored, I learned to trust my intuition. I had to let go of my own worries of imperfection and the product in order to fully immerse myself in my own creative process. I allowed my creativity and curiosity to guide me which helped me open up to new possibilities. I integrated my art practices to discover new ways to explore such as using my drawing and writing to inspire new ways to explore movement. This is an area that I would like to

continue to explore further in my teaching such as incorporating more embodied ways of learning using movement, drama and visual arts.

Being outside my comfort zone and having the courage to share my learning experiences with students was vulnerable, since I did not know how students would respond to what I shared. This helped me see that it might be also difficult for students to share aspects of themselves. By sharing my learning, my students shared more of their experiences with me. The reciprocity of sharing vulnerability created openings in my classroom. In order to for this to happen, I learned that I had to be open first. Opening up for me involved taking more risks and trying new practices from visual arts and dance classes, as well as teaching math in different ways. As I embraced the process and welcomed what arrived, I found myself shifting from product to process gradually. This shift took time which was part of the reason why I was hesitant to engage in the arts again. I wondered about what I could draw or paint rather than just doing it. Envisioning the product made me more hesitant to start and get my creativity flowing.

Following my creative process and curiosity was an opening for me. When I finally engaged in art practices, I realized that creating and analyzing are different processes. I saw that focusing on the product made it hard for me to create as I was analyzing while creating. Perhaps students might feel this way in math when focused the answer. Rather than exploring concepts, they were sometimes focused on being right or wrong. Using different ways to teach math such as making dance patterns helped them experience math differently. Creating an estimation scenario using students' ideas like an improv show was another way to show that they could use their daily life to explore math concepts. As I noticed myself becoming more curious in my journey, I realized that I had to be curious myself in order to nurture students' curiosity. Being more open helped me become more curious. I wanted to explore ideas in new ways. When I had the product in mind, I tended to focus on the product and limit myself. When I did not plan exactly what I was going to create, the possibilities became endless. To help students to see these possibilities, I needed demonstrate curiosity and being open to possibilities. It was important for students to see that I was also learning to help them witness learning as a continuous process.

Continuing my current art practices and exploring new practices through improvisation will help me continue to focus on the process. I envision myself continuing



to share my learning with students and being vulnerable with them. Sharing aspects of myself with students helped me see that it might be difficult for them to share themselves with me and with each other. By sharing aspects of my learning with students, it showed them that learning is a vulnerable process that involves risk-taking. I needed to engage in my own process of learning again in order to better understand and embrace their processes.

### **6.3. Exploring Through Improvisation**

My art exploration created a path for me to be vulnerable. Improvisation was a key change in my teaching. Stepping outside of my comfort zone and exploring improvisation in different forms of art helped me become more open to possibilities and embrace the beauty in uncertainty. I used to stay in my comfort zone by having everything planned and knowing exactly what I would be doing. Now I see the potential of uncertainty and the importance of going outside my comfort zone to explore the unknown. When changes arise, I appreciate the new possibilities that emerge and the potential to open up the space for exploration. I realized that in order to open up students to see math in new ways, I needed to open myself to taking risks and exploring the unknown. Through my art engagement, I reconnected with my curiosity and creativity which began to help me embrace uncertainty.

Improvisation in my art practices opened up my creative process. Instead of going with what I have planned, I found myself becoming more improvisational when moments of possibility arrived. Not thinking or even knowing what I was going to draw or paint, and how I was going to move my body allowed me to just create and follow my intuition. One line, brushstroke or movement led to the next, rather than being planned in advance. Improvising helped me let go of what the product might be and embrace the beauty of uncertainty. I started to experience this in my artwork as well as my movement exploration. I felt free to explore and focus on the process. Improvisation in my art practices led to spontaneity in my teaching and other aspects of my life. I found myself being more open to trying new ideas in general. Whenever changes arrived, I began to embrace the new possibilities that they brought.

My inquiry has been a life-changing experience for me. As I opened up to new ways of exploring my art practices, I became more curious. My reignited curiosity has

allowed me to approach my teaching in new ways by being more spontaneous and trying students' suggestions on the spot. I realized that openness is reciprocal as well. I needed to be open to welcome their suggestions. As I became more open with them, they also became more open to new learning experiences which made me feel more comfortable to take risks. Embracing the unknown through improvisation helped me take more risks in my art practices and my teaching.

## **6.4. Continuing My Journey**

When I look into the future of my practice, I see myself continuing to go outside my comfort zone to explore the arts and other areas of learning. I see myself continuing to share my learning experiences and my work with students. I also see myself continuing to explore new ways of teaching math and other subject areas. My inquiry was only the beginning of my journey of rediscovering myself as a learner and a practitioner. I hope to share my experiences with teachers to show the importance of allowing students to see one's learning process. In my experience, taking risks and opening up myself to the unknown was the start of creating openings in my teaching and exploring new possibilities in my classroom with my students.

As I continue to engage in the arts through my art practices, I will explore more embodied ways inspired by my art exploration to teach math, and continue to use improvisation in my teaching. In my inquiry, I found that taking on students' ideas was a way for me to take risks in trying something new. Welcoming and trying students' suggestions in my teaching will continue to be an important part of my practice as I explore and unfold learning with them.

### **6.4.1. Student Perspectives**

In my inquiry, I became more open through my art exploration which helped to create openings in my teaching. I embraced students' ideas and tried their suggestions on the spot. I realized that these moments could arrive and leave without notice if I was not open to exploring new ways of teaching in the moment. Being open to follow what came along allowed my own curiosity and creativity to guide my teaching. Letting the moment unfold helped me embrace the process of discovering possibilities with students. I appreciated the exploration and journey that we went on together. Seeing

that I was taking risks to try something new helped them open up to math in new ways. I hope to continue to take more risks with students and discover new ways of working collaboratively with students to unfold learning together.

Since my inquiry has focused on the changes within myself and in my teaching practice in math, my next steps would be to continue to explore new approaches of teaching in other subject areas and learn more about students' experiences in my classroom. In my inquiry, I have seen positive comments and more participation from my students. I embraced what my students have taught me. I was inspired by their imaginations and openness through their suggestions. To further my exploration in trying new ways of teaching, I would like to know more about students' learning journeys in my classroom. I would like to explore students' perspectives as a result of the changes in my teaching practice and sharing my learning experiences. This could be helpful in developing a greater understanding of the effects of the reciprocity in sharing vulnerability. Some ways to explore students' perspectives could be inviting them to share their experiences through their work, reflections, surveys, interviews, group discussions, or representations of their learning in other forms. Having a better understanding of students' perspectives through documenting their experiences could help me learn more about the impact of the openings that I created in my classroom. It could allow me to better understand what aspects of the changes in my teaching practice helped students open up to seeing math in new ways and inspire new ways to create more of these opportunities in my classroom.

As I get to know students' learning experiences in my classroom, it would also be helpful to explore students' creative process with them. In my position as a learner support teacher, I often work with students for more than one year, though not necessarily consecutively. It would be helpful to see how my students change overtime if I have the opportunity to work with them again at a later point. Further research on students' learning journeys from being in a classroom where vulnerabilities of teachers and students are shared could help to develop a better understanding of the pedagogy of vulnerability and the role of reciprocity in the classroom.

## **6.4.2. Teacher Vulnerability**

Throughout my inquiry, I have been sharing my experiences with students and colleagues. Sharing my vulnerability has helped me become more empathetic of students' experiences. I needed to take risks myself in order to better understand what students might encounter. My experiences of going outside my comfort zone helped me become more appreciative of my students' learning processes. The reciprocity that I experienced with students helped me see the importance of teacher vulnerability. I would like to continue to explore teacher vulnerability in the classroom and its impact on student learning. I hope to share my learning journey with more teachers and learn other ways to be vulnerable with students to further my own learning. By sharing my inquiry, I hope to be in dialogue with others about different vulnerabilities in learning and the importance of showing vulnerability as a teacher. Further research on understanding possible ways in which teachers might share their vulnerability with students and its effects on student learning could lead to a better understanding of the role of teacher vulnerability. By sharing my experiences of opening up through my art engagement and being vulnerable with students, I hope to inspire teachers to share their vulnerabilities with students and welcome what emerges.

## **6.5. Final Thoughts**

My learning experiences in my art exploration became an important part of creating openings in my teaching. Throughout my inquiry, experiencing vulnerability in my own learning helped me open up to students and take more risks in my practice. I shared my own learning process with students which inspired new ways of teaching math. Experiencing vulnerabilities in my art exploration and sharing my experiences with students helped me build a more supportive learning environment for risk-taking in my classroom. By sharing my inquiry journey, I hope to inspire teachers to unfold their own learning with students by exploring their own experiences as learners and continue to pursue new learning opportunities to inform their practice.

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